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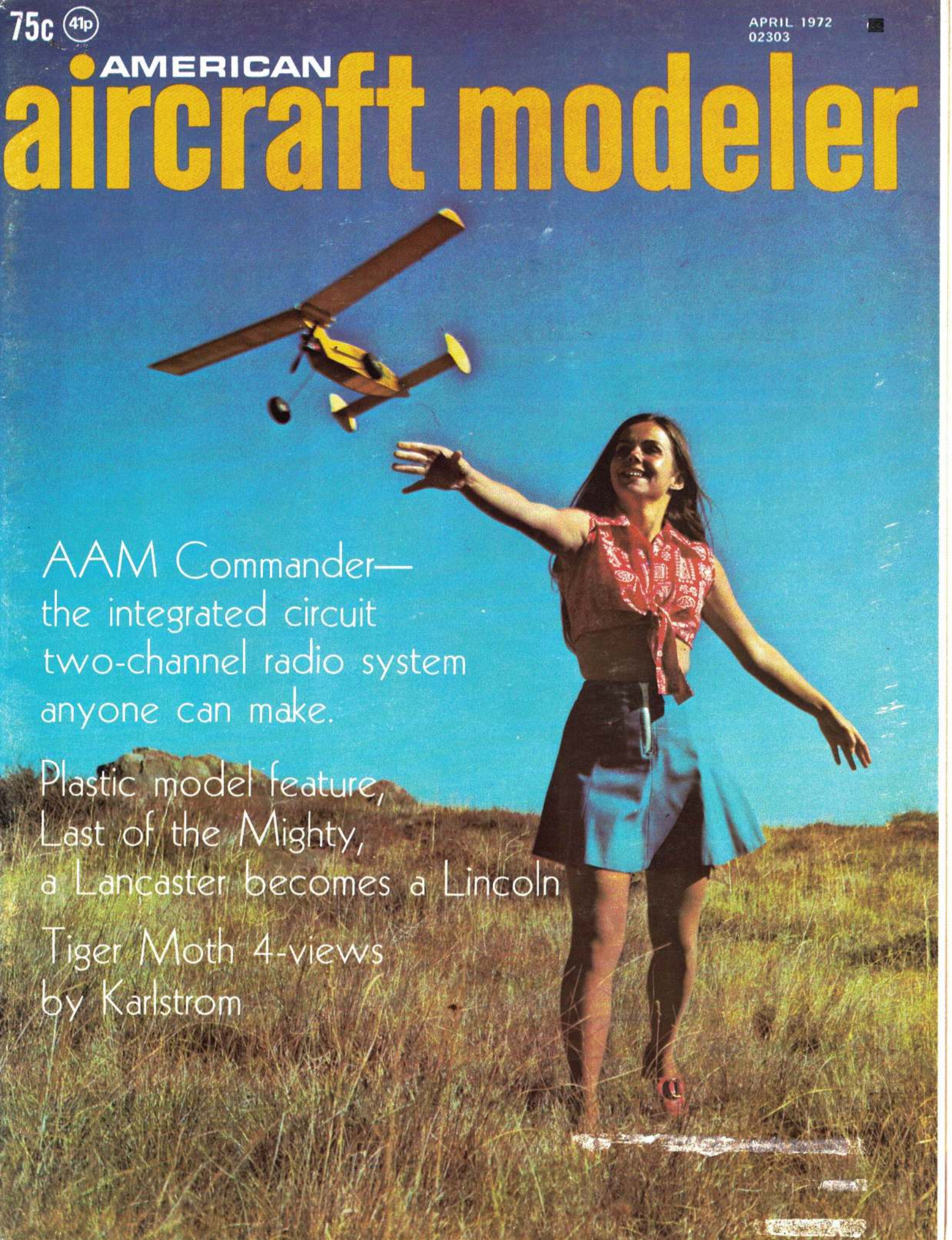

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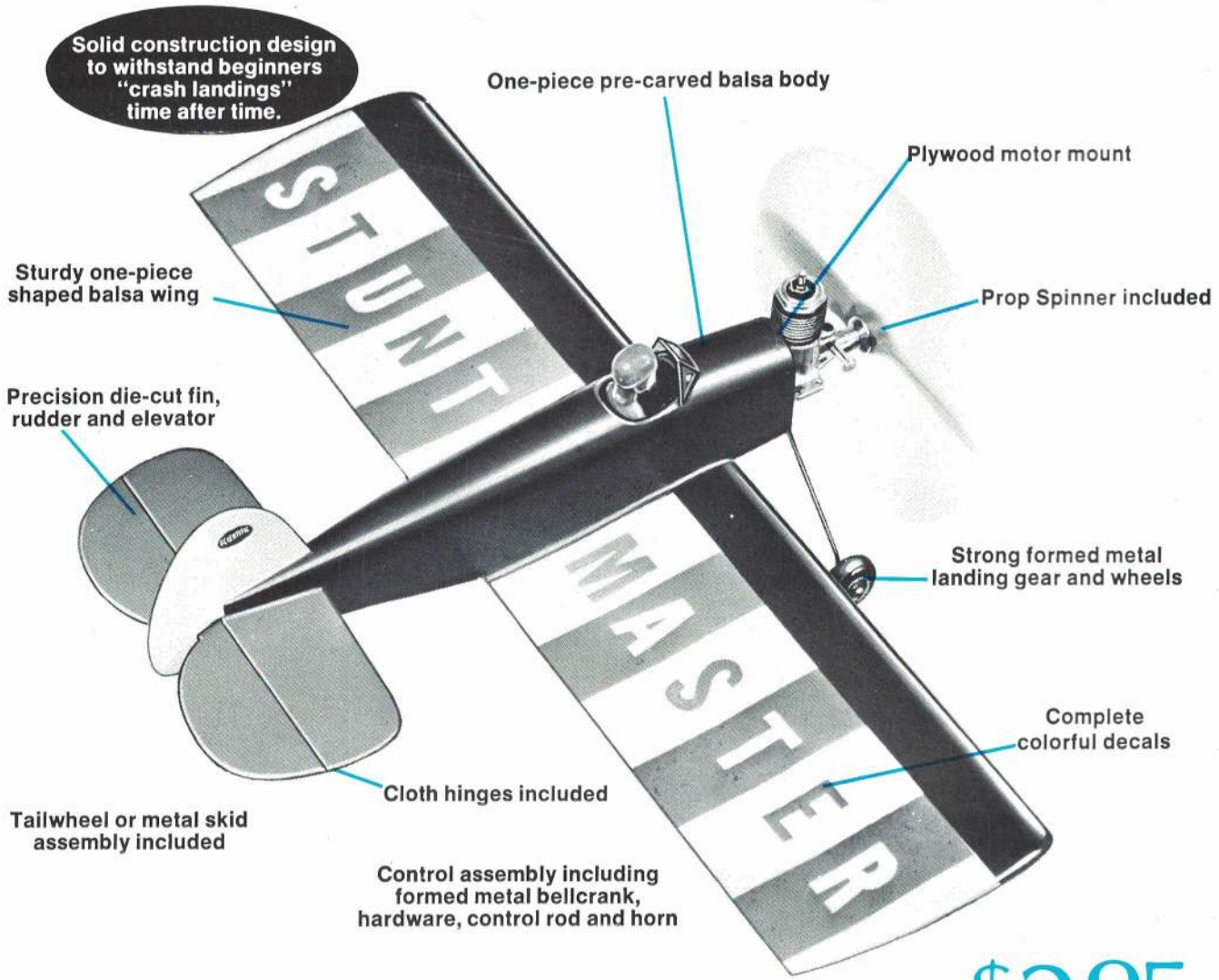

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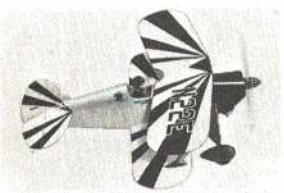

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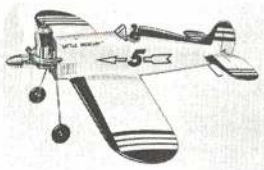

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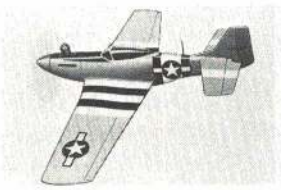

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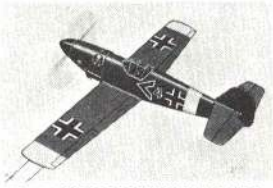

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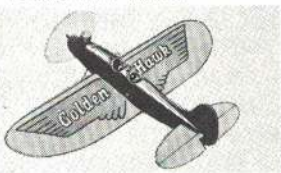

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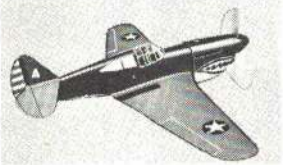

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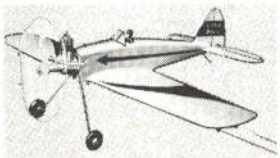

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Cover Photo: The sporty Quarter Pint gets an enthusiastic launch by Sandy Denson. Look to page 26 for this Tenderfoot feature model. Photo by author Paul Denson.

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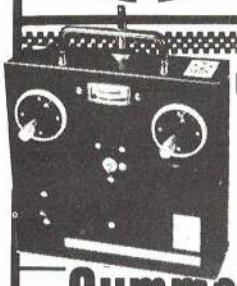

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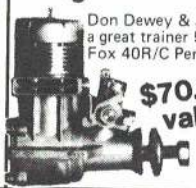

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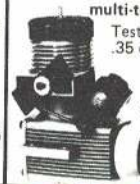

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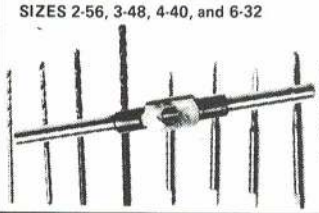

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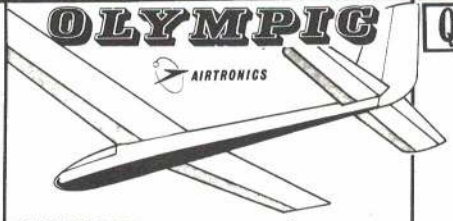

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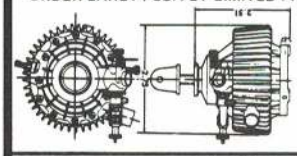

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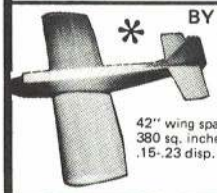

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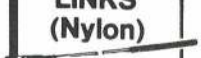

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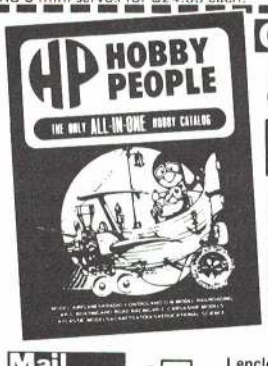

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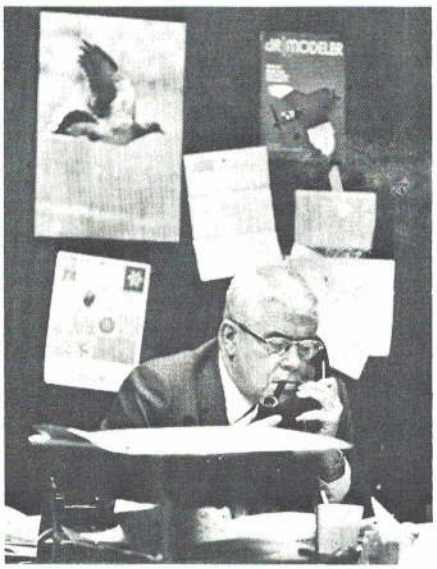
straight and level



CONSIDER THE LOWLY WORKSHOP. IS IT SERVANT OR MASTER? IT, RATHER THAN PLANES, MAY BE YOUR SECRET HOBBY.

Workshop. There must be one in your life too. What's it like? Small? Large? Clean, or we must ask, you understand, as messy as a weed patch? Have you ever wondered if you took up this hobby to build model airplanes, or to put screws and things in plastic boxes, to store balsa so it would not warp, to sweep up shavings, to scrape hard glue lumps off the workbench, to hang up tools in their proper places, to supervise the scrap box. You probably have a radio—with a disc jockey flying up a storm while you solder some joint with the help of a magnifying glass. Or a symphony vying with a jig saw. (The Skaters Waltz is ideal for a long sanding job!)

Long ago we stopped naming airplanes. It makes more sense, and will contribute to the rapport you have with the place you work, if instead you name the workshop. If you must keep track of the crates you build, scribble a number somewhere. There's an art in naming the workshop. The name must have character, and express your joy or suffering. The military comes to mind. Project North Pole describes one shop we had. Operation Dust Bowl, another. How about "The Pit?" Why not El Tyrant?

You gotta be organized to operate a workshop. But who could possibly write that direly needed book: How to Use a Workshop? So you think it is a place where you go to build airplanes and boats? Oh, no. It's got a personality, even if you haven't noticed it. It's sly, just maybe your master. And it has personality because of a condition known as "workshop syndrome."

Once we had the shop to end all workshops. Having built models in closets, attics and basements, on tables, workbenches and handy boards, in places where fingers were stiff with cold, or perspiration ran off the forehead like Victoria Falls, a moratorium was declared until there was at long last a civilized place to work. It took three weeks to build a room. Wide benches ran down two sides. There were enough shelves for a supermarket. Peg board on the walls, tools neatly hanging in place, electrical outlets along the fronts of both benches, shielded florescent fixtures overhead—and a door with a real lock! You don't build ROG's in a place like that, anymore than you'd collect gems in the high school auditorium. The super shop is a super challenge. Big crates, lots of balsa sheeting. Scraps, shavings and balsa dust to match the Mount Rushmorian scale.

Cause and effect, that's what it is. You keep hanging up tools, then save time by allowing them to lie on the bench. You put away wood constantly, then let it lie with the tools. A whisk broom to swish away chips? The hand seems quicker and better—until some porcupine shoots it full of used pins. So you form a pin posse with a magnet. Sweeping? Let it go until one day a week. Then it doesn't get done. How about when the crate is finished, then sweep and clean. That's a day's work postponed for months! The chips are nice to walk on! Then you drop a precious part. Do you go to the store for another or organize a search? So you divide the floor into a grid and call the family. Rob, you take squares one to four, Dave you take four to eight! So how about a ready-to-fly plane? Now you discover the shop has ESP. It whispers: "Use me, build something." There's this cuckoo clock kit downtown, wooden gears, gillions of little parts. Let's see now. One servo would run the cuckoo in and out. Oh, heck, it's Sunday. Let's go watch the guys fly. Seventy-three crates waiting to fly. And everyone came from some workshop. Boggles the mind, it does.

Howard G. McEntee, who as so many of you already know, passed away on January 13, commanded so much respect as a man, achieved so much in a quiet way, and contributed so much to the hobby we all enjoy, that one feels constrained to only a few humble words. To **AAM** readers of two generations he was an institution. From about 1950 on he prepared dozens of Blue Ribbon Reviews, created designs for planes and radio equipment, conducted the Radio Control section for many years, and lately was a main-stay contributor to "Where the Action Is." All this is but a fractional part of a long and illustrious career.

Howard, only just recently the overdue recipient of a Hall of Fame Award, was Mr. Radio Control. In the shaky days of radio, most hobbyists had used his equipment. When nothing else worked properly, one knew that a McEntee transmitter was dependable. It would be difficult indeed to recount all that he did in this field alone—and he was active in other related fields. He knew the frustrations of being a man far ahead of his time. As editor of *Model Airplane News* in the forties, he published many articles and designs on radio control. And that was before the FCC had even considered providing us frequencies. He pioneered pulse and proportional control. Howard was a crackerjack machinist and his projects frequently appeared in a wide range of science and electronic magazines. He was a "ham" whose call letters went back long before WW II.

His bit recently had been RC gliders—at which he excelled as always. He had a way with little models—tiny RC jobs, Jetex and CO-2. About 40 years ago he did a series of rubber-powered scale models for *MAN*—a Cessna, an SE-5 and, we believe, a Polish Fighter. The Cessna was a genuine classic which older hobbyists never fail to recall in any conversation. Always young-minded Howard was a dean of the oldtimers, yet contemporary as any young reader of **JAM**. His editorial career went back into the twenties, when he worked for Gernsback who published, among others, *Radio News*.

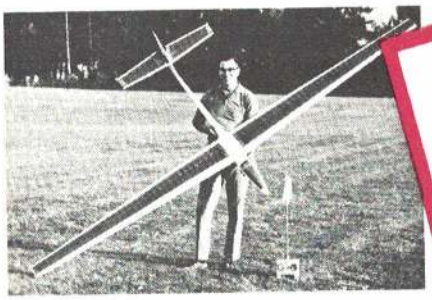
Unassuming, quiet, steadfast and immensely productive, Howard never had an unkind word for anyone, a quality which endeared him to countless friends all over the world, and commanded the respect of all who ever met him. The Memorial fund being established, to be applied to the advancement of things that interested him, is certainly fitting. But the memory of what he stood for will always remain green in the minds of those fortunate enough to have known him.

MONOKOTE* GETS LETTERS... LOTS AND LOTS OF LETTERS!

*T.M.

"I've never taken the opportunity to thank a manufacturer before, but I do want to express my opinion on your Super Monokote. I've just covered five new wings and stabs with it, and it is great!

Chuck Broadhurst
Sacramento, Calif.



The ship came in 250 ft. straight down in a radio failure and there was only a small tear on the derside of one panel.

Har
W

In these days of tising it's a rea into a product everything clai

I have not "silked" a Monokote became avail Monokote job was regular on an Antic, since then have covered 14 models of my own. 3 Bikes, 1 Tripe & 4 Kwik Fli were included in this total.

Don Johnson
Denver, Colorado

I've been showing it to everyone I know demonstrating how hard it is to damage and the ease with which it can be repaired. Believe me it's all the ad says and more.

Winston Hockenberry
Waterbury Center, Vt.

I have found that Super Monokote works easier than any other covering that I have ever used. Super Monokote surprised me at how smoothly it covers curved areas like wing tips.

Brian McAvoy
Greenock, Pa.

MONOKOTE IS THE GREATEST!! I've experimented with most of "them" and always go back to Monokote.

Dan Rhoads
Newington, Conn.

Being a litt
mem

position
the most

ene Rubel
Torrance, Calif.

It's the prettiest finish I've ever had.

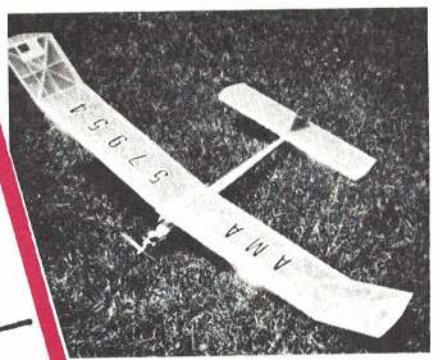
Dr. Walter Good
Bethesda, Md.

Even Naomi, my wife, loves Monokote because it is odorless, and also I have been able to stop getting paint all over my clothes. I am sold on this item and intend to trade in all of my paint brushes for a new "iron."

Donald Rothbaum
Silver Spring, Maryland

I'm a fairly new modeler and thought Monokote was too expensive until I saw your ads comparing Silk & Dope costs to Monokote. I tried Monokote . . . and you're right—Monokote's cheaper than Silk & Dope, and holds better too!

Marc Hoit
Michigan City, Ind.



ired the damage and recovvith a fresh section of transSuper Monokote. Only a eye would ever spot the The good old days of and wait, then steam it again to make adjustgone forever if Super is used.

Richard A. Lape
Dewitt, Mich.

THESE ARE JUST A FEW OF THE MANY, MANY LETTERS WE RECEIVE EACH MONTH ABOUT SUPER MONOKOTE. TAKE A TIP FROM OUR USERS — SUPER MONOKOTE WILL CUT YOUR COVERING TIME TO A FRACTION AND IT'S MORE ECONOMICAL THAN THE OLD SILK AND DOPE METHOD. IT'S BEEN PROVEN . . . MONOKOTING GETS YOU FLYING, FASTER!

*Pat. No. 3,388,651

modeler mail

More literature on rigid airships

The book, *The Millionth Chance*, Prof. Caxton C. Foster mentions in his letter (February 1972 AAM) was written by James Leasor and published by Reynal & Co., Inc. in 1957. It was printed by Stratford Press, Inc. of New York.

The History of Airships by Basil Clarke, published by St. Martin's Press in 1961, devotes a chapter to the R-100 and 101 and includes profile and cross-section sketches of R-101. For general airship information, I would also mention *Ships in the Sky*, by John Toland, published in 1957 by Henry Holt & Co., New York, and *Graf Zeppelin*, written by J. Gordon Vaeth and published in 1958 by Harper & Co. Copies of *The Aircraft Yearbook* for the early 1930's, if you can find them, are excellent sources, as are some old issues of *The London Illustrated News* and *The National Geographic*. *The National Geographic* of January, 1925, for example, contains some 40 photographs and cutaway sketches of the "Shenandoah."

I am grateful to Prof. Foster for his precise mathematics. As a mathematical moron, I have been operating on a hunch that available lift would be a major probelm in construction of a rigid airship model. (It was, in fact, a problem with the original R-101, which had to be chopped in half and extended to provide more lift.) Apart from the weight of engines and RC equipment, I believe it would be necessary to compartment the model or employ interior gas containers to keep the lift evenly distributed in flight. Even with barn-door control surfaces, I would imagine control would be a headache on anything but an absolutely windless day.

Certainly the rigid airship is a temptation to the model builder. As a boy, I used to rush into the street to stare up at those magnificent ships and I can testify that nothing more beautiful has ever flown.

Allen R. Dodd, Jr., Thomaston, Maine

Praise for "Pay-Up"

Nice to see the "Pay-Up" payload job in the January issue—author Bill Tracy and others who built the ship hoped to enter the Nats Payload Event sponsored (for the fifth time running) by the National Free Flight Society at the Glenview Nats. It is an unofficial event.

Dave Linstrum, Hanover Park, Ill.

Aviation movie aficionado

I am a modeler, aviation buff, and lover of motion pictures. I am combining these interests by doing research on the history of aviation motion pictures. I am wondering if any of your readers would be kind enough to write me if they know where any information of this type can be obtained.

Stephen Pendo, 91 Tremont St., Barre, Vt. 05641

Old-Time Cardinal

Your article in the February 1972 issue entitled "Cardinal," written by Dan Santich, brought to mind another model of the same name which was designed by Maxwell B. Bassett and kitted by Megow Models at least 25 or 30 years ago. This old-timer is a nice little cabin job with a 48½-in. wingspan and 29½-in. length. I am sure there are many of us who would appreciate AAM printing the plans to Bassett's Cardinal and other oldies.

Robert P. Greiner, Rockville, Md.

Thoughts on power sources

"Straight and Level" for February 1972 was a good one. However, in the musty recesses of my mind, a special "boing" sounded forth. Springs? We've had 'em in my time.

The December, 1942 issue of *Air Trails Magazine* carried an advertisement for the "SKY-KOIL 32!" Manufactured by Rokwell Industries in St. Louis, it weighed less than 1¾ oz., and gave 200 turns to the propeller. Appeared to have had a 4-1 (or so) gear box on the business end. Price, ready to install—$1.29. (Remember, 1942 and we college students couldn't afford a $1.00 kit just any old month.)

As an engineer devoted to the application of energy for various purposes, I looked again at both springs and rubber as power sources. It appears that our search for performance killed off the spring drive! Consider the following: A superb spring of fine steel wire, properly formed, heat treated and stress relieved, can store approximately 130 ft.-lb. of energy per zone of spring active weight. Lubricated and wound rubber strands will store about 270 ft.-lb. per zone of active rubber. The parasitic weight for holding the spring will further handicap the metal power source. Gears are mandatory on spring drive, as is a spring guide to keep it properly aligned. Neither of these are a necessity on a rubber motor.

Therefore, while a spring drive is certainly possible, the results are likely to be disappointing. (An easy way to find out is the 1937 test technique of making a rubber motor in two halves separated by a ring. A pin through the fuselage and the ring will inactivate half of the motor without affecting CG. This yields appropriate torque, but reduced duration. It will closely approximate a spring drive of equal weight if some weight is added further to simulate guider and gears.

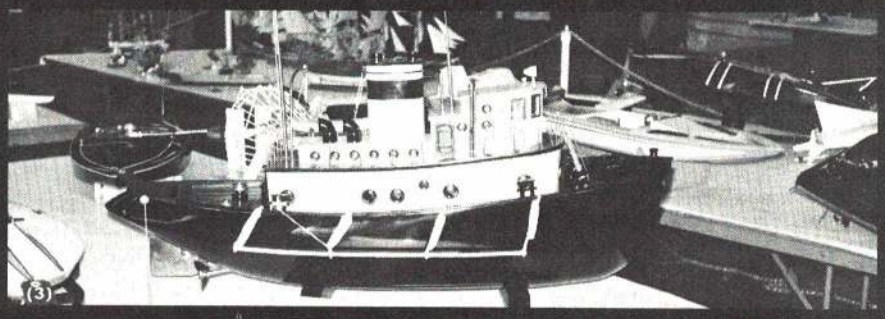
Some parting shots on my way back to a private belfry: Parachutes were tested in man-carrying tests in 1884. . . .The basic description of dynamic soaring was written clearly in 1881. . . .If the exponential law of reinvention holds true, the spring will arise—and rightly so—in 1977 for consideration as a power source.

Thanks for a fine magazine and for your appreciation of "the modeler's" desires.

W. L. Kincheloe, Monte Sereno, Calif.

ON THE SCENE


(1)


(3)


(2)


(4)

(1) TORK member Doug Banks helps brother Don, while Steve Coffman, Alan Czolowski and Chuck Hardy cut and paste their way to building a Delta Dart. (2) Here is one of the Czolowski boys with a model that started out as a Delta Dart and ended up as a P-38. Watch for this rubber-powered model in a forthcoming issue. (3) An indication of the growing interest in RC boating was the wide range of RC boats entered. Terry Allen won first place with this tugboat as the Best Radio Control Boat. (4) This realistic P-51 is an RC model that typifies the quality of models on display at the Oklahoma Model Hobby Fair.

THIRD SOUTHWEST MODEL HOBBY FAIR—A FAMILY AFFAIR

by JOE WRIGHT

It was 9:00 a.m. on a dreary Saturday morning with manufacturers' exhibitors running around making last minute preparations for the Third Annual Southwest Model Hobby Fair in Oklahoma City. The schedule said that the gates were to open to the general public at noon. However, people started pouring in at 9:15 and didn't stop till the show closed Sunday afternoon. This was indicative of the whole show. The sponsors optimistically predicted a crowd of 3500. When it was all over more than 5500 people had paid to see the Fair.

The Oklahoma Science and Arts Foundation, sponsors of the show, tried to make the show appealing to the general public rather than just to us mad fanatical modelers. An entire room was set aside for films—two of the most impressive concerning the operation of railroads. Another room was devoted to a swap shop—one of the most active areas. One hundred and fifty modelers from Texas, Oklahoma, Kansas and Arkansas entered nearly 500 models in the static award competition. Of these 500, almost half were in the Junior (age 12 and under) category. The models included planes, boats, cars, trains, rockets, and a couple of weird flying saucers. Manufacturers' representatives vied with modelers to demonstrate their models. At almost any given moment the buzzing of airplanes and the squealing of tires in the RC car pit could be heard.

A real eye-catching exhibit was the scale scenic railroad. This display ran for the whole show and I noticed more than one father with itchy fingers. I wonder how many boys in Oklahoma City got trains for Christmas this year?

Of course the reason why all the models were there was to win prizes and the contestants were not disappointed. Awards were plentiful, with 50 given for craftmanship plus a Best in Show trophy. The Oklahoma Radio Kontrol Society (Torks) donated the trophies for all RC categories.

We were just in time at the show to display our new magazine **JUNIOR AMERICAN MODELER.** Bright and early Saturday morning, armed with glue, pins, cardboard and 1000 Delta Darts, I waited for the gates to open at noon. I was going to run a workshop with two or three boys and girls at a time. After all, I thought, kids don't want to spend an hour putting together a model when they could be elsewhere looking at all the exhibits. This is what I thought at 9:00. At 10:00 a.m. I thought I was going to run out of Delta Darts by noon. The response was fantastic. It started out with four kids at one table and ended up with eight kids at two tables and another four building on the floor. There was no particular age group in evidence. I saw a five-year-old boy who couldn't read building his plane by watching the girl next to him. At the same table there was a 35-year-old "kid" getting instructions from his 12-year-old son on such foreign words as "dihedral." By closing time on Sunday we had put together over 900 Delta Darts. I saw only one that did not fly and that was because, in the excitement, the boy sat on it. The simple rubber-powered plane teaches the modeler much of what he has to know to build the bigger models. One of the Czolowski boys, a member of the American organization for the old Polish Air Force, wondered how he could improve on the Delta Dart. By putting our heads together you can see what we came up with—a rubber-powered P-38 that really flies.

Potomac Aviation was at the show to commercialize on our new magazine, *but*, at the same time, we were very much interested in boys and girls and their "experiences." We know that modeling is a good hobby and if your parents understand this, then more kids will have good experiences. The show ended on a happy note with many awards and door prizes. The show was judged as a success by the sponsors and I must agree. It was a show that was of interest to the whole family.

CARL GOLDBERG

THE BEST ACCESSORIES YOU CAN BUY!

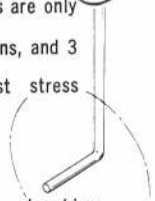
PROVEN IN PERFORMANCE

USED BY THE EXPERTS!

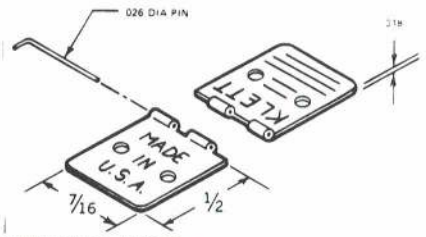
NEW! CG RETRACT GEAR

FORGET THE LOW PRICE. When you want dependable retract performance, find out why the leaders use CG Retracts. People like Terry Prather (current FAI record 1:48), Jack Stafford, Nick Ziroli, Pete Reed, Garry Korpi, Bud Atkinson, and many others use Carl Goldberg Retracts.

LOWEST PROFILE—Main Gears are only 1" high.
LIGHTEST—Nose Gear, 2 Mains, and 3 Struts, only 6 oz.
BROADEST BASED for best stress distribution.



TOUGH—Rugged vibration absorbing nylon moldings. Large bearing surfaces.
SHORTEST TANK COMPARTMENT—Nose Gear needs only 5½" to 6".
SIMPLEST—Main Gear has only 3 molded parts.
EASY—Installation or Strut Removal. Low actuating force—one retract servo can easily actuate all three units.
Pair of Main Gear Retracts—**$ 9.95**
Set of Nose Gear & 2 Mains—**$19.95**



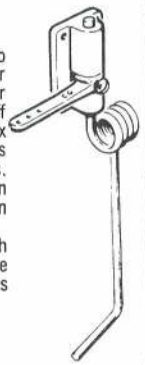
KLETT NYLON HINGES—THE NEW BREAKTHROUGH
Designed and Manufactured by Roy Klett, Originator of the World-Famous RK Hinges!
An exclusive with Carl Goldberg, here is an extremely strong smaller hinge constructed with exceptional care and attention to detail. So thin that all you need is a knife slit. Top quality, yet only cost **$1.95** for 15 and **$1.10** for 7.

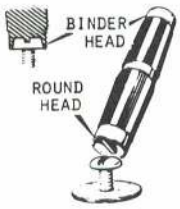
UNIQUE SNAP-LINK! Patent Pending. Now for the first time—you can buy a truly safe link—the SNAP-Link! Note these features:

- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patent Pending!
- One-piece design—no separate pieces that might come apart.
- Proven tough nylon molding—takes tremendous stress, prevents metal electrical noise.
- Self-friction fit on threads—no need of a nut to prevent change of adjustment or vibration wear on threads.

When you want a SAFE link . . . ask for SNAP-LINK!
Snap-Link, Regular, with rod
Mini-Snap-Link, with rod } **29¢** each
Snap-Link or Mini-Snap, less rod
2 for **40¢**

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, 3/32" plated music wire strut, extra collar, blind nuts, screws and washers—**$2.50**.





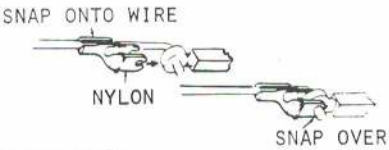
NOW from Roy Klett the NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD—CAN'T SLIP OFF AND DAMAGE YOUR WING!
One end takes Round Head Screws, other end takes Binder Head.
KLETT SAFETY DRIVER
Large for ¼" Nylon Screws
Small for #10 Nylon Screws } **98¢** each.

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—**$3.50**
R/C Fittings Set No. 2 for ship with strip ailerons—**$3.50**

NYLON BEARING
One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers—**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 or short horns, with screws—**50¢** for 2.

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—**50¢** for 2.

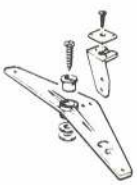


SNAP'R KEEPER
Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 3/64 to 5/64" diameter—**50¢** for 4.

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

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., **$8.95**.

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.—**50¢**. ¾" wide x 5 ft.—**25¢**.



½A BELLCRANK and HORN
Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too —**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 3/16—**30¢** for 10; #4 x 3/8—**30¢** for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 35¢ per item (75¢ outside U.S.). Minimum order $1.

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

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I am sending 20¢ for 8 pg. Illustrated Catalog with, "Recommendations in Starting in R/C," Basic Explanation of R/C Equipment and Radio Control Definitions.

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CARL GOLDBERG MODELS INC.
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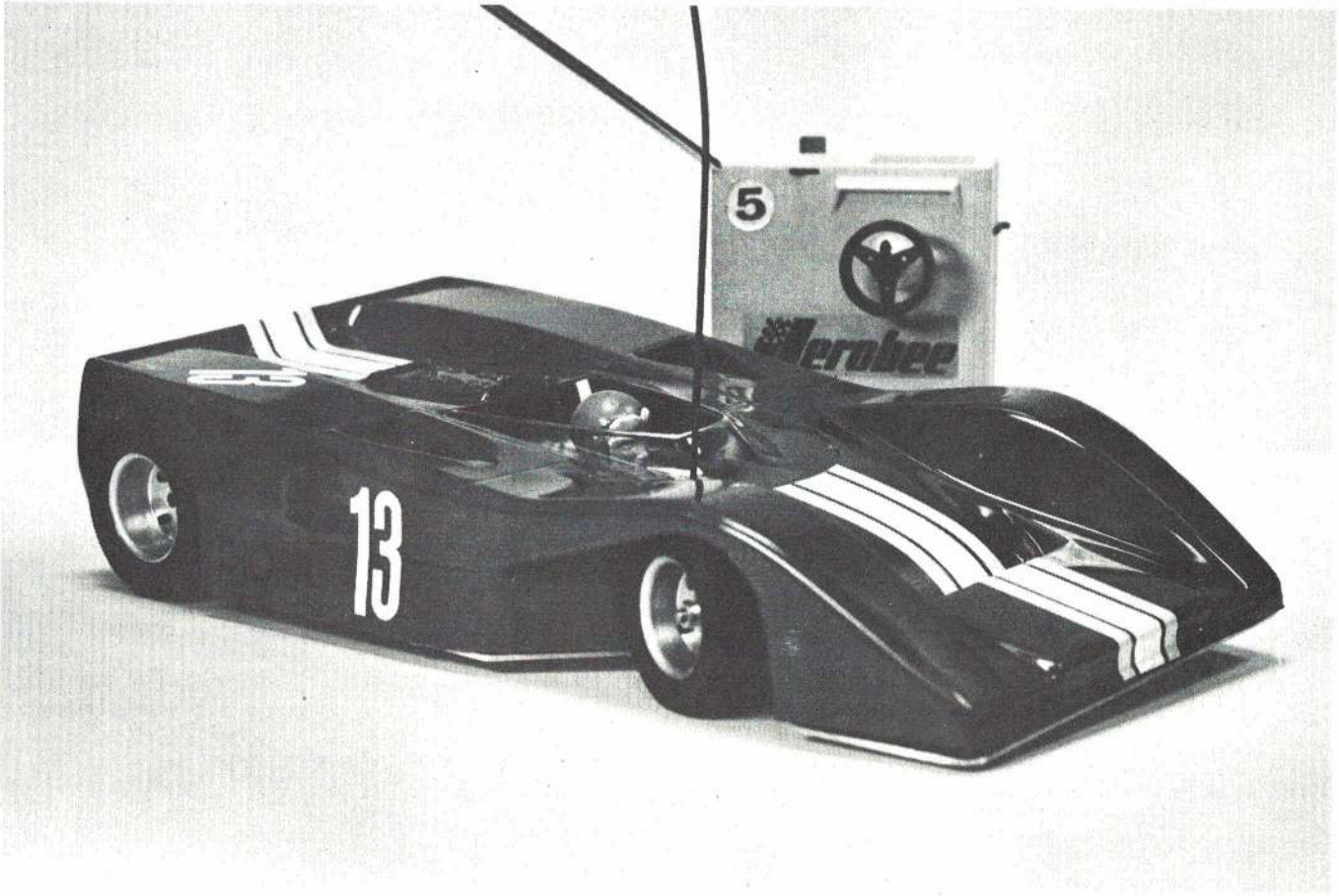
Blue Ribbon Review

1971 ROAR NATS WINNING CAR,
THORP McLAREN IS DRIVEN WITH THE 100mw JEROBEE RADIO.



by WENDEL GREEN

The Thorp RC Car is a pure racing machine without frills, without gimmicks. The car is built by John Thorp, who machines the parts, builds the car and races it. It is produced like a racing machine, each part machined and matched; not stamped out by giant automated cookie cutters.

When the box containing the Thorp RC Car kit is opened, the first thing obvious is the large chassis pan. This is a piece of 6061-T6 alum. 0.10 thick with tapped holes, machined slots and smooth edges. Contained in a number of plastic bags are a clutch assembly, the front suspension assembly, the rear axle blocks and ball bearings, and a multitude of socket head cap screws.

The kit contains everything you need except a Veco 19 engine, a radio, a few tools and some paint. Thorp holds exclusive rights for packaging Velcro as a body mount from the holder of patent No. 3,464,153; R. W. Small.

The rear tires that came with the car tested were the capped tires like those Mr. Thorp used while winning the 1971 ROAR Nationals. The tires packaged with the kits being shipped after January 1, 1972 are of uncapped sponge.

The kit instructions are not elaborate, but are clear and concise. The specific assembly details will not be repeated here. However, some comments are in order.

The first is: Do not force anything machined to close tolerances. If a part won't fit, read the instructions again because something has been done wrong. It cannot be emphasized enough that this is a racing machine, and like all racing machines of all scales, including one to one, the difference between great and mediocre is only a small amount of careful attention to detail.

The instructions specify removal of the casting flashes from the front bearing housing of the Veco 19. This must be done with care. Take off too little and a front engine bearing gets wiped out; take off too much and the mount will not hold the engine snug. It is also important to match the numbers stamped on the top and bottom of the front engine mount.

During initial assembly, do not snug everything down tight. Measure the entire car (except for radio installation) and get a straight edge, a small draftsman's triangle and a good rule and set up the car accurately. Scribe a centerline on the chassis. Make sure both rear wheels are the same distance from the centerline. Make sure the front wheels (dead ahead position) are also equally distant from the centerline. Use a triangle to ensure that the kingpins are vertical. When all of this is completed, employ Loctite to tighten everything except the motor mounts.

(Continued on page 66)

$12. SUPER DETAILED WORLD WAR 2 3/4" SCALE FIGHTERS AND DIVE BOMBERS

(USE .049 TO .09 ENGINES)

KIT 1001
REPUBLIC P47-D THUNDERBOLT
30¾" wing span

KIT 1003
DOUGLAS SBD-3 DAUNTLESS
31¼" wing span

KIT 1002
GERMAN JUNKERS
JU-878 STUKA
34¼" wing span

KIT 1004
VOUGHT F4U-4 CORSAIR
30¾" wing span

GUILLOW
OFFERS THE FINEST SCALE MODEL KITS

All models are ideal for gas or rubber powered free flight. The ten World War 2 models can also be flown by control line. Each of these ten kits contains a bell-crank, control horn, pushrod, control handle and Dacron flying lines.

$7. FABULOUS WORLD WAR 2 3/4" SCALE DETAILED MODELS

(USE .020 TO .07 ENGINES)

KIT 402
NO. AMERICAN
P-51 MUSTANG
27¾" wing span

KIT 406
FOCKE-WULF FW 190
25¾" wing span

KIT 403
SUPERMARINE
SPITFIRE
27⅝" wing span

KIT 401
MESSERSCHMITT BF 109
24⅜" wing span

KIT 404
MITSUBISHI ZERO
27⅝" wing span

KIT 405
CURTISS P-40 WARHAWK
28" wing span

$5. DRAMATIC 1914-1918 AUTHENTIC SCALE WAR BIRDS

(USE .020 ENGINE)

KIT 204
FOKKER TRIPLANE
20" wing span

KIT 201
THOMAS MORSE
SCOUT
24" wing span

KIT 202
BRITISH SE5A
24" wing span

KIT 205
DeHAVILLAND 4
27" wing span

KIT 203
NIEUPORT 11
24" wing span

KIT 206
RUMPLER C-5
24" wing span

$3. POPULAR LIGHT PLANES... LOOK AND FLY LIKE ORIGINALS

(USE .020 ENGINE)

KIT 301
AERONCA CHAMPION 85
24" wing span

KIT 302
CESSNA 170
24" wing span

KIT 308
BEECHCRAFT
MUSKETEER
20" wing span

KIT 307
PIPER
CHEROKEE 140
20" wing span

KIT 303
PIPER SUPER CUB 95
24" wing span

KIT 309
CESSNA 150
24" wing span

PAUL K. GUILLOW, INC.
Dept. A5, WAKEFIELD, MASS. 01880

See your local hobby kit outlet for these and all Guillow kits — check Yellow Pages under "HOBBIES". If none nearby, send direct to factory adding $1.00 packing and postage in U.S.A. $1.50 outside U.S.A. Send 10¢ for listing of Guillow kits

Carl says, "If we don't have it, you really don't need it!"

ENGINES

1—OS 35 RC, $24.50, stacked to ceiling. Plenty. Sale. $16.66
2—OS - 50RC, $42.98 Net. $30.00
3—New OS 10RC, $14.98. You pay: $10.00
4—OS Wankle, $87.50. Sale. $65.55
5—Webra 61RC, BH, $93.00. Sale. $62.22
6—Webra 40RC, Blackhead, $63.40. Sale. $44.44
7—Webra 201 RC, $28.98. Sale. Special. $21.00
8—ST 60RC SR lightweight 60, $46.98 retail. Net. $38.00
9—ST 46RC, $29.98. Sale. $23.33
10—ST, 40RC, ABC, $45.00. Yours for: $32.00
11—Enya 09RC, $14.95. Yours for: $11.00
12—Enya 15RC, $16.50. Yours for: $12.00
13—Enya 19RC, $18.98. You pay: $14.00
14—McCoy 19RC, $14.95. Net to you. $10.00
15—McCoy 29RC, $15.96. Sale. $11.00
16—McCoy 40RC, $17.95. Sale. $12.50
17—USED FOX 19 workhouse engine. Sale. $7.50
18—Fox 35, $16.95. You pay: $12.00
19—Merco 49RC, $44.95. Sale. $33.33
20—For engine collector, 6 assorted ignition antique engines $100.00
21—Dubro sportsman and Veco 61RC, combo special, $125.00 value. Net. $85.00
22—Testors #4900 Cosmic Wind UC/o49 engine, list $12.95, net $9.50—#4901, $14.95. Sale. $11.00
23—K&B 40RC, rear and front rotary, $35.00 Net. $23.95
24—Tatone No. 030454 custom engine mt for RR 40RC (K&B), $4.95 net. Sale. $3.25
25—Black Ross 60RC, twin, $145.00. Sale. $125.00

KITS

101—Du-Bro Seabird CLOSEOUT. Sale. Special! $40.00
102—Final new prices on Dubro Skymaster & Sportsman 600 as of 1972. $40.00
103—Dubro Cherokee Arrow, list $39.95. Sale. $27.00
104—Dubro Aero Commander, $39.95 kit. Sale. $24.00
105—Topflite P-51 Scale Mustang Kits, all you want, $39.95 List. Sale. $30.00
106—Skylark 56" kit, low wing RC trainer. $17.50
107—Kwik Fli-III kit, list $39.95. TF Sale. $26.50
108—SE5A-TF Kit, $44.50 list. Sale. $28.50
109—Sig Clipped Wing Cub J-3 kit. Net $18.00
110—Sig Citabria Kit, $32.95 Net. $26.00
111—Sig Zlin Akrobat kit. $39.95 Sale. $32.00
112—T-34 Mentor Sig kit. $36.95 Sale. $29.50
113—Sig Ryan STA Special kit, net. Sale. $40.00
114—Yak-18P Sig. kit, list $49.95. Sale. $40.00
115—Piper J-3-72" kit, Sig Mfg. Co. — 2" Scale. Sale. $18.44
116—VK Nieuport Bipe $44.95. Sale. $28.88
117—VK Fokker Triplane, $47.50. Sale. $34.00
118—Special VK Cherokee Babe, $27.95 kit. Sale. $18.00
119—Navaho VK kit, $39.95. Sale. $27.50
120—J. Stafford Chipmunk kit, $45.95. Net. $35.00
121—J. Stafford Minnow or Super Midget scale Pylon kit, $39.95. Sale. You pay: $30.00
122—Midwest Trisquire, $16.95 kit. **Sale. $11.50**
123—Midwest Flea Fli — 10, kit. Sale. $16.00
124—Midwest Super Snifer FF, $8.95 kit. Sale. $6.50
125—Sterling P-51 Mustang, $39.95 Net. $30.00
126—Sterling Ringmaster, $7.95 kit. Sale. $6.00
127—Lancer Kit. Net. $19.50
128—Berkeley navion, kit, 68" wingspan, super scale, 2" 1". Sale. $75.00
129—Berkeley Buster 48" Scale. Net. $12.00
130—Berkeley Super 15 Privateer kit. Sale. $10.00
131—Guillow P-47D, $11.95 kit. Sale. $8.00
132—CG Falcon, 56 RC, $18.95. Sale. $14.00
133—Royal Products P-38. $69.95 Sale. $57.50
134—DeBolt World Champion Perigee —pattern kit. Rare. Sale. $30.00
135—J&J Eyeball kit, $59.59. Sale. $48.00
136—Scale Joy Jenny kit, WW-1 Bipe. Sale. $40.00
137—Groupner, Middle Stik, Retail $66.95. Sale. $45.00
138—Buzzard Bombshell, old time FF, $19.95. Net. $17.00
139—CG Skylane 62, $34.95. Sale. $26.66

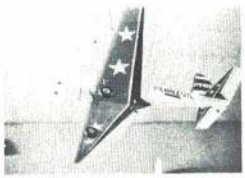
RC GEAR NEW

201—MRC710, 5 channel, on 72MC, retail $340.00. Sale. $250.00
202—MRC710, 5 channel, on 27 MC, retail $320.00. Sale. $235.00
203—MRC713, 3 channel, with two #2 servos, $180.00. Sale. $144.00
204—Orbit Hawk 3 channel for gliders with 2 NEW servos, pak and channel $219.95. Net. $140.00
205—Extra servo for Hawk, list $40.00. Sale. $32.00
206—Blue Max, 4 channel, 2 stick with 4 s4a servos, built, $300.00. Sale. $195.00
207—New OS, 3 channel, 3 servos, nicad pak & charger, $179.95 Special Sale. $133.00
208—New 1971, OS-2 Channel, complete with Airborne nicad pak & Chn., retail $139.95. Sale. $100.00
209—New EK Logictrol 2 Channel set, list $119.95. Sale. $88.00
210—EK Regular 5 channel 2 stick, 27MC or 72MC. Sale. $280.00
211—Extra servo, EK, list $40.00. Net. $32.00

BUILT-UP AIRPLANES

301—Jack Stafford Midget Mustang. New. $100.00

302—Chipmunk, built-up, new. $150.00



303—Commanche, built-up, with flaps. $150.00

304—Original Eindecker E-111, 60" **wing, all red silked**, black crosses, Veco 35RC. $85.00

305—All new, beautiful Fleet Bipe for 60RC, blue and yellow, silk finish, with 5 cyl. dummy motor. $150.00

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306—Bristol Bullet, built-up, deluxe, WW-I, Bipe. $300.00

307—64" Aero 150 for 60RC, fiber glass fuselage, foam sheeted wing, new. $100.00

308—DeBolt Colera, hobby paxi finish, very clean. $125.00

309—J. Stafford scale ercoupe, deluxe, very clean, professional workmanship. $200.00

310—Built-up scale Sterling Nieuport Bipe for u-control with McCoy engine. $35.00
311—TF SE 5A WW-1 Bipe all new, brown and tan, average finish, silked. $100.00
312—Majow Model Saulner WW-I Monoplane, very clean, silked, rods, wheels, sharp. Hobby Poxi finish. $95.00
313—Miss Bikini, low wing sport plane, high gloss finish, white and blue trim, silked and very clean. $75.00

314—VK Nieuport Bipe, built-up, all white, light cream and silver trim. WW-1. $100.00

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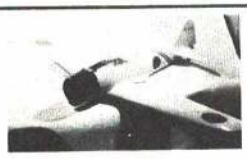
315—Airomaster Bipe, wheels, rods, monocoated white and trim. Very clean. Sale. $125.00
316—Original Striker, wheel brakes, rods, Poxi finish. $175.00
317—CG Skylane 62" for 35-45 engine, no ailerons, all yellow with red trim, silked & new. $75.00

318—2" scale Tony with merco 60 plus retracks and flaps. **$195.00**

320—Qwik Fli-III with retractable gear, tapered wing. $125.00



321—Wing Mfg. Co., Zero with retract gear, new. $175.00

322—Very deluxe TF, P-51, flaps, rods, wheels, spinner. $250.00

323—Sea Fury, built by Dave Plate, flaps, retract gear, folding wings, very scale finish. $400.00

324—Very high gloss finish, olive drab and light blue, TF, P-51B, fibre glass finish, fillets and bottom cowl. $325.00

325—Built-up and ready to fly, CG Shoestring, with Johnson Combat Special 35RC, rods installed. Sale. $75.00

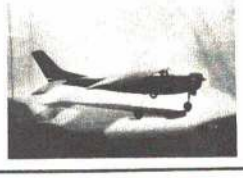
319—Deluxe Sopwith pup scale, WW-I Bipe, very new, detailed, $500.00 labor. Sale. $250.00

326—All Lanier Kits in stock at lowest prices.

327—Beautiful, original built Fokker D-8, 60" wing span, camouflage and detail, machine guns, ailerons, WW-I, scale. $200.00

328—Cessna Skylane 62, silked. Ailerons. $95.00
329—Breezy Sr., very clean and silked. $60.00
330—Nelson Quick Silver, low wing, steerable nose gear, a good small stunt ship. $75.00
331—Shoestring scale pylon racer for KB40 side mount, very deluxe, silked, yellow & black trim. $135.00

332—Deluxe C-Goldberg, Skylane 62, ailerons, flaps, OS, 50RC, scale shock, steerable nose gear, a very stable flyer. $225.00



333—Major Model Saulner, been flown. $50.00

334—Andrews Trainermaster, silked, neat and built right. $140.00

335—Major Model Saulner, ailerons. WW-1. Stable. Good Trainer. $70.00

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337—Berkeley Rudderbug, 62" for 19RC, silked. $40.00
338—Groupner Viking, 60", low wing, new, silked and new. $40.00
339—Veco Explorer cabin type trainer, fuselage, rudder and elevator. Only $35.00
340—Dragon Fli, been flown, manscoated, wheels, rods trimmed. $80.00
341—Sterling, built-up SE-5 Bipe with OS-30RC installed, WW-I colors, wheels, rods. $80.00
342—VK, Nieuport Bipe, silked, above average, silver, very clean. $145.00
343—CG, Shoestring, just built, yellow and orange, very clean. $125.00
344—Original Class II, pylon racer, very nice, 600 sq. in. for 40 engine. $100.00
345—DeBolt Cobra, built-up, silked, for 60RC. Sale. $125.00
346—Sterling, very, very nice, camouflaged spitfire for 60RC. Deluxe. Built-up, silked & very clean. $200.00
347—Deluxe, hand-built P-51 with retractable landing gear, with Dave Platt finish, Perfect Scale, Mounts for 60RC engine. $225.00
348—Consolidated Spirit, high wing rainer, 54" wing for 19 - 25 engine, very clean, silked. $65.00
349—Sterling Wizard Bipe, a good sport biplane, clean, about 62". Sale. $80.00

350—NEW Topflite P-51-B, Enya 45RC, EK 6-Ch, 5 servos, flaps, ailerons, all new, all installed, wheels, just gas up and fly. Sale. $550.00

351—Built-up Tiger Moth Biplane 58" with new Enya 35RC. $125.00
352—Williams Brothers La Jollita for 40RC, very clean. $125.00
353—Built-up TF Tauri trainer, ailerons. Sale. $55.00
354—Absolutely immaculate Falcon 56, silked, scalelike paint finish. $100.00

USED RADIO GEAR—PROPORTIONAL
401—Used, very clean, like new Heathkit, GDA, S7-1, 3 channel with 3 KFS, #9 servos, complete working set. $95.00

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402—C'Ship 5 Channel with 4 plastic case servos, working on 26:995-MC, very clean complete set. $160.00

403—C'Ship, 5 channel on 72:400MC, with 4 servos, like new working set. $155.00

404—5 Channel, EK, single stick, working. $150.00

405—Orbit, 4 channel Annlog, 2 servos, no batteries, TX, REC., parts. $40.00

406—EK, 5 channel with 4 servos, complete working set, all mounted in a Red Dragon Fli, rods, wheels. Yours for: $250.00

407—Bonner Digimite, 4 channel set with 4 servos, needs servicing. $100.00

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410—4 channel digitrio, 4 servos, dual charger. $140.00

411—MRC, 5 channel, on 72,400, clean, complete, working, like new. $180.00

412—Bonner Digimite, 4 channel, 4 servos, working, clean. $145.00

413—3 channel Sankyo Digital, 3 servos, needs servicing. $70.00

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502—F&M, 10 channel Matador, TX & Rec., 5 transmites, nicad pak, all wired, like new, but needs a little work.

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504—Ford GT electric powered car with 6 channel, C'Aire reed SH, 3 annco RL servos, all mounted and working with charger. $99.99

505—Used transmites always in stock. Always! Each: $10.00

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508—C'Ship CNT, 10 channel transmitter. $12.00

509—Used escopements, single SN or compound, assorted brands. $2.00 or 5 for $7.50

510—MRC Tone Monitor (Rec. & speaker). Sale. $10.00

511—Futaba TX, Rec. 2 servos, in box, needs servicing. $25.00

512—Citizenship DP-T-1, TX, Rec. servo and pak, like new. $45.00

513—Min-X Pulse, TX, new. $18.00

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514—Jansson Triple, Treat TX, Rec., like new, Rand LR-3 and pak, needs work. $35.00

515—Digit Migit, complete TX, Rec. servo, needs service. $38.00

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601—Miller Sprayer #2016, $44.95. Net. $36.00

602—Miller 2017 Sprayer, $49.95. $40.00

603—MG, mirror finish, nylon hub wheels,
Scale like 3" Sale. $2.00 pr.
Scale like 2¾" Sale. $1.85 pr.
Scale like 2½" Sale. $1.65 pr.
Law Bounce 3" Sale. $1.65 pr.
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604—Dremel moto tool set #280, retail $39.95. Net $32.00

605—Moto tool dremel set #260, retail $24.95 Sale. $20.00

606—Williams Brothers, 3½" diameter for P-51, Spinner #121, $5.45. Net. $4.00

607—Electric Fuel Pump, $10.95. Sale. $9.00

608—CG Retract handing gear, 3 in set, $19.95. Sale. Net. $14.00

609—Aero Gloss. $2.29 pt., 3 for . . . $4.60

610—Aero Gloss, quarts $3.69—any color. Sale. $2.50

611—AG Pactra Plastic Balsa, 39¢ tube. Sale. 25¢

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613—12 Sheets SGM heavy silk-span. Net. $1.25

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617—Midwest 1/16 x 3 x 36"—20 sheets balsa, $7.00. Net. $5.00

618—Super Monocoat—still $6.10 a roll, 3 for $17.77 and 10 for . . Sale. $55.55

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620—All TF wooden props @ 25% off list price.

621—Perry Carbs for 60 engines, $11.95. Sale. $9.75

622—Topflight RCN-1, $9.95 tri-gear kit. Net. $7.50

623—deMeco RC-9/8, $6.95 Steerable gear. Net. $5.00

624—Penford M-1 or CS-1, air-plane or car, electric starter, $24.95 net. $18.00

625—Selector Heat Sealing Iron, $10.95. Sale. $9.50

626—X-Acto Tools & Sets — 25% off retail — huge stock!

627—DuBro Universal Motor Mt-MM-1, net. $1.50

628—Tatone #30454 Mt for 40RV net. Sale. $3.50

629—Perry Air Cleaners, large. Sale. $1.50

630—Cushion-Aire Knee-Action Steerable nose gear for that added scale, $12.95 list. Sale. $10.00

631—5" or 4½" Dia. Balloon Wheels, $7.00. Sale. $5.50

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632—Dubro Wheels—any size. All at — ⅓ OFF

633—New Tatone Twister Wooden Props 10-6, 11-6, 11-8 all 25% off retail sale.

634—Fox Conventional Spinners, 2" Net. $5.00

635—1940 thru 1950 M.A.N. & FM & Air Trails Magazines. 100 for $50.00

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SALE IGNITION ENGINES 100 ASSORTED GOOD TO START COLLECTION AND FOR SPARES $1,000.00 SEND US YOUR OLD IGNITION MOTORS FOR CASH.

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Come on Fellows, let's Help your Buddies get in the Air! Send us your list of unwanted airplanes and ignition motors, and trade up to PROPORTIONAL real quick. Up to $200.00 Trade-in allowed for your old proportional set.

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Please specify:
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2. 27 MHZ or 72 MHZ frequency

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Hey Kids! We *ARE* number one, and number two, three, four, five... But before you head for your math teacher wait a minute. We are number one, two, three, four, five, because we are the *ONLY* modeling magazine written just for you. See, now it's possible! Why should we be the only one to publish a modeling magazine just for you? We guess we're the only one that saw what was happening to the hobby. It has been getting too fancy and expensive for your liking. So now we are going to give you a magazine that is not complicated, or expensive. Look at what we did in the last issue.

FIRST SARGEANT—a plastic model B-24 that was painted with dots and wild colors to draw the formation together.

SWAMP SKIMMER—a crazy swamp boat with full size plans!

HOT CANARY—this all-balsa profile model of a famous racer makes a sturdy control-liner.

KNOW YOUR BALSA—a good basic article on balsa, what it is and how to use it.

And look at what's in this issue of JUNIOR AMERICAN MODELER.

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FORTY-FIFTH IN A SERIES

getting started in RC

THROTTLE PUSHROD SYSTEMS

by HOWARD McENTEE

We have mentioned throttle linkages in several past parts of this series, but here we'll gather all the info together and add a few new suggestions. The throttle linkage is not as "vital" as control surface lineages. If the throttle fails to operate it's a distinct nuisance—but doesn't usually lead to a crash, as is almost always the case with defective control surface linkages. Still, a reliable and smooth-working throttle is a real joy—and below are a few hints to attain this end. We'll not include data on setting the engine throttle—this varies too much among engines and is covered in the instructions for each.

The throttle is linked to its servo with either a flexible metal wire or a small plastic tube; in both cases the pushrod casing is larger plastic tubing. These are commercial items sold at most hobby shops. If your linkage requires one or more sharp turns, the flexible metal rod is the best bet. If it's fairly straight, either metal or plastic will do nicely. A common setup at the throttle is seen at A. If the throttle arm is metal (virtually always the case) most fliers prefer to use a nylon clevis at this point. Always use a "safety ring" on the clevis, no matter if it is nylon or metal. Vibration is very high here and the ring, which comes packed with some clevises (or a piece of rubber fuel tubing can be used), helps assure that the clevis won't open during flight. The forward end of the pushrod casing should be attached to the firewall (or other solid component) and the rear end of the casing must be fastened near the servo. "Adapters" threaded to screw into the clevis are readily available for either style of pushrod. Adjustment of the throttle clevis at this point is vital to setting up the throttle operation; adjustments are made here much more easily than would be the case at a clevis on the throttle servo.

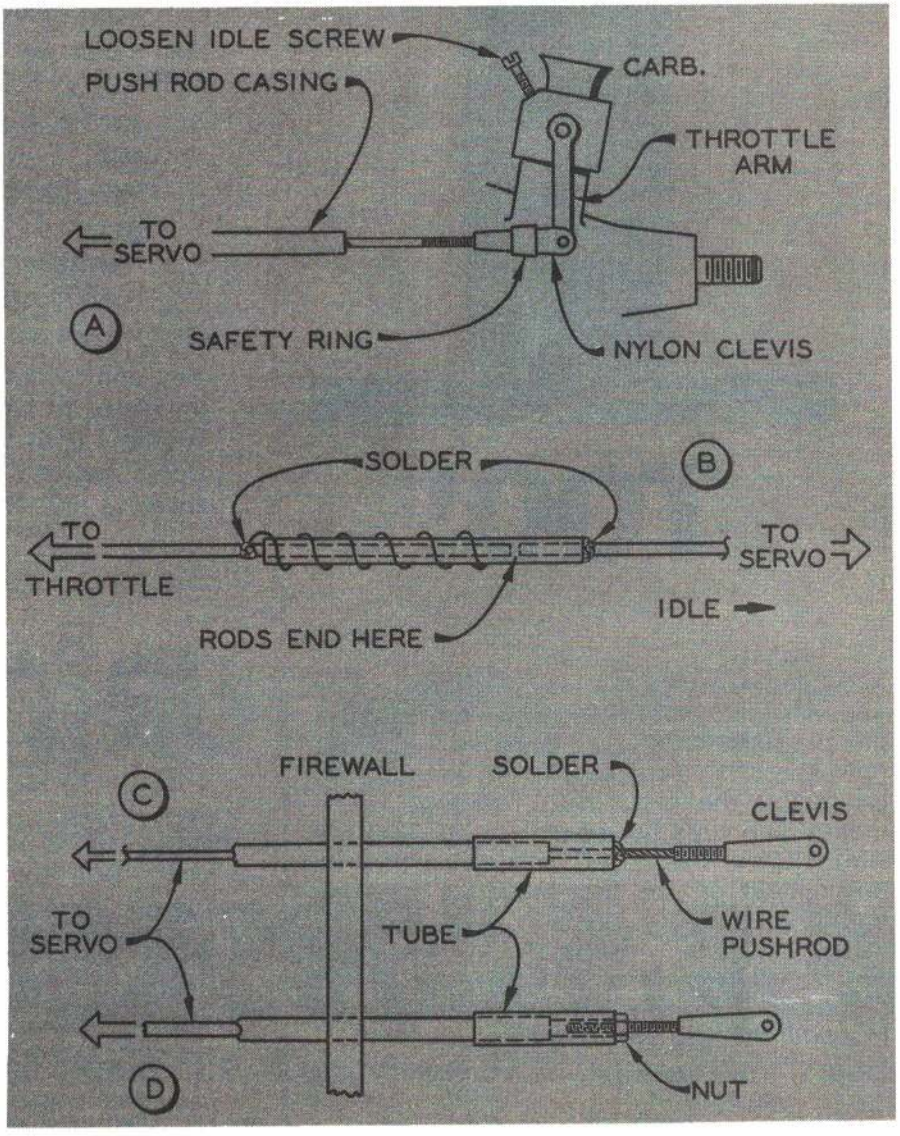
The most important point in setting up a throttle linkage is to avoid having the servo pull up against a solid stop at all costs. This could happen at either wide-open throttle or at full idle, but is more usual in the latter case. The safest way to insure against a stalled servo (such a servo draws very high current, leading to servo damage and rapid battery drain) is to unscrew the idle stop on the carb, then adjust the proper idle setting by adjusting the clevis at the throttle arm, and by proper setting of the throttle trim lever at the transmitter (such trim is normally available only on two-stick transmitters). Modern propo equipment is so accurate in operation that the touchy idle setting will hold for long periods. Once the idle is set, make sure the throttle rotor doesn't come up solid against the stop screw at the high speed position. The idle screw should not be removed on most carbs, as it retains the throttle barrel in the body. If the throttle is brought up against the stop screw at either extreme, you will have to reduce total movement of the throttle lever. Put the clevis in a hole farther from the pivot point of the throttle arm and readjust high and low positions.

It is possible to use the idle stop on your carb if you insert a spring link in the linkage. This would normally go close to the servo. A homemade link is shown in B. The rod to servo is soldered firmly to the tube, while the rod to throttle is a sliding fit and is held so the rod ends touch by pull of the spring. Spring tension need only be strong enough to assure that the throttle arm is pulled reliably against the idle stop when the servo is in idle position.

It will take some servo current to maintain this situation, but if the linkage is properly adjusted the current will not be high. It increases as spring tension is raised, of course. If you don't want to go to the trouble of making such a gadget, there are several commercial units available which fit right on the servo, and which prevent the latter from pulling against a solid stop.

One should in all cases be sure the throttle itself works smoothly and without sticking or drag. Most intake throttles have exhaust throttles coupled to them, and the whole setup must be checked occasionally to be sure dirt hasn't gotten into the closely fitted parts, to cause sticky operation.

An odd factor connected with throttle linkage is the matter of fuel and oil passing back through the pushrod casing. There is always a lot of oil in the engine compartment, of course, and there is positive pressure there from prop blast and movement of the plane. Thus oil moves rearward between pushrod and its casing, helped along by movement of the pushrod. We have heard of instances where such oil has traveled back along the pushrod until it reached the rear end, and then dripped down into the servo to render it inoperative. Such oil can make a mess of your fuselage interior. One way to reduce the flow is to put a tube over the front end of the pushrod casing, as seen in C. The tube should be a reasonably snug fit on the casing, and must be closed at the front end. For a metal pushrod it can just be soldered in place. With a plastic pushrod (D), a nut may be utilized to hold the tube. Even with this gadget, you will probably still find some oil getting through the casing, but it should be greatly reduced over the amount that can get through an unprotected casing.



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Flying Wing Contest

(1)

22 April 1972

AN EVENT IN MANY CATEGORIES WITH BUT ONE RESTRICTION—THE AIRPLANE MUST NOT HAVE A TAIL.

(2)

(3)

(4)

(1) Juan Livotto's father brought this red silk free flight, but did not fly it. It was given to him by a man who is building a real glider three times this size. (2) Bill Watson flew this tailless helicopter. (3) The Granger third of the Williams Bros. holds a scale 1928 experimental Canova all-wing. Model is 20 years old. (4) By far the most impressive flight was by Bill Watson's behemoth insect. Five mph

by D. WALTER CLARK

Each November the flying wing nuts immerge from their shells to display their highly original designs at Sepulveda Basin near Los Angeles, powered by everything from Jetex to Supertigre 60's. Few contests offer more model airplane categories than the Annual Northrop Flying Wing Contest—free flight-gas, towline, free flight-scale Jetex, rubber, and RC. The only restriction was a big one—the airplane must not have a tail.

A completely original design is a most refreshing sight, and in this meet, unlike most contests, every model airplane was original. As a result there were many failures, but to the flying wing builders that risk was well worth the glory of watching a successful flight of an airplane so wonderfully unique, so strange, and yet so beautiful—beautiful because it was all theirs, not Carl Goldberg's or Sig's. They didn't even have to share the glory with a magazine's plans.

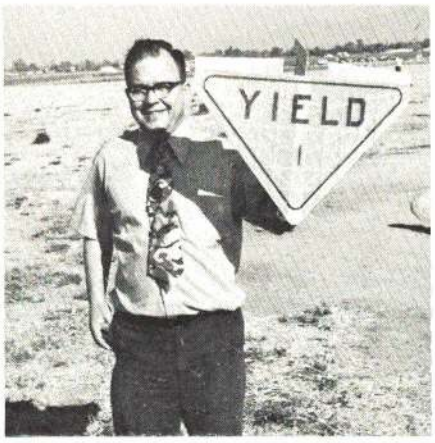
The RC section of the contest was dominated by Ron Neal's Gryphon. He flew a powered version of his very successful slope-soaring stunt and racing glider kit. His son showed him up, however, with a standard Gryphon Kit propelled by a 15 on a power pod. Also flown was an eight-ft. YB-49 which crashed on a low altitude turn; some fast Deltas kept the spectators back where they belonged.

Free flight was broken down into five categories, with each sharing five trophies. Among the winners were Jerry Huban, an aerodynamicist at Northrop, and his two sons. Each placed in their category. Brian and Kevin flew towline, and their father, gas. Both boys flew a variation of Jerry's Victory III, whose plans appeared in May '71 *Model Airplane News.* The only other Victory III was the winner of the towline event which maxed out all three times. Jerry's powered Victory III had 1½ min. flights from 15 sec. engine runs, better than any of last year's flights, but not yet competitive with conventional models. According to Jerry, the big problem with free-flight flying wings is the powered part of the flight.

Flying wings have an incredible glide angle and if you get them up there they will certainly hold their own against any conventionally tailed model. In a tailed model like the Starduster, the tail is in the prop wash and the effects of incidence and downthrust are constant throughout the powered flight, whereas a tailless model under power is only stable in pitch at its peak climb velocity. This means all launches must be thrown, and thrown fairly precisely. Too hard a throw results in a loop; too soft results in too low a climb angle.

For those interested in converting the Victory III to power, Jerry advises the use of an .020 mounted on a pylon above the CG. The thrust line must be 5 in. above centerline and parallel to the root cord.

Nick Linardos is approaching the problem a little differently, as his new plane will have auto-elevons. During the powered part of the flight, the 8° of



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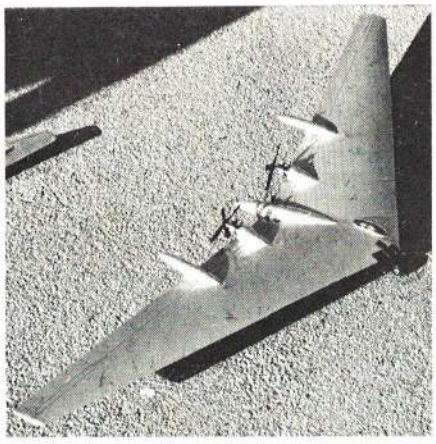
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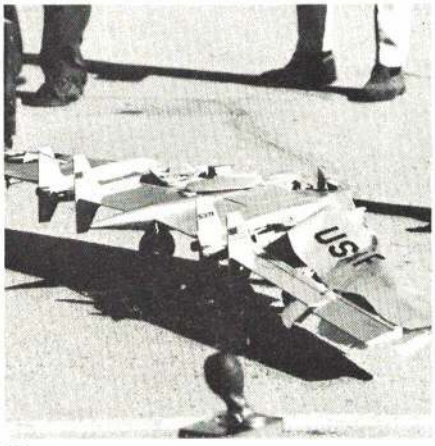

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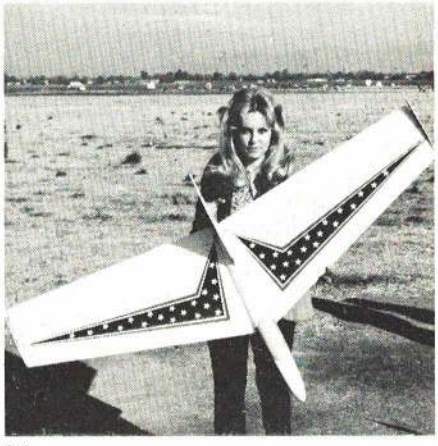
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RESULTS

Radio Control—Junior, Senior, Open

1. Mitch Neal—a Junior
2. Ron Neal, Open
3. Ed Lewis, Open
4. Arnold Wilcox, Open
5. Bob Serna, Open

Rubber/Jetex—Senior & Open

1. William Pardoe, Open
2. Ken Sykora, Open
3. Bill Hanna, Open
4. Walt Mooney, Open
5. William Pardoe, Open

Gas Free Flight—Junior, Senior, Open

1. Walt Mooney, Open
2. Jerry Huben, Open
3. Jim Adams, Open
4. Dan Walton, Junior
5. Tony Nackarato, Open

Towline Glider—Junior, Senior, Open

1. Robert Provart, Open
2. Brian Huben, Junior
3. Ken Suszewieg, Open
4. Jack Headley, Open
5. Keven Huben, Junior

Rogallo Wing—Junior only

1. Joe Rieman
2. Joe Rieman
3. Kent Doyle
4. Dennis Chadd
5. Dennis Chadd

Special Award for Northrop Scale

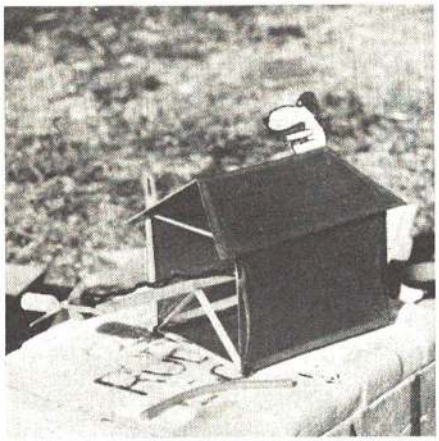
Robert Serna

washout will be entirely removed. This more complicated approach has the advantage of not being sensitive to the launch. Nick, also a Northrop engineer, is an expert modeler and an avid flying wing fan. He has entered this competition every year, but somehow fails to place. This year he brought two Sailwing 50's, one of which was an actual 1939 Jasco kit. (Frank Zaic, designer of the Sailwing 50 and one of the father's of our hobby, was also in attendance at the meet.)

10-Hi designer, and real Flying Wing test pilot, Johnny Johnson flew a 1953 English design called the Dactile, which is 6 ft. in span and has a wing loading of 2.5 oz/ft^2 for a glide angle which he describes as being far flatter than his own 10-Hi. Like so many other contestants, the model's first flight was at the contest. However, it survived only the first flight, disqualifying a consistent winner at these contests.

The Flying Wing Contest is a meeting place of persons with unique ideas in aerodynamics. This year, as in the past, there were models that wouldn't fit into any of the categories, but were nevertheless brought, flown, and talked about. Unusual airplanes such as ring wings, ladder wings, flying tubes, canards and many singular scale models have been brought to the contest, but have not been entered because their design couldn't compete on a basis of duration in the glide. To encourage the builders of these extremely unique designs and to maintain Northrop's image as a company vitally interested in new ideas, the club is considering a miscellaneous category this year, judged on the basis of originality, stability, efficiency, etc.

Flying Wing competition is only three or four years old, so you won't find the exactness of detail or bitter competition in performance. It is a contest more of aerodynamic design than of perfection in reproduction. If you would like an aerodynamic challenge and the total reward of an original endeavor, begin design work on a flying wing now. An AMA sanctioned contest, the competition will again be held in November, so watch for date and time announcement in AAM's "Contest Calendar."



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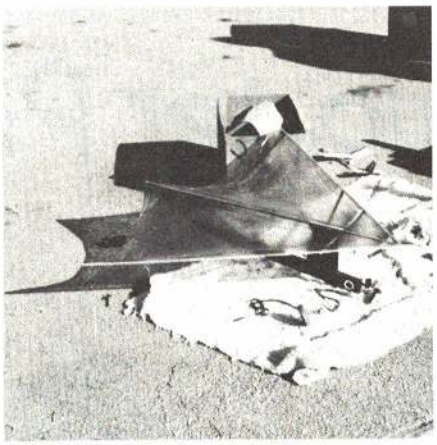

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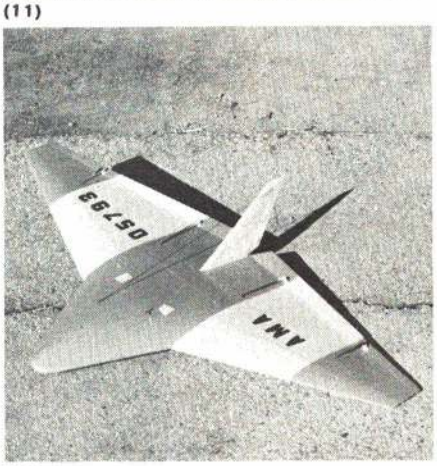

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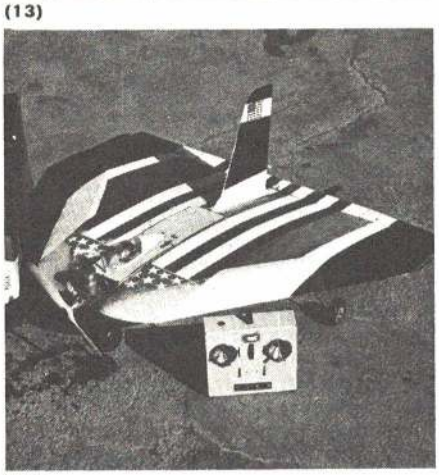


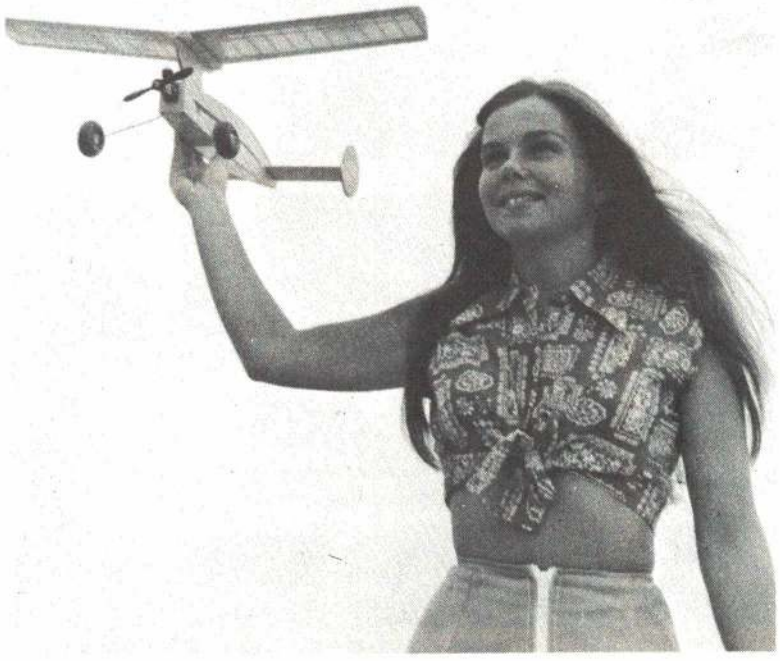
(16)

top speed, but climbs about as fast. (5) Walt Mooney, free flight correspondent, holds his rubber-powered Yield Sign. (6) This 15 oz. scale XB-35 was built by Tony Naccarato Jr. from photographs. (7) First place in flying scale went to Robert Serna with this YRB-49A. (8) Fear of this result stifles interest in flying wings, and keeps the number of flying wing enthusiasts rather exclusive. (9) These two models are both Ron Neal's. The prettier one is his daughter Sheri Neal, and the other is his Gryphon, now available in kit form. (10) One of the many fun planes of unorthodox design which did not compete. Perhaps there will be a category for them next year. (11) There was a special category for Rogallo Wings. This one, flown by Joe Rieman, received first place this year as well as last year. (12) In the foreground is the writer's unfinished RC scale YB-49. In the background is a Delta which brought fourth place in RC for Arnold Wilcox. (13) Frank Culver is describing the lateral control system to be employed on his full-size hang glider which is now being built. This model was flown repeatedly at the contest. (14) There was one event which did not take place for lack of a hill at Sepulveda Basin. This elegant slope soarer was only on display. (15) Johnny Johnson, designer of 10-Hi, holds a new creation. He was one of the few persons who flew Northrop's N9M Flying Wing. (16) Winner of third place RC was this very fast Delta by Ed Lewis. Beauty is in the eye of the beholder. (17) Mitch Neal, right, first place winner in RC, holds his father's 29-powered Gryphon. Behind his father is Mitch's first place winning aircraft.

(17)

NO MATTER HOW YOU LAUNCH THIS SHRUNKEN OLD-TIMER, IT GETS INTO A RIGHT SPIRAL CLIMB FOLLOWED BY A LONG EASY GLIDE.

Quarter Pint



by PAUL DENSON

While looking for ideas for a sport plane, I recently ran across the article "Famous Free Flights" in the 1964 **American Modeler Annual**—a concise history book, full of ideas for sport free flight. I first considered Goldberg's "Zipper," but the thought of covering those elliptical wings with tissue caused me to turn pale. Then I saw Lou Garami's "Half Pint," and those lines punched my aesthetic button. Using what I could see from the small side view, I made the original drawings for Quarter Pint. Since it uses a ¼A engine, what name could be more appropriate than Quarter Pint? However, considering the proposed change from the English to the Metric system, I thought I might call it .125 Liters (¼ pint in the Metric system), but someone might have thought I was talking about the displacement of a foreign sports car.

Quarter Pint is not intended to be an exact replica of "Half Pint." It was originally designed as an RC single-channel RO, but I found cramming all that gear into a plane this small to be quite a headache. After watching it fly, I was glad I decided to eliminate the RC gear and make it free flight.

I started with a side view of the fuselage and made it square rather than diamond shape for ease of construction. By rummaging through the extra wings that always seem to survive the crashes, I found the top wing of a bipe that had been built some time previously. This gave me the dimensions for the pylon; from there it just naturally fell together.

A hypodermic syringe is useful for putting about one cc. of fuel into the tank. Crank it up using a 4D-2.5P Cox .02 prop and fling it away in any direction—into the wind is usually best. It flies straight out about 30 to 40 ft., gains speed, then climbs up as if it is going to loop. On top of the loop, it rolls out into a steep right-hand turn and climbs until it runs out of fuel. At this point, it makes a transition to a large left-hand circle and floats flat-out much like a Nordic glider.

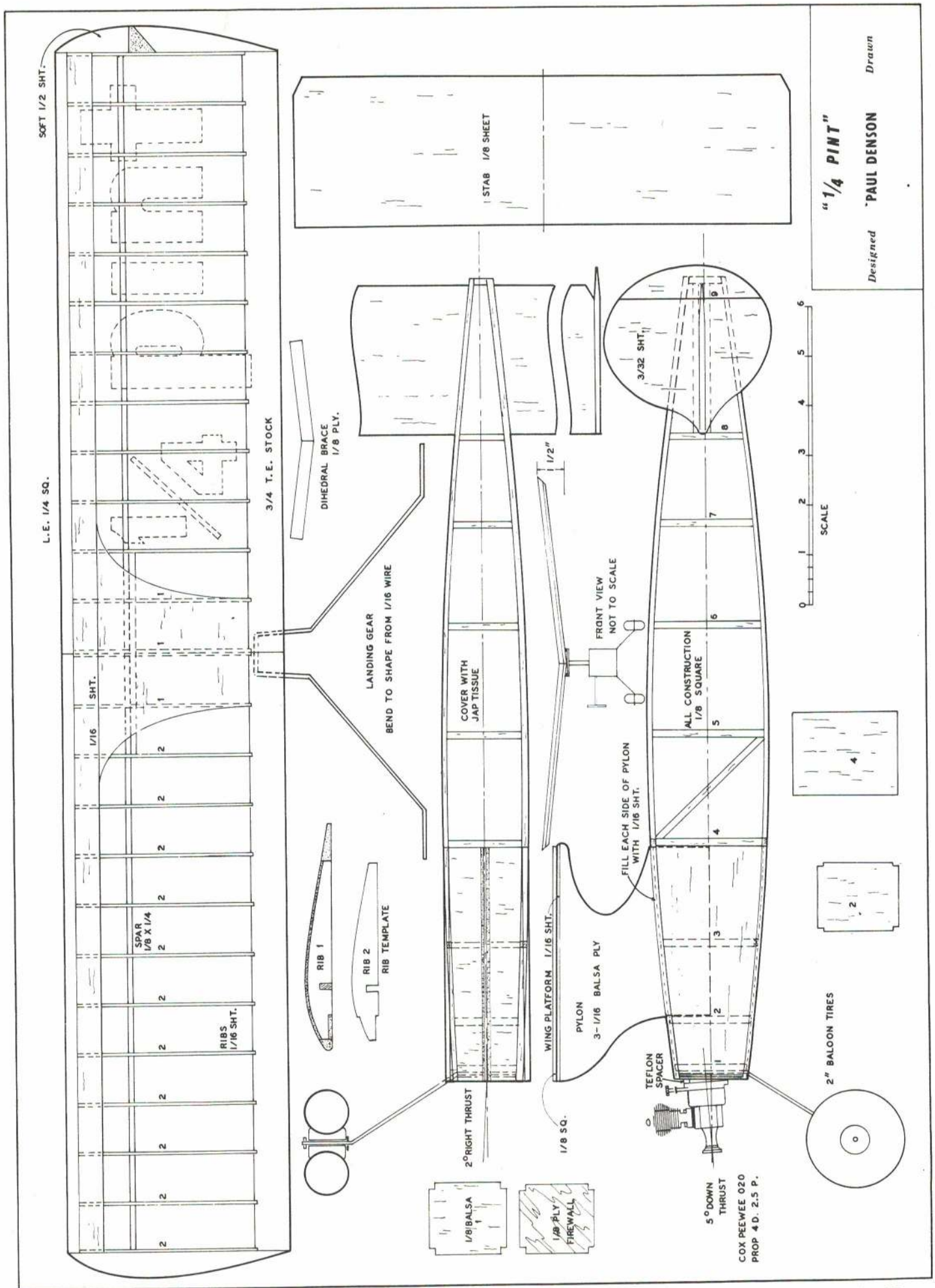
Big air wheels are 2" in diameter. Balsa equivalents could be made if desired (as these provide low-down drag needed). Don't substitute smaller or thinner wheels.

I have never used a dethermalizer, because the motor run has been so short that it never gets high enough to catch a thermal. (I know, famous last words. I heard of a fellow who lost a plane OOS at 35 min. on a test glide!) The fuselage could be left uncovered just above the stab and the top longerons used as a stop for a pop-up stab dethermalizer.

Construction

The construction is straightforward and should pose no problems even to the beginner. The wing is built flat in one piece, leaving the two center ribs unglued. Put the bottom sheeting down first and build on it. The leading edge, spar and trailing edge can be cut in half,

(Continued on page 76)



FULL SIZE PLANS AVAILABLE—SEE PAGE 84

Tiger Moth

by DON BERLINER

One glance at a Spitfire and you can tell why the British get so emotional about it. No matter what the model or condition, the Spit is a beautiful bird. And even if it hadn't helped save the Western World in 1940, it would have attained immortality on its looks alone.

The British also go fluttery about the Tiger Moth, and that isn't quite so easy to figure out. It certainly isn't much to look at. Its flying characteristics leave something to be desired. And there's not even a rumor of one of them having shot down a single German plane in the entire war. Yet, there must be something quite special about this open-cockpit biplane with enough struts and wires to build a couple of Pitts Specials.

Maybe the reason the Tiger Moth has attracted such a loyal following is because it's been in active, daily use longer than just about any other kind of airplane—over 40 years! And you can add to that its versatility: trainer, sport plane, ag plane, aerobatics plane and World War I fighter replica. Versions have been stretched to house four or five people, while others have been made into trim single-seaters.

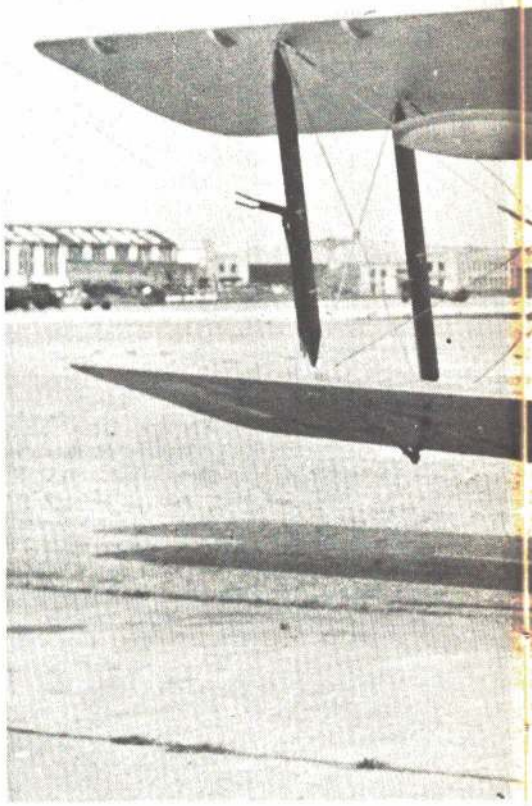
Just when it started is a little hard to determine, for its ancestors were many. The earliest deHavilland airplane to resemble the Tiger Moth was the DH.51, a low-powered trainer/tourer built in 1925. One of the three completed is now part of the famed Shuttleworth Collection and flown upon occasion in England. The first version called a "Moth" was the DH.60, which flew in 1925 and was followed by more than 100, known as the "Cirrus Moth" because of the upright Cirrus four-cylinder, in-line engine.

In 1927, deHavilland built a slick little open-cockpit, low-wing with which they set a World Record of more than 186 mph over a 100-km course. While it used DH.60 Moth parts, its only role in the story of the Tiger Moth was its use, for the very first time, of the name "Tiger Moth."

As production of the DH.60 Cirrus Moth continued at a steady pace, improvements were appearing. The first important one occurred in 1928, when the DH.60G Gipsy Moth entered the arena powered by a 100 hp DH Gipsy in-line engine. A few were modified to use the new inverted in-line Gipsy II engine and were fitted with 19° swept-back wings. While they were still considered DH.60T's (T for trainer), the "T" now stood for "Tiger." The fourth of these modified machines got its lower wing dihedral increased for better ground clearance and so led to a new standard basic trainer: the DH.82 Tiger Moth. The first one flew in October, 1931 and the thousands of airplanes which followed were all pretty much alike.

Only 135 DH.82's were built from 1931 to 1934, but they had an impact far beyond mere numbers. Most were military trainers, with examples going to some 25 air forces around the globe. A few were sold to private owners, especially traveling air circuses which enabled tens of thousands of people to become familiar with the airplane. In 1933, the DH.82 was further modified with plywood covering for the turtle-

(Continued on page 93)



SECOND ONLY TO THE SPITFIRE IN THE HEART OF AN ENGLISHMAN IS THE deHAVILLAND 82—FOR MORE THAN 40 YEARS ONE OF THE WORLD'S MOST VERSATILE AIRCRAFT.

Photos from the Smithsonian Institution

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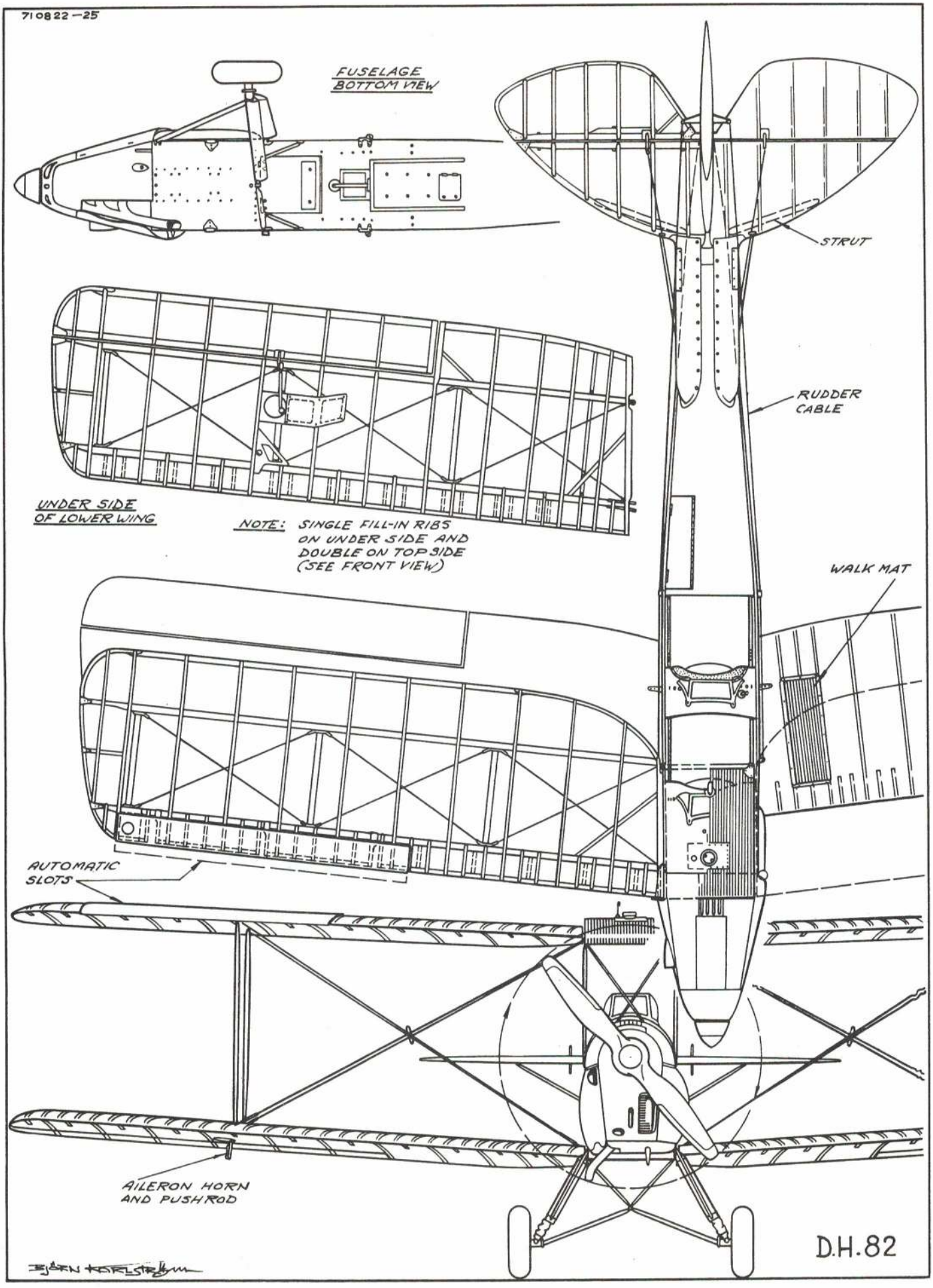
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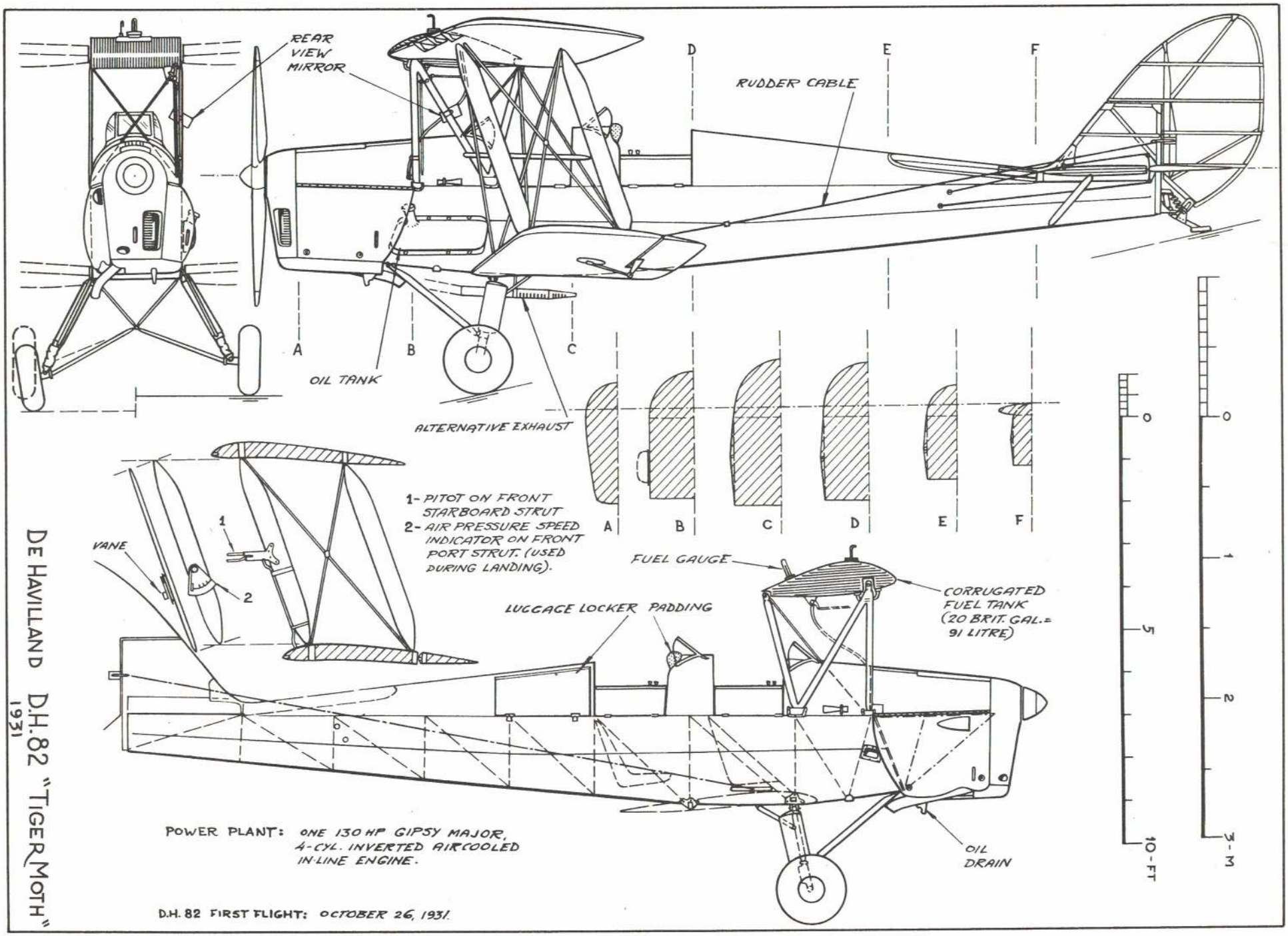
ON UNDER SIDE AND
DOUBLE ON TOP SIDE
(SEE FRONT VIEW)
WALK MAT
AUTOMATIC
SLOTS
AILERON HORN
AND PUSHROD
D.H.82

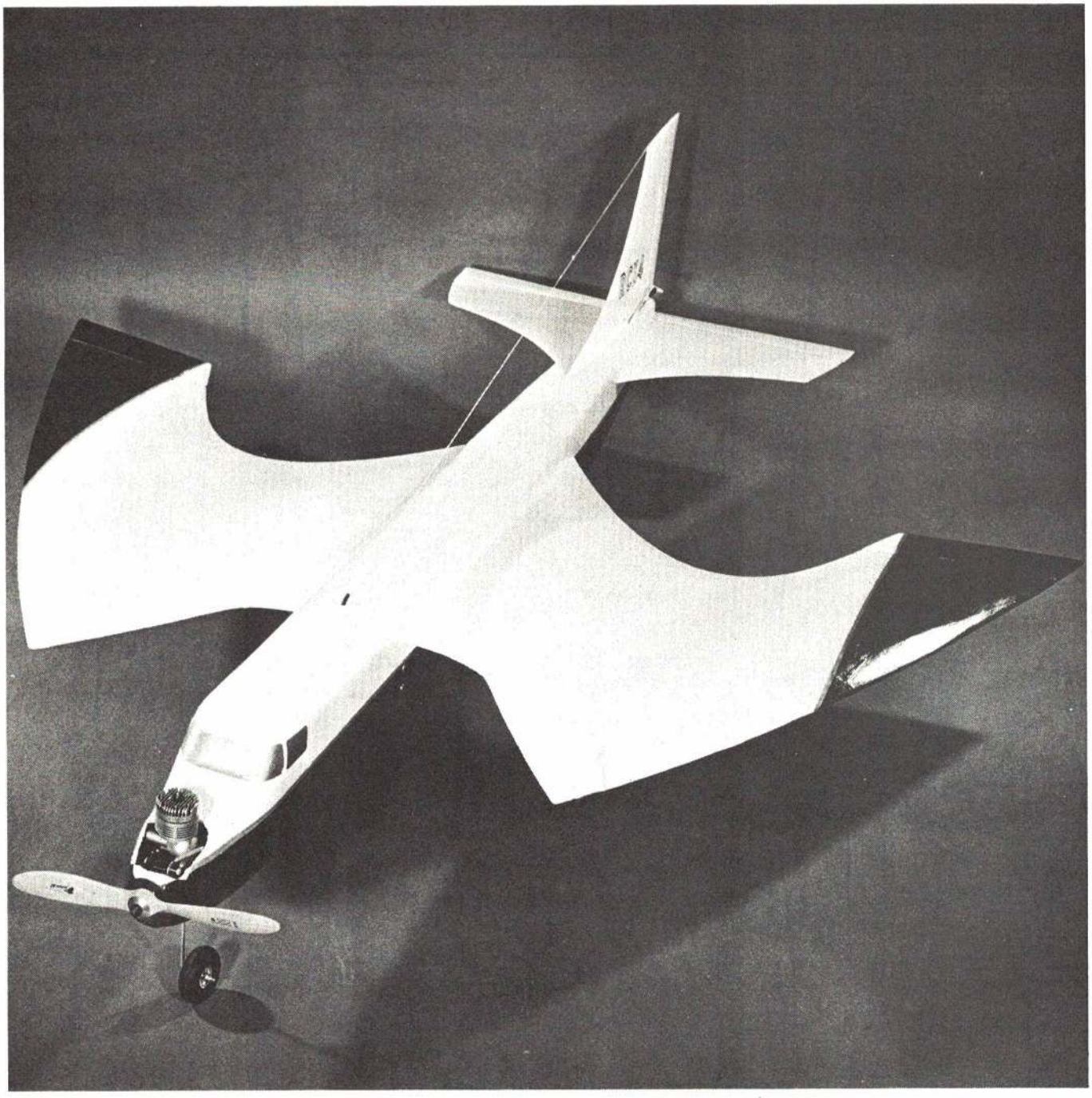


DE HAVILLAND D.H.82 "TIGER MOTH"
1931

POWER PLANT: ONE 130 HP GIPSY MAJOR, 4-CYL. INVERTED AIRCOOLED IN-LINE ENGINE.

D.H. 82 FIRST FLIGHT: OCTOBER 26, 1931.

IF BATMAN AND ROBIN WERE HERE NOW, THIS WOULD BE THEIR PLANE. UNIQUE SHAPES HAVE PURPOSE, RESULTING SHAPE IS EYE-CATCHING AND FULL OF ACTION.



RCX4

by MILTON SCHMIDT

Wing shape is intended to control spanwise air flow patterns to produce a very stable flying model. Has an airliner-like fuselage.

Although powered by a 71, a good 60 will do-fine. Fuselage is a cavern, anything fits.

The Super Bat wing design is not merely an attempt to concoct a radically different configuration. Every part of its sleek design has aerodynamic improvement in mind. I'll "touch and go" on a few of the highlights.

First, the front point. This is most essential in providing the exceptionally sharp sweepback. If the leading edge did not go outward and forward first, the whole lifting section would be much too far to the rear. It gives a wider span farther ahead and affords good lateral stability. This in turn gives a very long, sharply swept wing "side" from front point to rear tip—one of the reasons for its exceptional longitudinal stability and smooth flying. The high leverage to center of gravity makes balancing much less critical. Also, wing tip is horizontal to fuselage at rear where there can be no loss in efficiency.

But what about maneuverability? The front point reaching 14 in. ahead of CG, its thickness and V-line of top convex, and flat bottom with sharp leading edges, all combine to give a high degree of response. Another factor is length of wing attachment to fuselage, which locks in almost twice the side pressure on fuselage when making turns. The previous test model (RCX3) with rudder and elevator only, did beautiful banking turns almost as if it had ailerons. (This also improves rolls.)

The RCX4 was designed with a scale-type appearance in mind—long deep fuselage, high fin and rudder, and no dihedral in wing. If neatly marked out and painted as the "Venus Express" or "Moon Cargo Lines" you might convince the judges of actually seeing one and win a scale award. It's a bit fast with a 71, but is smooth, graceful, and easy to fly. However, if you use a 60, select lightweight balsa, fiberglass around front end of fuselage only, using nothing heavier than silk and dope for other areas. The RCX4 weighed 10½ lb. minus fuel, 11½ lb. with fuel. It withstood an emergency landing on a disced field with only a slightly bent gear, so it's a very rugged ship.

Construction

With a long, level work top the entire wing can be built with one-piece spars all the way across—no center joining. Use two pieces of 1/16 x 6 x 36 balsa for each bottom. Lay one piece along outside edge as shown by the sheet lines on plan. With a ruler and sharp knife cut straight down the centerline of rib 6 pattern and weight it down in that location. Add 1/16 x 4 balsa sheeting to finish out bottom, and cut down centerline. Glue edges of sheets together. If you lay out the second piece of 1/16 x 6 x 36 inside the rib 6 line, you can get two pieces (if you follow the lines as shown). Fill out bottom, and cut down centerline. Block sand edges joining at rib line, glue together and weight down. Now you have two wing halves roughed out. Trace and cut out on light cardboard a template for wing on one side. Block sand edges to obtain accurate copy of diagram on plan sheet. Lay it on your 1/16 sheet halves to mark and cut both halves exactly the same. Lightly block sand edge of sheeting at center of fuselage line and glue together.

Spars are all 1/4 x 1/2 spruce. Glue down S-1 and S-2, then 1/4" rib No. 6, and continue with the other spars in their numerical order. Mark out position of 1/8 ribs, notch out and glue in. Piece in 1/4" hard balsa at wing tip, light 1/4" balsa block under rib No. 6 tip, and 1/2" balsa fill around front pocket as shown. With fine rasp and sanding block, round out balsa fills to rib tops, and top edge of ribs to contour of wing.

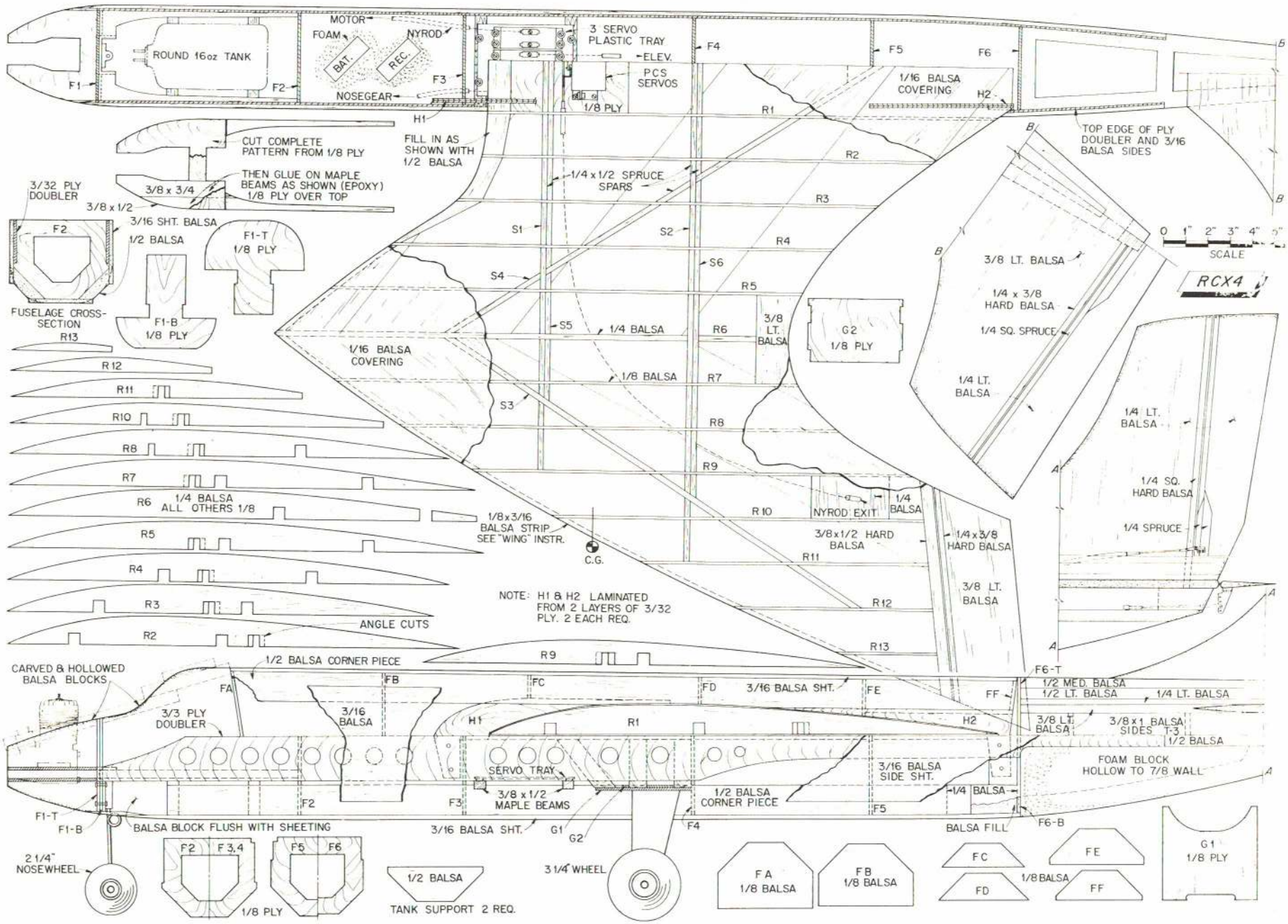
Cut enough 1/8 x 3/16 balsa strip for leading edge, lay it flat on rib points and mark. Then cut off front tips of ribs and glue in leading edge. Apply some glue on top edges of ribs from leading edge about 2" back. This will keep you from digging in when block sanding leading edge to rib contours. Glue in a 1/2" thick spruce or hard balsa triangle to hold bottom ends of S-4 spars together. Fill over top of cross spars between No. 1 ribs with 1/2" balsa up to top of ribs, then with 3/8" balsa on bottom end the same way. Lay 1/16" balsa top sheeting in approximately the same direction as on bottom.

A well stocked hobby shop should have 12 x 48" sheets of maple ply. From a 3/32" thick sheet cut out the doublers for the fuselage. Use 1/8" ply mahogany for the formers—it's lighter and you can get a small piece at your lumber yard. Glue 3/16" square balsa around the outside edges if you want more pinning area.

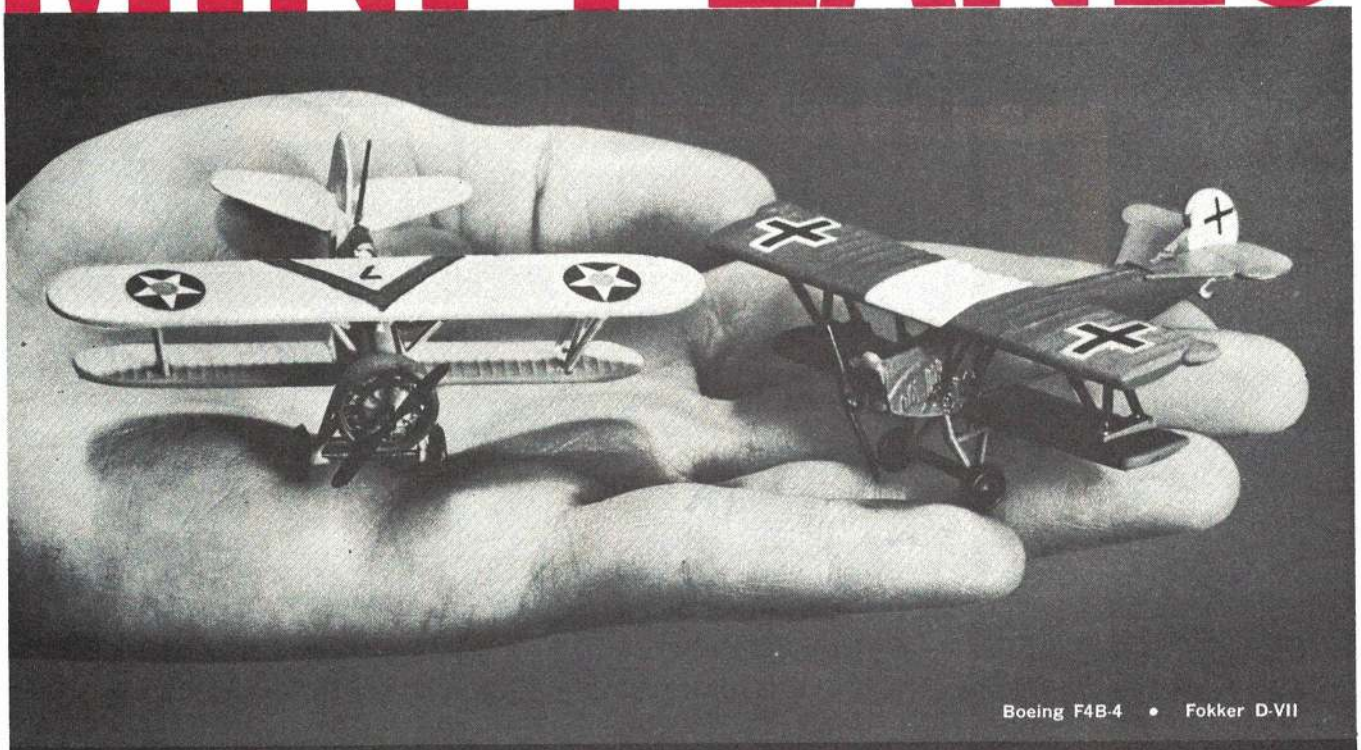
Build the motor mount assembly following detailed diagram on plan

(Continued on page 68)

FULL SIZE PLANS AVAILABLE—SEE PAGE 84



MINI-PLANES



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French Mirage 4A	British Spitfire	B-25 Mitchell	Nieuport 17	Boeing F4B-4	Ford Tri-Motor
B-17 Flying Fortress	Japanese Zero-Zen	Spirit of St. Louis	Fokker Eindecker	Kitty Hawk	PBY-5A Catalina
Boeing 707	F-4U Corsair	Sopwith Camel	Stuka JU-87G-1	Jolly Green Giant	C-119 Flying Box Car
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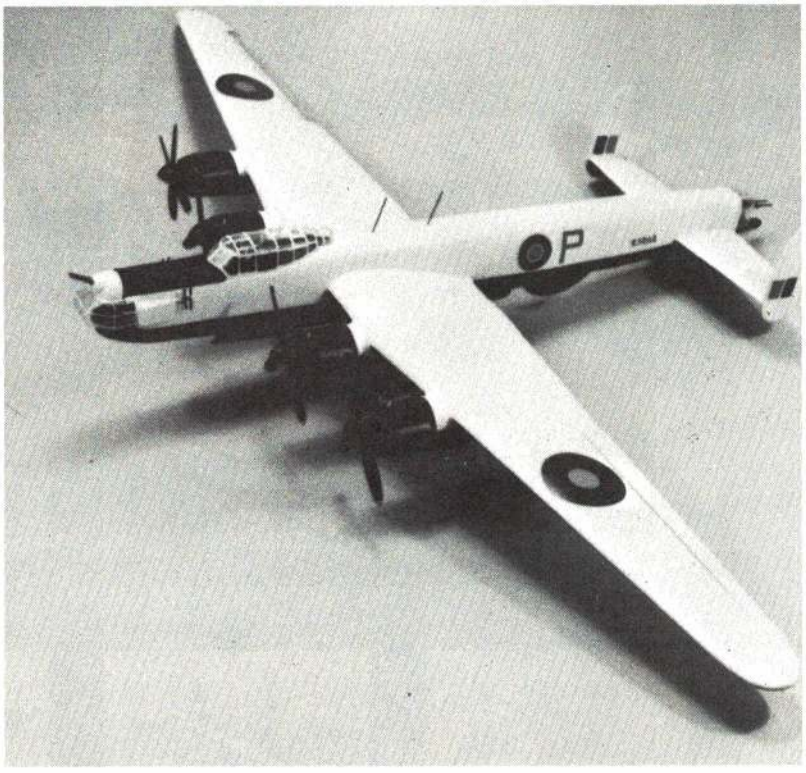
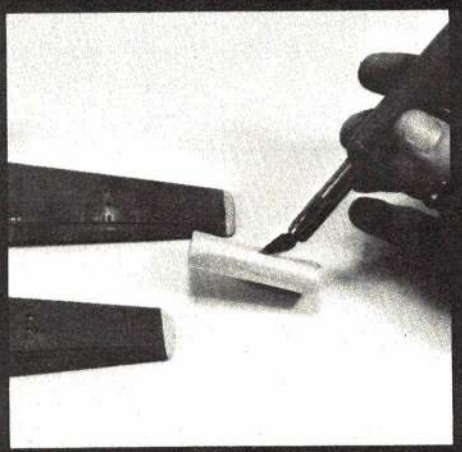


CONVERSION OF BRITISH BOMBER
THAT LIVED ON AFTER ITS TIME. A LANCASTER BECOMES THE LINCOLN.

The sectioning process.



The wing tips are extended 1/4 inch.

A Mattel Vac-U-Form is used to make the radome and the nose turret.

by BEN MILLSPAUGH

The British bombers that helped crush the Nazi threat during WW II lived on long after the war was over. The Lancaster and Halifax, especially, did not succumb to the post-war scrap collections. Rather they evolved into a great transport that would help Great Britain maintain peace throughout the free world. This evolution produced a strange but beautiful bomber—the mighty Lincoln.

The Lincoln first flew on June 9, 1944 and two further prototypes were produced shortly thereafter. The first model, powered by four 1750 hp Rolls-Royce Merlins, was delivered to the RAF early in 1945. Number Fifty-Seven squadron received the first ones.

Made by Avro, the Lincoln featured in this conversion is the famed B2. The B2 differed from the B1—the horsepower rating went to 1765 and they were made by Packard, not Rolls. A maritime version named the Lincoln III evolved into the Shackleton MR1. Because of this, we find that we have to use two kits in our conversion—the Revell Lancaster and the AMT Shackleton.

Quoting from the *Royal Air Force Flying Review,* volume XVI, No. 1: "The Beaufort Division of the Department of Aircraft Production in Australia also produced the bomber as the Lincoln B30." This allows the modeler to mark the bomber in the "Kangaroo" roundels as well as standard British markings.

The Lincoln had an impressive performance for a bomber. The maximum speed was 290 at 20,000 ft. with a standard cruise of 230. The service ceiling was 22,000 ft. and the range was 2,250 miles. It grossed out at 82,000 lb., giving it an impressive 22,000-lb bomb load. The Lincoln could defend herself in aerial combat, to say the least. She carried two half-in. Browning machine guns in the nose turret, twin Brownings in the tail turret and two 20mm Hispano cannons in the dorsal turett.

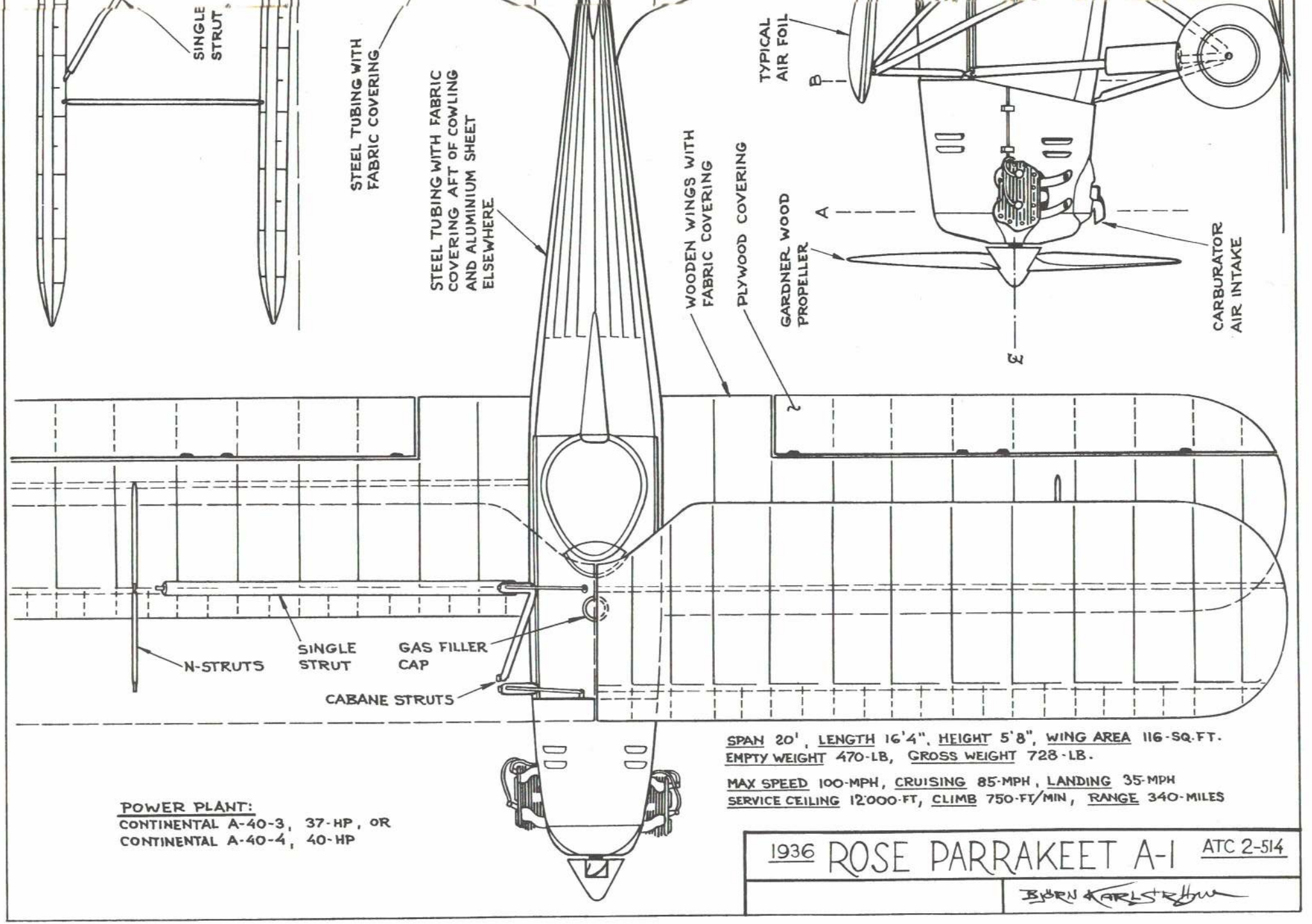
Ben Fulcher and Bob Stensvad, the builders of the models shown, built two planes and marked them separately. One was done in a striking black and white, while the other was a very attractive grey and black—both impressive. When the two modelers displayed the Lincolns at the local IPMS meeting, the models were immediately surrounded by other club members. Some bombers are just "so-so" in appearance, but not the Lincoln. It stands in a league all by itself. For this was the last of the mighty prop-powered bombers for the Royal Air Force.

The Lancaster served as a base fuselage kit and the other parts came from both the Shackleton and Lancaster kits. The reference used for the Lincoln was the popular "Aircraft Camouflage and Markings 1907—1954," and the *Directory of RAF Operational Aircraft*, by William Green and Dennis Punnett, taken from a 1963 *Air Progress* magazine.

First cement the fuselage halves of the Lancaster together. Use a high quality putty, such as Green Stuff by R-M Products, to fill the windows, turrets and seams. The fuselage, after all is set and dry, is cut 2½" aft of the trailing edge of the wing root. This is a section and pieces of scrap plastic were used to extend the rear end out 3/4". Plastic balsa was used to fill the gap area with Green Stuff covering the outer surface. The tail section of the Lancaster is now installed stock. A piece of scrap plastic must be used to extend the wing tips on the Shackleton wing. This is the only minor step before installing the Shackleton's wing into the Lancaster fuselage. The Shackleton's nacelles are a poor fit and require a liberal use of putty to bring them to perfection. The Lancaster landing gear is used and the only change is the locating pins on the back brace. These are cut about 1/32" to fit.

Concerning the props, the modeler has a choice—he can either make the four-bladed props from scrap plastic or he can buy four Frog Tempest kits and filch the props from these. The latter is the expensive way, but the props are accurate. A radome must be carved from plastic or wood stock and formed by use of a Mattell or similar Vac-U-Form. A template is provided for your guide. Position the radome using the finish photographs as a guide. Using the same basic method of sectioning, move the nose 3/8" forward of the cockpit. The nose piece, from the kit, is now moved forward 3/4" and filled to perfection with putty, plastic and balsa. Minor finish work is performed on the fairing such as the nacelles; the beautifully detailed bomb bay is installed. The entire plane is sanded to perfection and if desired, primed with AMT Hot Rod Primer or Martin Senour Primer Surfacer.

While the aircraft is drying, the nose turret can be finished. Using the template as a guide, carefully carve a nose turret from pine and sand out. The Mattell Vac-U-Form is used for this piece and extreme care must be exercised in forming. I would suggest that a heat lamp be used in conjunction with the Vac-U-Form to get the plastic hot enough to "baloon" over the turret. Experiment with a sheet of colored plastic before using that valuable and rare clear stuff. The nose turret was made using "frog eyes" found at any hobby or crafts store. The cannons are stuck into tiny holes drilled in the frog's eyes. The pilots are seated and the plane is now ready to paint. Using our photographs and the references as your guide, your efforts will produce a beautiful bomber.



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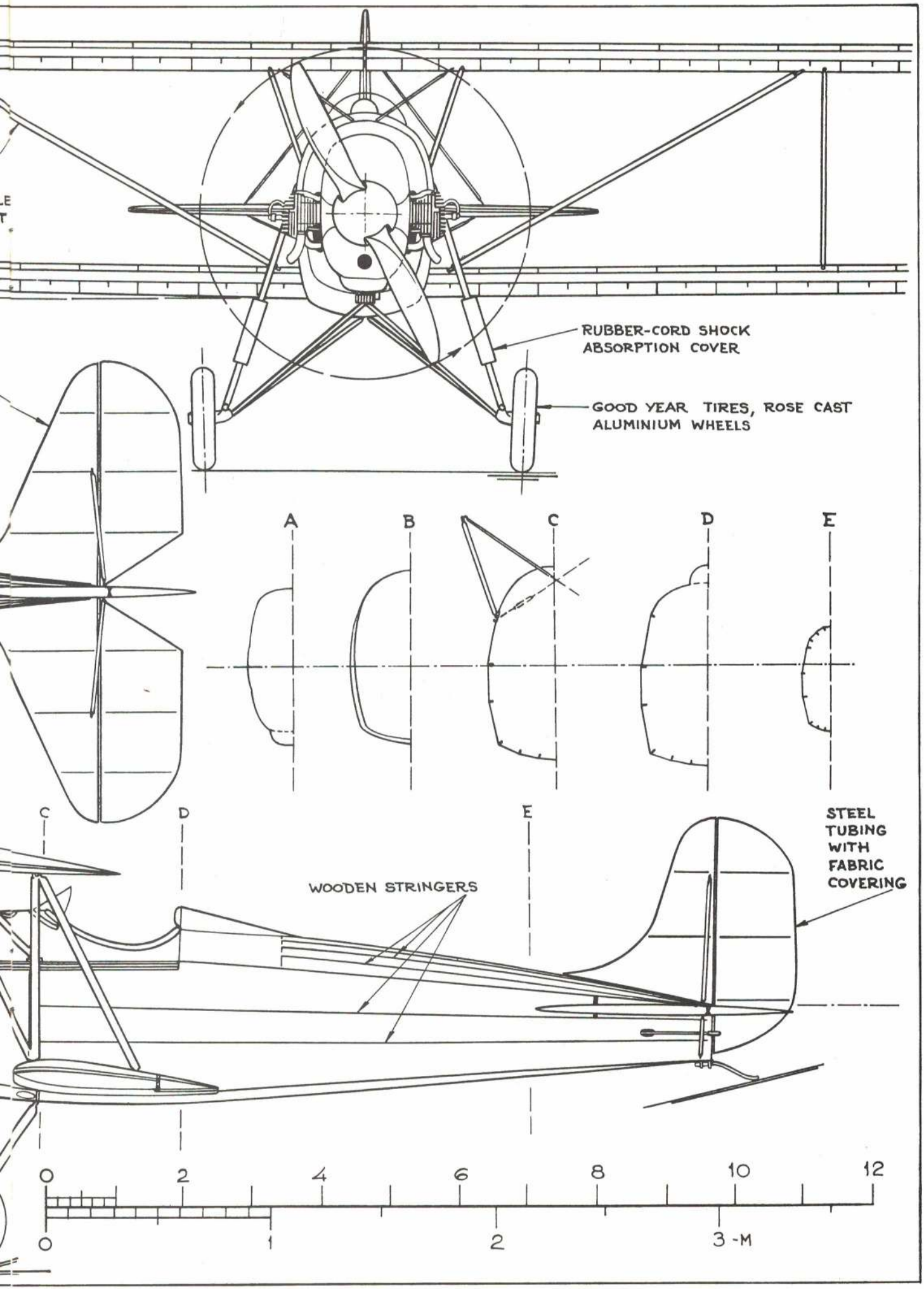
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A
B
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D
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C
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E
WOODEN STRINGERS
STEEL TUBING WITH FABRIC COVERING
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3 -M

Squeeze-Banger

by WAYNE PETREVAN

FAI (15) Combat grew in popularity last flying season in our area and it promises to be an even more popular event in the upcoming one. Last summer I decided to design a 15 combat ship to have a good flying plane for this season. I modified the original version five times—some changes being drastic, some only minor. The result of my efforts is the Squeeze-Banger.

I realized a few things were going to be different as compared to the 35 machines, because of the smaller motors. Scaling down wasn't going to work. To perform it had to be *light*. Smaller engines have less power, so the lighter the airplane, the less speed lost in maneuvers.

I wanted a plane strong enough to hold together under normal circumstances (whatever that is in Combat), but not so strong as to affect the weight. I have used light wood for everything but the leading edge which is medium hard. The completed model without motor should weigh a little over eight ounces. My theory is based on the old saying that the heavier they are the harder they fall. If a light plane hits the ground there is less inertia; instead of penetrating into the earth and shattering into splinters it just bounces around a little. Fortunately because of its excellent maneuverability it doesn't hit too often. I flew the Squeeze-Banger in a contest last year; in the middle of the match it went straight in, but it held together and I got back up again. And it was only covered with Silkspan!

Most fliers seem to like this model's flying characteristics. Its loops are about eight ft. in diameter and it flies quite fast. I've never clocked it, but I would approximate the Squeeze-Banger's speed to be about 80 to 90 mph. Of course, it all depends on the motor used.

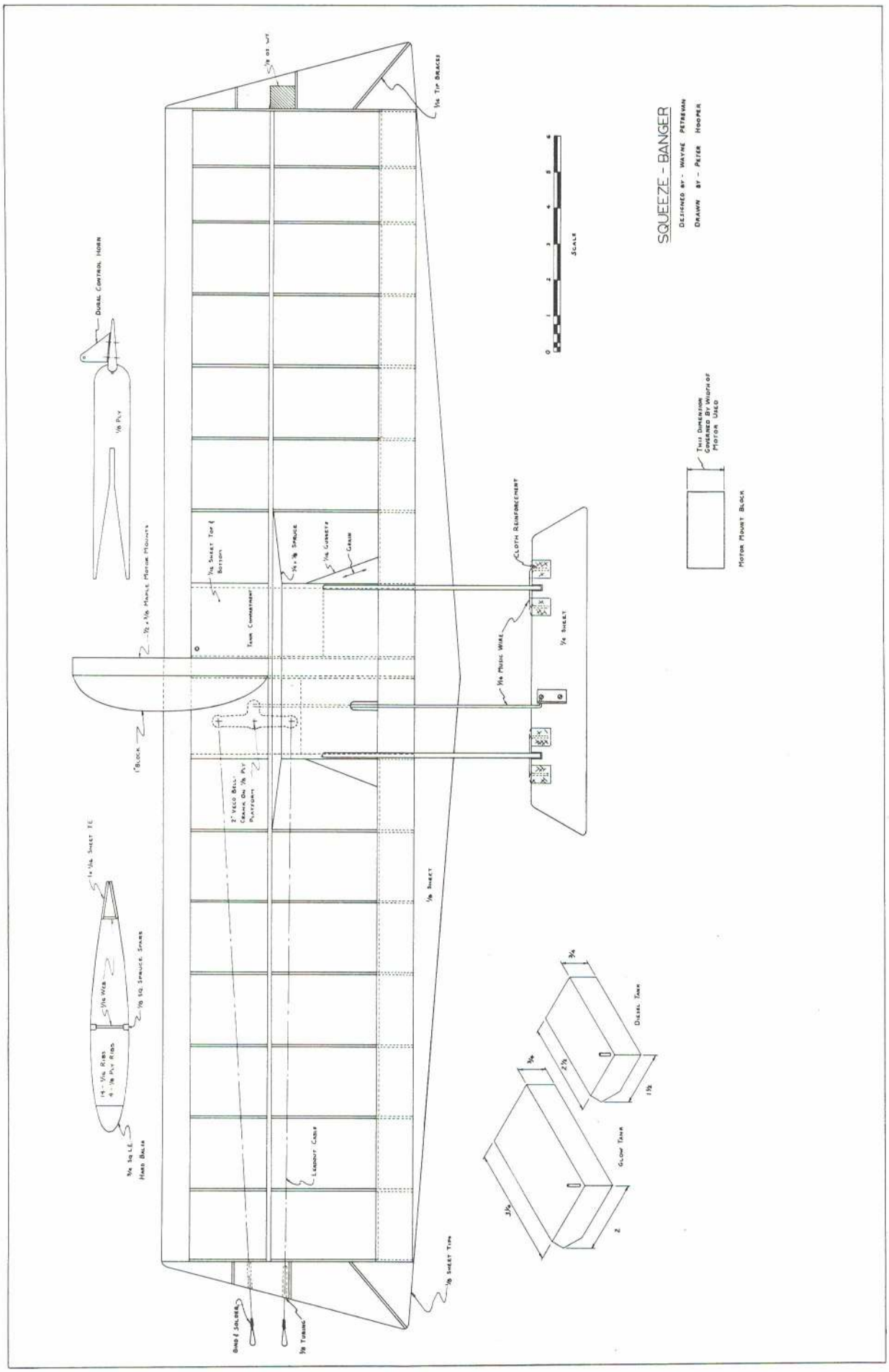
One good point about 15-size Combat ships is that they are inexpensive to build, mainly because the motors cost less. This enables Juniors to participate in the event. Everything is on a slightly smaller scale, but don't be surprised to find that these smaller planes are just as exciting as their bigger brothers. The contest flier can build several of these models in no time at all; because they are faster to build and cheaper, a modeler can take a few more risks that he might not ordinarily take.

Construction

Begin construction by cutting out fourteen 1/16" ribs, two 1/8" center ribs and two 1/16" ply center ribs. Notch them for the 1/8" square spruce spars and cut out leadout holes in seven of them. Make sure the center ribs are 1/8" narrower to allow for the 1/16" center sheeting top and bottom. Pin the bottom trailing edge piece to the plan. Block up the leading edge, so the ribs can be glued to it, and the trailing edge at the same time. The leading edge can be either carved from a piece of 3/4" square balsa or purchased preformed approximately to shape. A bit of sanding will get it exactly to what you need—check the cross section with a template. Glue in all ribs except the four center ribs. While this is drying, glue the maple motor mounts to the motor mount block with epoxy, clamp the assembly in a vise and let it set. (Make sure the mounts are firmly clamped, if not, the epoxy will allow the parts to shift giving you a misaligned motor mount assembly.) If the mounts are misaligned and a motor is bolted on them, undue stress is exerted on the crankcase which causes excessive

(Continued on page 78)

OUTSIDE THE U.S., COMBAT IS FLOWN WITH .15's AND SMALLER, LIGHTER, AND PERHAPS MORE MANEUVERABLE PLANES. MODELS ARE SIMILAR TO OURS AND PURPOSE IS THE SAME.



FULL SIZE PLANS AVAILABLE—SEE PAGE 84

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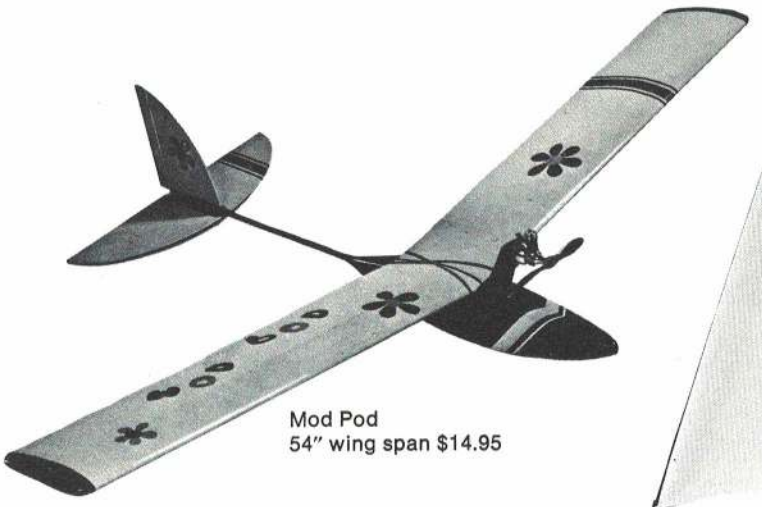

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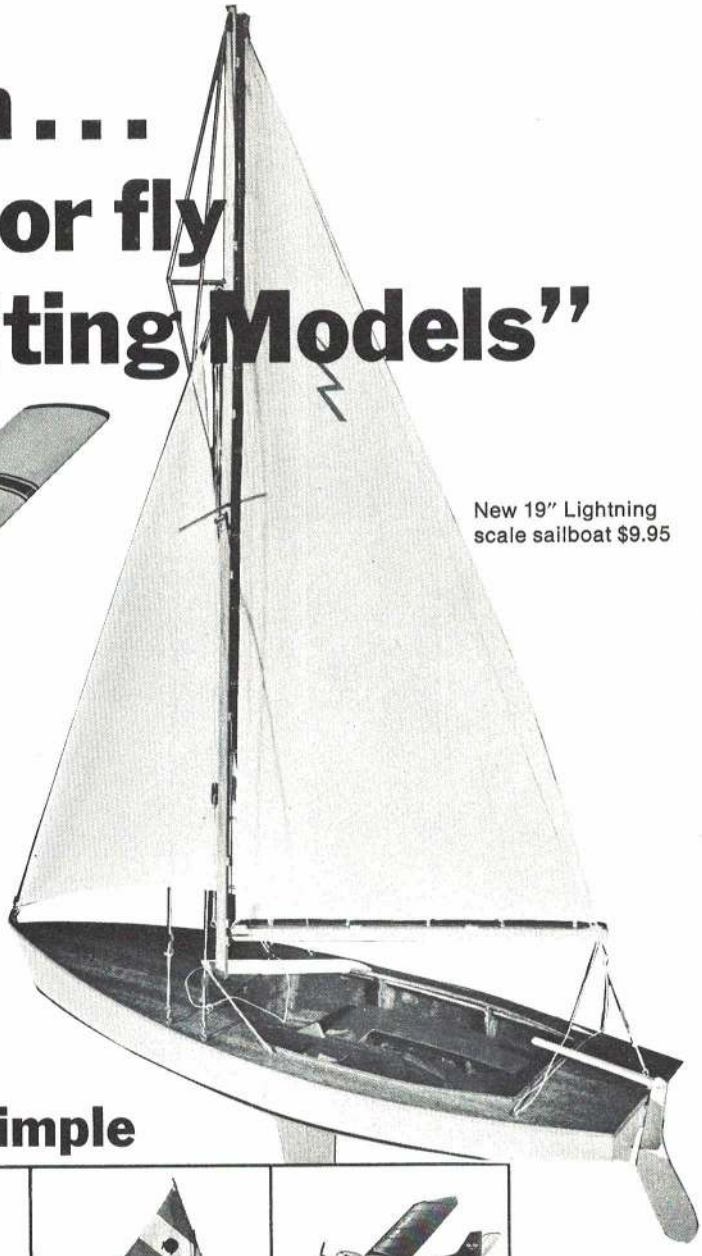

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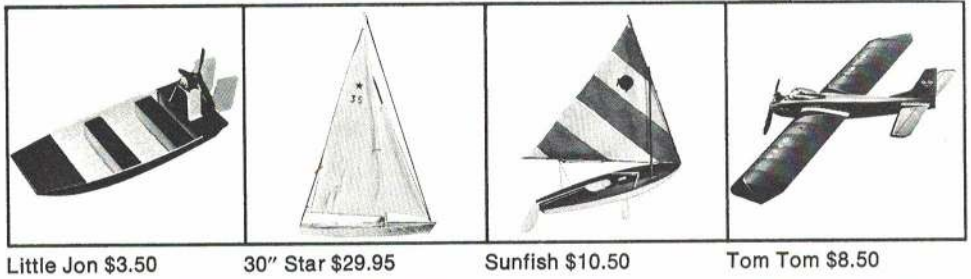

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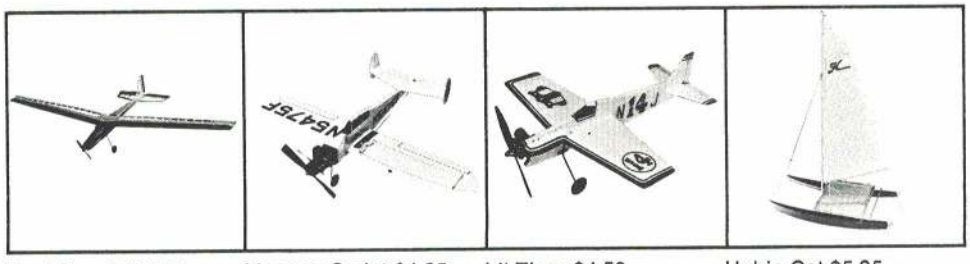

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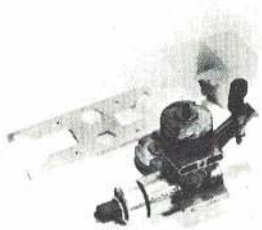

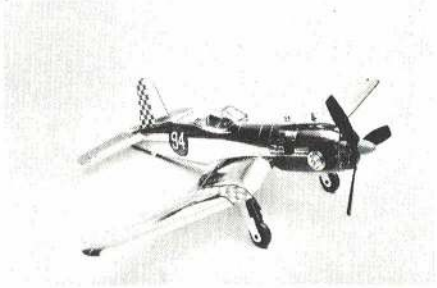

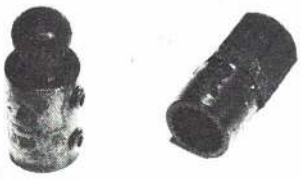

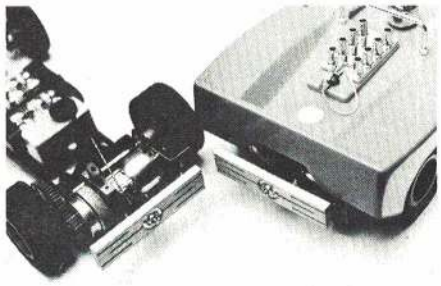

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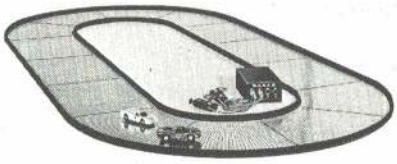
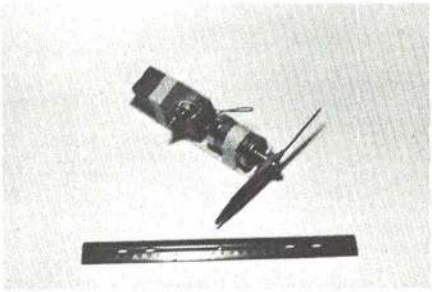
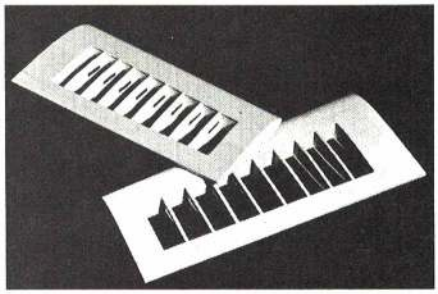
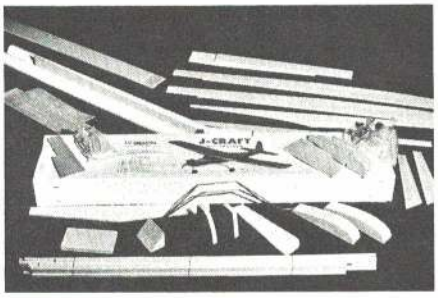
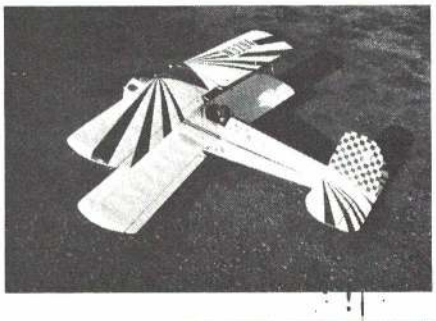
by FRANK PIERCE

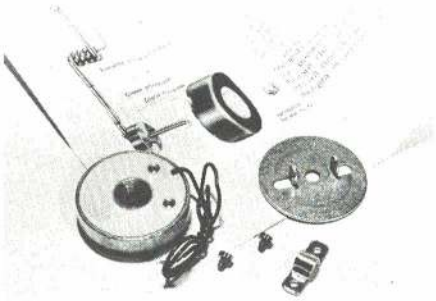


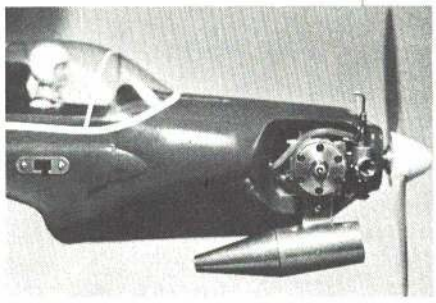


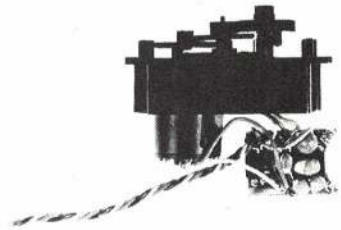












Heath/Slotless raceway. Great new technological breakthrough in indoor model car racing. MARK IV raceway resembles conventional 1/32-scale race course for four cars, but uses unique low-voltage frequency for control link from operator to vehicle. Cars use separate motor for each rear wheel, brush contacts mounted beneath chassis. Each car has own specific control frequency, same as with RC. 4 x 8' oval track, two race cars and controllers, $129.95. Extra car and controller, $21.95. Further information, write Heath Co., Benton Harbor, Mich. 49022

J & J Industries/J-craft. Big new RC job is built along nostalgic old lines. High wing 65" span gives 600 sq. in. flying surface. Up to four channel operation on 29 to 50 power, about five lbs. flying weight. Beautiful quality throughout, pre-cut balsa and plywood used exclusively. Aluminum engine mounts, other extras. $45.95. J & J Industries, Inc., Model Aircraft Div., Box 202, Oakhurst, N.J. 07755

Hobby Lobby/Disc Brake. Electromagnetic disc brake operates from 3-volt source, draws 250 ma, 1-1/4" diameter. Complete with necessary mounting hardware, clear illustrations. $5.95. Hobby Lobby, Route 3, Franklin Pike Circle, Brentwood, Tenn. 37027

Astro Flite/Electric motor. Producing power comparable to Cox 09, 14-volt electric motor can be used for RC or other models. With rechargable NiCads power is sufficient for 5- to 6-minute flight. With 8/4 prop, motor turns about 10,000 rpms. Motor, $19.95, battery pack additional $29.95. Astro Flite, 2301 Cheryl Pl., Los Angeles, Calif. 90049

Mini-Flite/Bucker. 4-channel RC version of world-famous aerobatic championship "Jungmeister" aircraft features vacuum-formed ABS plastic cowl and wing tips, top quality die-cut balsa, pre-bent cabane and landing gear wire. Recommended for 45 to 60 power, 54" span, biplane weighs 6-1/2 to 7-1/2 lbs. With all non-standard hardware included, $49.95. The Mini-Flite Co., 48 Princeton St., Red Bank, N.J. 07701

Midwest/1972 series HP40FR engine. New front-rotor 40-size engine has sufficient power to operate with lighter-weight 60-size aircraft. Rated at .90 hp, engine comes with muffler as standard equipment. $56.95. Midwest Model Supply Co., 6929 W. 59th St., Chicago, Ill. 60638

Foam Flite/Built-up foam wing. Available for Nobler (shown), Chipmunk, Shark 45, Skylark, and custom-built, foam/balsa ribbed wings make a light wing (6 to 7 oz.). With ribs and cap strips installed, ready for covering, $25.95. With balsa ribs drawn to size, numbered, and sheet balsa stock as a kit, $19.95. Send requirements for custom wing design and price quote. Add for postage and handling, $1.50 extra. Mankato Models, Foam Flite, 628 W. 6th St., Mankato, Minn. 56001

Graylines Express/Sub-miniature camera. May be just the answer for high-quality aerial photographs. Small enough to nestle into fuselage or under wing of a 40-size airplane, ultra-light weight, but rugged enough to take landings and vibration. Not a toy, takes excellent pictures which can be enlarged to 5 x 7 size easily. Fixed focus f3.5 lens, 1/100-sec. shutter, light shutter release which can easily be triggered by pushrod. 16-mm cartridge loading, Minolta quality. $29.95. Graylines Express, 8364 Gibbs Rd., Kalamazoo, Mich. 49001

Orbit/PS-6. Essentially a heavy-duty geared PS-4 but equipped with Orbit's new three-wire IC amplifier. Better centering and faster movement. $40.00. Also 180 version available. Now standard with all systems. PS-3 also available. Orbit Electronics, 17312 Gillette Ave., Santa Ana, Calif. 92705

.For Your R/C Flying Fun!.

commander '72

NEW CONCEPT IN PULSE RUDDER-ONLY

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

Fully Proportional—Rudder follows directly movement of your stick.

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

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

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

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

Inexpensive—Initial cost of system, airplane and engine is low; nickel cadmium airborne pak and charger are included; transmitter and receiver can be used for many different planes.

COMMANDER '72 R-O SYSTEMS

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

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

26.995, 27.045, 27.095, 27.145, 27.195
Please Specify Frequency

ACTUATOR/BATTERY COMBOS

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

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

COMMANDER '72 FLITE PAKS

Our '72 Commander Rudder-Only Flite Paks are available separately for the convenience of our customers who wish to use a complete installation. They include nickel cad batteries, On-Off switch, receiver and actuator--assembled and tested. More expensive than the Actuator/Battery Combos, it does not require any shifting. This offers a convenient and complete way of making an installation in another airplane without removing your receiver.

Be sure to specify frequency to match your transmitter.

The Baby and Baby Twin units contain the 225 ma 2.4 nickel cad batteries; the Standard and Standard Twin (Stomper) contain 500 mil 2.4 v nickel cad batteries. Charger is not supplied.

72G15—'72 Baby R/O Flite Pak	$39.95
72G15T—'72 Baby Twin R/O Flite Pak	$42.95
72G16—'72 Standard R/O Flite Pak	$41.95
72G17—'72 Standard Twin Flite Pak (Stomper)	$44.95

26.995, 27.045, 27.095, 27.145, 27.195 MHz
(Please specify frequency desired)

Extra chargers, actuators and parts, and batteries available separately--see catalog.

DICK'S DREAM KIT

Highly Recommended for Beginners

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

No. 13L100—Dick's Dream Kit $6.95

ACE HIGH GLIDER KIT

† 70" Foam Wing -- Moulded sections
† Precision Machine cut and sanded wood
† For .049--Power Pod parts supplied
† Recommended for Rudder-Only Standard or Stomper Commander
* Owen Kampen design

No. 13L104—Ace High Glider Kit $14.95

SKAMPY KIT

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

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

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

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

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

To be released April 1972

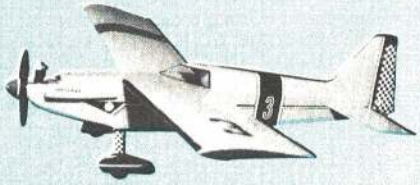
2T KIT By Ron Jacobsen

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

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

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

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



UPSTART 1/2A RACER KIT

† Midget Racing Just For Fun!
† 34" span, 6" chord, 200 sq. in. foam wing
† Top grade band sawed wood
† .049 to .051 Tee Dee Engine
† Two channel operation
* Owen Kampen design

No. 13L102—Upstart Custom Kit $10.95

R-O PULSE HANDBOOK with UP-TO-DATE CATALOG

Only $1.00 (Refundable)

New catalog is completely updated. Includes many items from major manufacturers.

Handbook has expanded data on How Pulse Works, Installation, How to Fly -- and much more. Most complete information on Pulse Rudder-Only available anywhere.

Price is $1.00 via THIRD CLASS BULK MAIL. Refundable on first order over $10.00. If you wish faster delivery, add 50¢ for FIRST CLASS.

ACE RADIO CONTROL, INC. * BOX 301 * HIGGINSVILLE, MO. 64037

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

QUANTITY	STOCK #	NAME OF ITEM	PRICE	TOTAL

Master Charge or BankAmericard No.

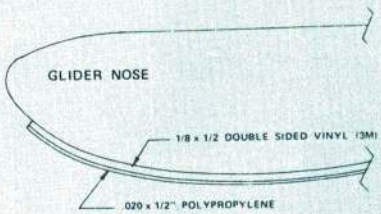
Add $1.00 shipping-handling for direct mailorders except catalog

Packaged R/C Accessories

ACE R/C INC. HIGGINSVILLE MO 64037

NEW LOOK FOR 1972

All of the accessories that have been coming from Ace Radio under various names such as More-Craft, Rand, Goodies, and under our own label now will appear with the new card header as shown above. These should be on your dealer's shelves soon. If he doesn't have them, advise him that his distributor, who is up to date with the latest in R/C accessories, is stocking them. These are proven accessories, and model builders everywhere are using them.

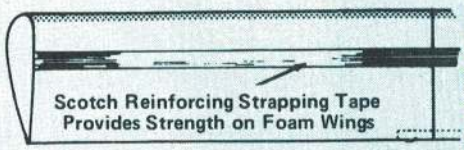


GLIDER SUPER SKID

Make Your Glider Safer With A "Super Skid"

We've packaged up 4 ft. of 1/8 x 1/2 double sided vinyl tape (3M) and .020 x 1/2 polypropylene which when applied to the nose of your glider makes an attractive, quick, and indestructible skid that absorbs shock and protects the plane's belly from hard surfaces. There's enough for two or more gliders.

25L14—GS-Glider Super Skid $1.50



1" REINFORCING-STRAPPING TAPE

The one-half inch brand of 3M Reinforcing Glass Tape is available at almost any corner drug store or hardware store. The one inch variety, which is finding increasing usage in strapping, dihedral bracing, and other applications in R/C, is virtually nonexistent on the consumer market.

Ace R/C is doing something about it, and has it available in 10 yd. rolls 1" wide.

This will allow you to buy only what you need instead of having to buy a case!

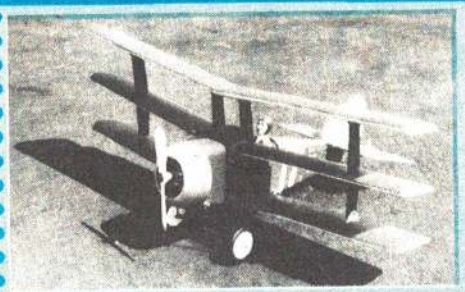
This is 3M Scotch brand Glass Reinforcing Tape--the highest quality available.

35L10—RT1-1" Reinforcing Tape, 10 yds $1.89
(Glass Strapping Type)

HEAT SHRINK TUBING

Heat Shrink Tubing in convenient sizes. Precut. Use it on plug and connector ends to give you a neat and flexible joint. Decreases fatigue. Use with heat from your iron or match or cigarette lighter and shrink to the size of your connector. Dimensions I.D.

40L211—HS-.050 Tubing, 4-3" lengths	.45
35L7—HS-5/64" Tubing, 4-3" lengths	.45
40L212—HS-3/32" Tubing, 4-3" lengths	.45
35L8—HS-1/8" Tubing, 8-1½" lengths	.45
35L9—HS-3/16" Tubing, 6-2" lengths	.45



SOPWITH TRIPLANE WING SET

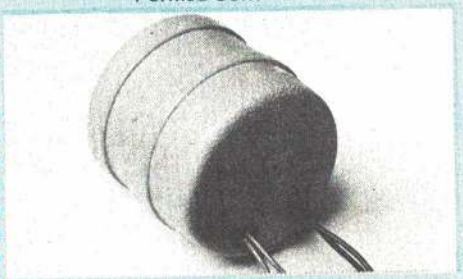
The Sopwith Triplane by Fred Reese, featured in the January issue of R/C Modeler, uses three of our constant chord foam wings. In order to make it more economical, and also more feasible for us to ship, we have packaged three of them in one box. We're passing the saving on to you.

Full size plans are available from R/C Modeler (check the January issue).

No. 13L205—Triplane Wing Set $6.95

SOPWITH ABS COWL

No. 16L384—Sopwith ABS Vacuum Formed Cowl $1.35



JANSSON THERMAL SENSOR

Here is a commercially produced, crystal controlled, lightweight telemetry sensor for every glider fan. Available on 146.385, 146.565, 146.745, 146.925 and 147.285 MHz.

Transmits under FCC Vol. 4 Part 97 on 2 meter head ham band, and requires a technician class license.

1 5/8" diameter x 1½" long. Weight is 1½ oz., and drain is 35 milliamps. Uses 4.8 volts, which may be taken from either a separate 250 maH battery, or taken from the airborne receiver battery pack. No connectors are furnished.

Jansson Thermal Sensor broadcasts barometric changes (thermal air) by variation in tone - Low Tone: Descending - High Tone: Ascending. The audibly detected tone stabilizes at about 1000 Hz and increases (or decreases) at 3 ft. per second rate of change. It will broadcast thermal activity before the effect of rising air on the airborne glider is visibly detected.

Requires a pocket size portable receiver capable of receiving 146-175 MHz. Recommended for this use are either 99-35313L from Lafayette Radio Electronics or A-2587 from Allied Radio Corporation. These units sell for less than $20.00, and also receive broadcast band signals; test proven to be the best available for the money. They are not furnished with the Thermal Sensor, but must be purchased separately.

The Thermal Sensor will be drop shipped from the Jansson factory. Allow 2 weeks for delivery. If airmail is desired, add $1.00. Also please state frequency preferred.

(Drop shipped from Massachusetts)

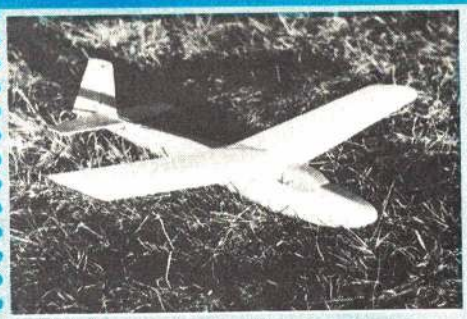
No. 11A8—Jansson Thermal Sensor $75.00

6 AMPERE WET NICAD BATTERY

We have an unused surplus 6 amp nickel cadmium battery which measures only 4¼" x 2 1/8" and is only 7/8" thick. These are in a nylon case and have a new pressure cap; have been completely checked out and refilled, but should be charged before they are used. This is a husky 6 ampere hour, and at our price is a great bargain for the quality and the amperage involved. 1.25 volts.

Excellent for starting, boats and other heavy duty applications.

No. 38K7—6 Amp Nicad Wet Cell $3.95



Dear Friend:

The pic above is of a Schleicher K8B--stand off, or "sort of", scale. This is a full size plan in our 1972 Handbook-Catalog! FULL SIZE! The Schleicher sort of Glider is made with a set of Ace Mini Taper wings, and with the Baby '72 Commander comes in at about 8 ounces. Strictly a flying machine--for fun.

The design is by Roman Bukolt, whose Cassutt-Bonzo appeared in RCM last year, and who has several other designs up his drawing board. One is a cute Bipe that is being tested; another is a sort of "pick your side" WWI jobs. You can either make it Allied or German style; and either an .020 or an .049. A very versatile design, and flight tests look most promising.

The photo has Mrs. Bukolt holding the models. Pretty, aren't they? All three of them!

You'll be hearing more about the Bipe and the WWI jobs in future Ace newsletters and ads.

Returning to the subject of our catalog--the Schleicher is only one of the many features to be found in our greatly expanded Handbook section. We believe we have gathered more pertinent information about Pulse Rudder-Only Proportional than has ever appeared between two covers. As a matter of fact, the Handbook section is about as large as the catalog section! It will be a real boon for those who are just starting out in pulse; it also presents some new innovations about what can be done with this simple get up for the experienced.

With the high cost of mailing catalogs (prices have just gone up a walloping rate on bulk third class) we ask you to be patient. We must wait for the minimum quantity required by the Post Office, and then unfortunately they take their time to get it to you. To insure getting it more quickly, you might want to add 50¢, then we'll see that it goes out to you by return FIRST CLASS mail.

One final bit of news--we've doubled our floor space and completed the move! Twice as much room to give you better service.

Keep 'em pulsing,

Yours sincerely,

Paul F. Runge

Serving R/C Since 1953

Dragonette

LIGHT, 40-POWERED .8-SIZE DRAGON FLI AT FOUR POUNDS IS A REAL PATTERN CONTENDER WITH JUST THE RIGHT MOMENTUM.

by JERRY PARKER

Dragonette is a very good reason to think small. It seems every serious AMA/FAI pattern ship today uses a 60 engine in an eight-lb. airplane covered with twenty dollars worth of MonoKote (or silk and dope), consumes one gallon of fuel during an average flying day, and has to be disassembled and packed on top of the car in a special stretcher for the ride home. These very reasons prompted me to search for a 3½-lb. airplane, powered by a 40 engine, using an eight-oz. tank, covered for only ten dollars, easily transported (with the wing on) in a VW sedan, and one which will compete with the very best 60 pattern ship.

Phil Kraft's Dragon Fli proved to be just such an airplane when reduced to 8/10 of its full size and the wing and stabilizer construction changed to a lighter built-up type structure.

There is only one way to really appreciate the Dragonette and that is to fly it. For those who choose to build this model, you are in store for a pleasant surprise.

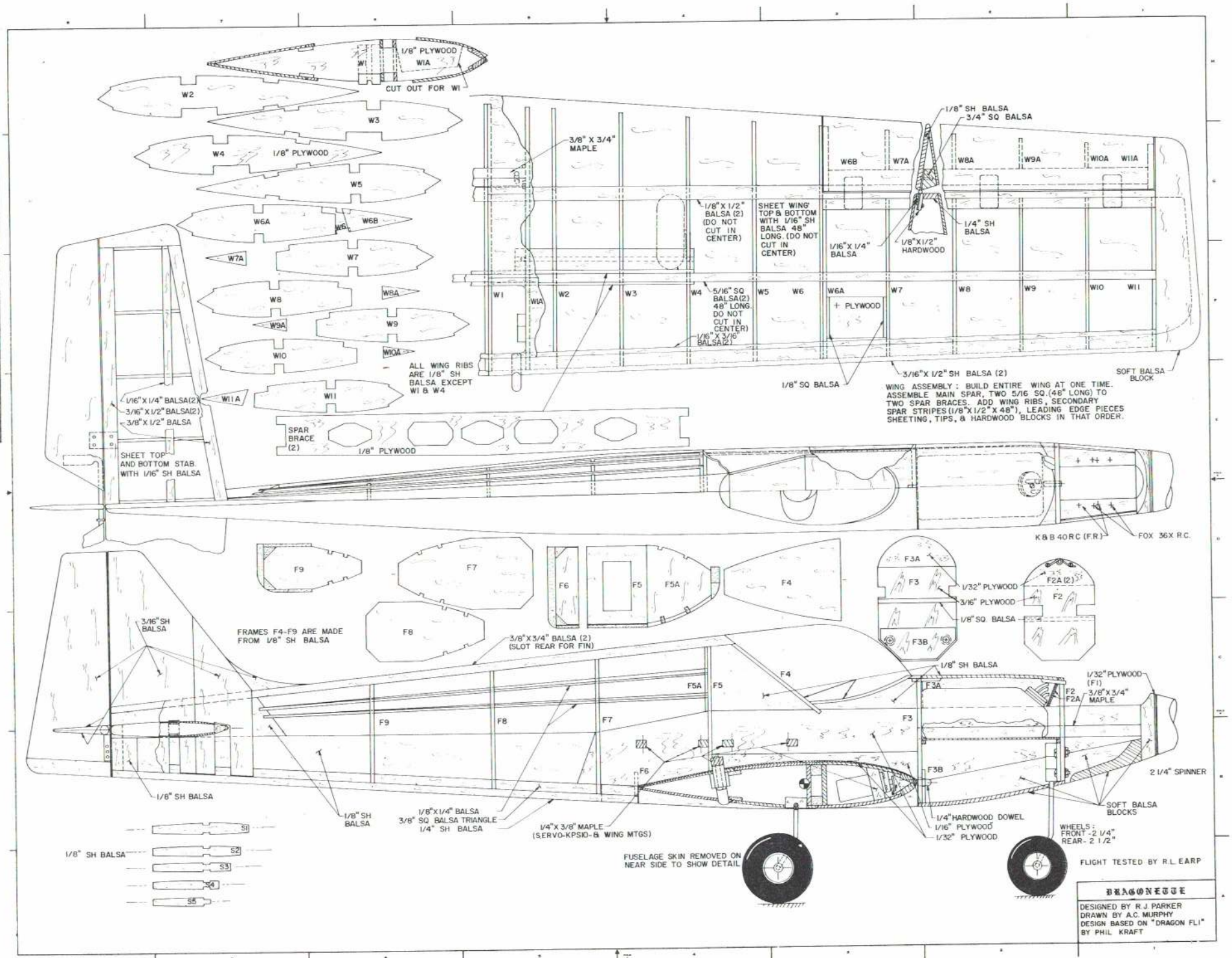
There are no sound reasons why a 40-size airplane cannot perform as well as the 60-size variety provided they both have the same "momentum." How can a four-lb. airplane have the same momentum as a six-lb. one? Simple! It must fly faster. Momentum is the product of the mass, or weight, of the airplane multiplied by its velocity, i.e., M=mv. A four-lb. airplane flying sixty mph and a six-lb. airplane flying at forty mph each have a momentum of 240 lb.-mph. Dragonette not only makes use of this speed compensation, but its design imposes a weight restriction to improve its slow speed characteristics. Three and one half to four and one half lbs. is ideal and easily obtained. Dragon Fli has about seven hundred square inches of wing surface. At seven-lbs. its wing loading is 0.160 oz. per square inch. Dragonette has 450 sq. in. of wing surface, and at four-lbs. its wing loading is only 0.142 oz. per square inch. A five-lb. Formula I racer is higher still at 0.178 oz. per square inch and consequently its stall speed is considerably higher.

I am aware I have ignored many other factors—air foil shapes, drag coefficients, etc.—but I have assumed these factors to be the same for each example. In reality the low drag air foils chosen for Formula I racers characteristically exhibit low lift/high stall speed properties which make them unstable at slow speeds. This is a necessary compromise for racers if they are to fly fast.

As long as weight and speed are kept in proper perspective, any sound airplane will have good rough air characteristics and acceptably low stall speeds. Dragonette II is powered by a modified K&B 40 (thanks to my good friend Ron Earp) and weighs 4½ lb. The eight-oz. Sullivan SS-8 tank allows a 12 to 15 min. flight time. The plane will apparently climb vertically, from takeoff, for an indefinite period of time. It can be climbed at 45 degrees upright, then inverted using ailerons only to continue along the same straight line without further correction. Vertical rolls, such as Top Hat, are precise as the ailerons do not lose their sensitivity. Perfect horizontal rolls are performed with ailerons only. Pitch maneuvers can be made almost square depending on the sensitivity set into the elevator.

Incidentally, Dragonette I was successfully flown with an unmodified Fox 36XRC during some of its first

(Continued on page 86)


1/8" PLYWOOD
W1
W1A
CUT OUT FOR W1
W2
W3
W4
1/8" PLYWOOD
W5
W6A
W6
W6B
W7A
W7
W8
W8A
W9A
W9
W10
W10A
W11
W11A
ALL WING RIBS ARE 1/8" SH BALSA EXCEPT W1 & W4
3/8" X 3/4" MAPLE
1/8" SH BALSA
3/4" SQ BALSA
W6B
W7A
W8A
W9A
W10A
W11A
1/8" X 1/2" BALSA (2) (DO NOT CUT IN CENTER)
SHEET WING TOP & BOTTOM WITH 1/16" SH BALSA 48" LONG. (DO NOT CUT IN CENTER)
1/16" X 1/4" BALSA
1/8" X 1/2" HARDWOOD
1/4" SH BALSA
5/16" SQ BALSA (2) 48" LONG DO NOT CUT IN CENTER)
1/16" X 3/16" BALSA (2)
+ PLYWOOD
1/8" SQ BALSA
3/16" X 1/2" SH BALSA (2)
SOFT BALSA BLOCK
WING ASSEMBLY : BUILD ENTIRE WING AT ONE TIME. ASSEMBLE MAIN SPAR, TWO 5/16 SQ.(48" LONG) TO TWO SPAR BRACES. ADD WING RIBS, SECONDARY SPAR STRIPES (1/8" X 1/2" X 48"), LEADING EDGE PIECES SHEETING, TIPS, & HARDWOOD BLOCKS IN THAT ORDER.
1/16" X 1/4" BALSA (2)
3/16" X 1/2" BALSA (2)
3/8" X 1/2" BALSA
SHEET TOP AND BOTTOM STAB. WITH 1/16" SH BALSA
SPAR BRACE (2)
1/8" PLYWOOD
K&B 40 R/C (F.R.)
FOX 36X R/C.
F9
F7
F6
F5
F5A
F4
F8
FRAMES F4-F9 ARE MADE FROM 1/8" SH BALSA
3/16" SH BALSA
3/8" X 3/4" BALSA (2) (SLOT REAR FOR FIN)
F3A
F3
1/32" PLYWOOD
3/16" PLYWOOD
1/8" SQ BALSA
F3B
F2A (2)
F2
1/8" SH BALSA
1/32" PLYWOOD (F1)
3/8" X 3/4" MAPLE
F2A
1/8" SH BALSA
1/8" SH BALSA
1/8" SH BALSA
1/8" X 1/4" BALSA
3/8" SQ BALSA TRIANGLE
1/4" SH BALSA
1/4" X 3/8" MAPLE (SERVO-KPSI0-& WING MTGS)
2 1/4" SPINNER
SOFT BALSA BLOCKS
1/4" HARDWOOD DOWEL
1/16" PLYWOOD
1/32" PLYWOOD
WHEELS : FRONT - 2 1/4" REAR - 2 1/2"
FUSELAGE SKIN REMOVED ON NEAR SIDE TO SHOW DETAIL
S1
S2
S3
S4
S5
1/8" SH BALSA
FLIGHT TESTED BY R.L. EARP
DRAGONETTE
DESIGNED BY R.J. PARKER
DRAWN BY A.C. MURPHY
DESIGN BASED ON "DRAGON FLI" BY PHIL KRAFT

YOU CAN MAKE THIS TWO-CHANNEL DIGITAL SYSTEM WHICH OFFERS RELIABILITY, PERFORMANCE, GOOF-RESISTENT ASSEMBLY, AND LOW COST BY EXTENSIVE USE OF INTEGRATED CIRCUITS.

PART I

by FRED M. MARKS

AAM Commander

Using a Tektronix 435 scope, Fred Marks checks encoder pulses. Scope is also capable of showing modulation patterns at 27MHz.

It seemed to us two years ago that our readers would be interested in the presentation of a two-channel digital system that would satisfy the needs of the car, boat, glider and sport power plane fans. AAM asked me to undertake the project and to try to make it as simple and goof-proof as practical. The project is finally complete and we are pleased to present the results.

In accordance with the above basic requirements, the following more specific objectives were set. The system should be as technically up-to-date as possible; have the maximum flexibility; be the utmost in simplicity with no frills added; and, taking advantage of inherent digital system characteristics, it should have a growth factor for those who would wish to expand the system later.

Achieving the first objective is by far the most difficult, for technology is a galloping horse. One must finally decide to jump aboard and go. This process led to several recycles and ultimately to the point that everything in the system, except the transmitter and receiver RF sections, utilize integrated circuits. The encoder, decoder, and servo amplifiers are all composed of integrated circuits. The use of bridge-type servo amplifier permits a two-wire power pack for the receiver and three wires for each servo.

The second objective is the most satisfying of all, as the system has been successfully tested in cars, boats, gliders and power planes. The receiver and decoder are compatible with any transmitter on the same frequency, from one to eight channels. The decoder simply decodes the first two channels that it sees, usually aileron and elevator, and ignores the rest. It will operate any servo made today (provisions are made for battery center-tap wiring), including those requiring a negative going pulse. It has been tested with the following: EK MM3; Orbit PS-4; Micro Avionics; all Kraft servos; Controlaire S4b, S4d, S-5 and S-6; Min-X; Digiace; MRC F-700 and F-710; Royal Electronics; Pro-Line; Heathkit PS-9 and IC servos; Larson, and others.

The servo has not been as extensively tested in other installations, but thus far has proven to operate satisfactorily with systems using IC decoders and with the Heathkit system which has an SCS decoder.

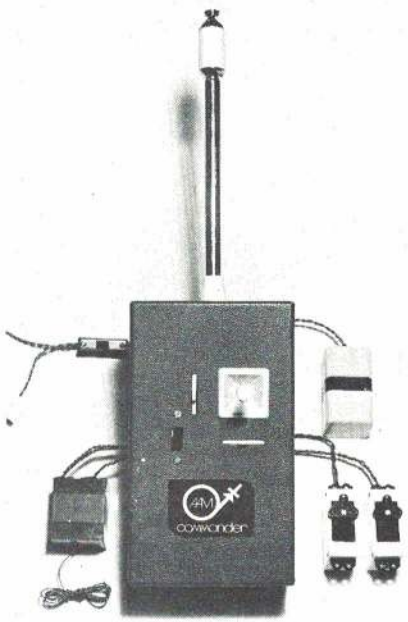
The transmitter will operate one or two channel receiver/decoders but, obviously, is not designed to provide additional channels at this time. It may be safely operated on from 8 to 12 volts with range dependent on voltage. The nominal design voltage is 9V, which provides out-of-visible-sight range. However, one may operate boats, cars, or small sport airplane models on 8V (seven nickel cadmium cells give 8.4V). The receiving system is designed to operate on 4.8V using four nickel cadmium cells, although alkaline energizers may be used. (Carbon-zinc pen-cells are not recommended for this or any other system.)

Simplicity was achieved by the use of inexpensive IC's. They offer two distinct advantages to the home or kit builder: (a) their use permits a drastic reduction in the number of solder joints required, and (b) every IC is tested by the manufacturer (this is not done for discrete components such as transis-

tors). The transmitter is further simplified by: the elimination of a metering circuit; the use of an external battery charger, if any; the necessity for only one stick assembly; and the need for only two tuning points. The receiver is simplified by relieving it of the normal clock and sync pulse forming functions. These functions are performed, instead, by the IC on the decoder. The use of the two-wire power supply eliminates approximately 10 points for potential failure.

The final objective, i.e., potential growth, is not difficult since any digital system is modular. By building two additional servos, changing to a new decoder board which retains all components except for a new IC, adding a new transmitter encoder board which has one IC, four capacitors, two resistors, and of course, a second stick assembly, a four-channel system is produced.

To insure that the system was designed properly and that performance



was optimized, the following procedure was employed. The basic system was developed by first designing the decoder, interfacing it with a well-known and tested receiver operated by a six-channel transmitter. The transmitter was breadboarded and verified on the bench; a p.c. layout was then made and three prototypes constructed. This setup was tested extensively using existing servos.

A considerable amount of effort was expended in the development of a suitable servo amplifier. Center-tap amplifiers using an ML 85 IC were tried and rejected, as was a design using a Darlington amplifier in each drive leg. Amplifiers using a Schmitt trigger in each drive leg were tried but we couldn't achieve the goal of placing the servo amplifier on a single board in the smallest servos. Finally, the World Engines IC chip was selected for the servo. This seems to be ideal and only has the disadvantage of requiring an 11 ohm motor.

The final problem attacked was the receiver design. We first attempted to use the ready-made ACE Micro Gem receiver modified to add AGC. This performs quite satisfactorily in cars and boats but does not provide a sufficient margin of performance for planes. It then became necessary to begin the design of a new receiver which could take advantage of the IC decoder. This done, three prototype units were tested extensively in a two-channel 0.10-powered model called the Flexible Flyer. In order to insure repeatability of the system, artwork and construction instructions were completed and a "pilot" run of ten systems was performed by local modelers.

While the preceding cannot absolutely assure that one will never experience a glitch, it is felt that system performance is well verified.

Another important point, not only for this, but for any digital system whether kit or not, is "In case of difficulty. . ." Except for checks of DC voltage, presence of RC output, and verification of transmitter operation using a monitor, an oscilloscope must be available to the builder of any digital system if he is to perform his own trouble-shooting. Actually, trouble-shooting is quite simple if one can use a scope and knows what the traces should look like. Insofar as practical, this information will be presented, not just to help the builder of the AAM Commander, but also as a means of showing the reader how digital systems work.

It can be hoped that a spark may have been kindled to assemble a complete system (transmitter, receiver, decoder, and two servos) or part of the system for use with an existing system. Here is the planned sequence for the AAM Commander: In this first part of the series, we have described the system in general, and will now present the printed circuit layout, list the components required, describe how they may be obtained, give the drawings for the subassemblies which may be readied for later use, and provide other information useful for getting started. The second of the series will present the schematics, block diagrams, design information, and instructions for assembly of the transmitter and the servo amplifier. The third part of the series will present the schematics, block diagrams, design information, and instructions for assembly of the receiver and decoder. At the completion of these, an entire flyable system will be achieved. To aid in better understanding the system and, as an informative item, the final article will: present system integration procedures; show how parts of the system may be used with other systems; provide trouble-shooting procedures; and indicate changes required for expandability.

Figure 1 presents a full-size print of the printed circuit layout for the complete system. In order to make the necessary boards, have a film negative made of the p.c. layout. This is done by photographing the p.c. drawing layouts on page 53 and having a film negative of this made to the exact same size as presented in the magazine. Special arrangement has been made with AAM's plans service to supply the film negatives for $1.00 per set. These may be ordered by writing to me c/o AAM or directly to the Editor. Purchase one sheet of 6"x6" pre-sensitized p.c. board (Kepro S66G was used to make the pilot systems). Also needed will be one pint of p.c. emulsion developer (trichlorethylene) and etchant. Either ferric chloride or ammonium persulphate may be used. These three chemicals may be purchased from a chemical supply house—perhaps the local druggist can suggest one. One may also purchase the Kepro kit for p.c. boards, which has the necessary chemicals, or purchase them packaged separately from Kepro.

The sensitized p.c. board is not extremely sensitive to light but must not be exposed to direct light. Use a red lamp while working to set up for exposure. Make everything ready (except for actual board exposure) before opening the package of sensitized board. A lamp socket fitted with a 750-watt photoflood bulb, a pane of glass, and two weights will be needed. Pour the developer (not the etchant) into a shallow pie tin. Turn off all lights except the red lamp. Place the p.c. board on a table (copper side up), and lay the p.c. film negative over it—the letters FM must read properly or the boards will be made backwards. Place the pane of glass over the negative and hold in place with weights. Turn on the 750-watt photoflood and expose the board for five minutes from a distance of 7 to 10 in. Place the board in the developer (trichlorethylene) for one minute; agitate while developing. Remove and permit the board to dry for at least 10 minutes. Do not touch and do not blow on the board.

Etch the board in ferric chloride or a solution of 3 oz. of ammonium persulphate per pint of water. (The latter is preferred because the solution is nearly clear, whereas ferric chloride is quite opaque.) The process may be speeded considerably by heating and by agitating the solution. Up to 180° is adequate—it should not boil. About 15 minutes etching time should suffice. It takes much longer at room temperature. Inspect the boards carefully for unetched material which might cause a short. If patience permits, a check between each land and all adjacent lands with an ohmmeter will insure absolutely against such shorts.

The boards are glass epoxy so any attempt to drill with anything less than carbide steel bits is a waste of time. A No. 64 carbide steel drill bit can be used if a very true running collet chuck is used in a Dremel or other high-speed tool. However, bit breakage is a problem. It was found that a No. 1 carbide steel, round dental burr fits one of the Dremel collet chucks perfectly and is at least an order of magnitude better than regular drill bits because the shank is about 3/32 in. diameter for excellent stiffness. One bit should drill all the holes needed. Such bits can be obtained from your dentist's supplier. Larger holes will be drilled in the few places

needed during construction.

Shear the boards, if possible, on a shear used for p.c. boards or on a foot shear used for sheet metal. As a last resort, tin shears will do. Work slowly and be sure the outside line is used for cutting. Haste will make a handful of wasted board! File and/or sand carefully to the final shape. This completes the p.c. boards. Set aside in paper toweling or plastic, where they can't be marred, until needed.

Having procured parts for the pilot models, we have an excellent feel for the job of rounding them up. It is asking for trouble to substitute parts even if you think you know what you are doing, particularly in the case of the semiconductors. No matter what anyone says, the general replacement lines of transistors will not work. Don't buy them! The most general source of supply is through the *Allied* Industrial Catalog, if there is no industrial supplier in your vicinity. Most of the transistors used are made by Motorola, as are the IC's, and are generally available from an electronic wholesale firm.

We are happy to report that arrangements have been made with ACE R/C Inc., Higginsville, Mo. 64037, to kit the system. In addition, ACE will include all the individual components in their 1972 catalog. While one may procure all parts and build the system from scratch, the chore is made much easier by obtaining the kit units. The OEM manufacturer for items is identified on the parts list for those able to obtain parts directly through a distributor.

The following information may help in obtaining components for any project, and to aid in building kits.

Resistors

The resistors used in the system are 1/4 watt composition types that are 10 percent tolerance. There is only one ex-

(Continued on page 56)

Part/Manufacturer/ Distributor	Transmitter		Servos (for 2)		Decoder		Receiver	
Tantalum Capacitors: Components Inc. or Sprague.	3	1.0mf6V	6	4.7mf6V	1	.068mf6V	1	10mf6V
	1	47mf35V	2	2.2mf12V	1	3.3mf6V	2	47mf6V
			2	.56mf12V	1	1.5mf6V	2	15mf6V
					1	47mf6V		
Disc Capacitors: all 12V CRL or RMC except Erie Redcap*	1	.02mf	2	.22mf*	1	.05mf	11	.05mf
	3	.001mf					3	.001mf
	4	.01mf					1	.01mf
	3	.05mf					1	47pf
	1	33pf					1	15pf
	1	100pf					1	1.5pf
							1	18pf
							1	3.3pf
1/4 Watt Resistors: all 10% any source (**) is 1/8 watt	1	330ohm						
	1	47ohm	6	47k	1	33k	1	22k
	2	470ohm	2	22k			1	3.3k
	1	10k	2	3.3k			1	470ohm
	5	4.7k	4	150ohm			5	10k
	2	1k	2	100k			1	2.7k
	1	82k	2	120k**			9	1k
	2	2.7k					2	4.7k
	1	390ohm					1	100k
	1	560ohm					1	100ohm
	1	100ohm					2	220ohm
	2	10ohm						
Transistors and diodes: Motorola except those designated F and GE.	1	2N4871	none (there are over 30 contained in the IC chip)		1	1N4148	1	2N3646
	1	2N3646					3	2N3563
	2	2N6534					2	2N4124
	3	2N6531 or 2N708A (GE) or EN708 (F)					1	1N4148
	1	1N283						
	1	1N5225						
Integrated Circuits: Motorola except that designated WE	2	MC717P	2	WE3141 (WE)	1	SN7404	none	
	1	MC885P			1	SN74L73N		
Inductors:	3	10mHy (ACE)	none				1	5.1mHy tapped (ACE)
	1	22mHy (M)						

MISCELLANEOUS

Transmitter: Stick assembly with 5k pots; Case from ACE; Crystal (select desired freq.); Switch DPDT from Switchcraft 46206LH; Coil form CTC 2173-3-3; Trimmer 7-100pf ARCO 424 by Elmenco; 18" length No. 18 enameled wire; 24" length No. 22 enameled wire; P.C. board, see text.

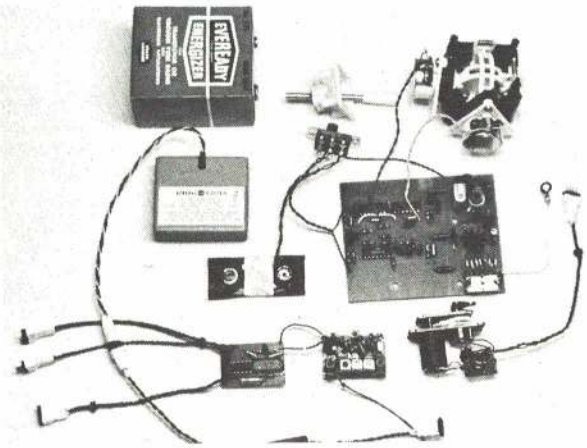
Servo: (Two each of the following): 11ohm Furuichi or Mitsumi 16mm motor from WE; 5k pot element from WE; D-R servomechanism—use either DPS-2 or miniature DPS-3; P.C. board, see text.

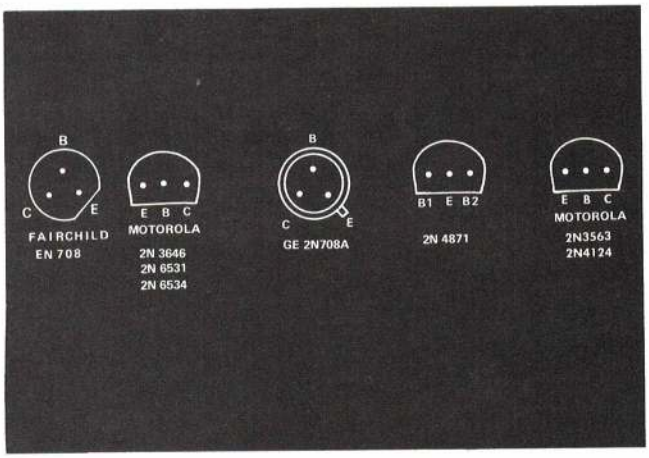
Decoder: 3 Deans 4-pin gold-plated connectors; Switch DPDT from Switchcraft 46206LH; P.C. board, see text.

Receiver: 2 coil forms 5/32" OD from Royal Elec.; 30" length No. 26 enameled wire; Yellow IF LLC4827(T1), White IF LLC238(T2), and Black IF LLC4828(T3), by Miller Co. from ACE or Allied; Crystal (same freq. as transmitter); Plastic case from ACE; P.C. board, see text.

ABBREVIATIONS

mHy . . . . . microHenry
pf . . . . . picofarad
mf . . . . . microfarad
k . . . . . ohm's X 1000
CRL . . . . . Central Lab.
RMC . . . . . Radio Materials Corp.
CTC . . . . . Central Transformer Corp.
F . . . . . Fairchild
GE . . . . . General Electric Co.
WE . . . . . World Engines
M . . . . . Miller
ACE . . . . . ACE R/C, Inc.
Deans . . . . . W.S. Deans Co., Inc.
IC . . . . . integrated circuit





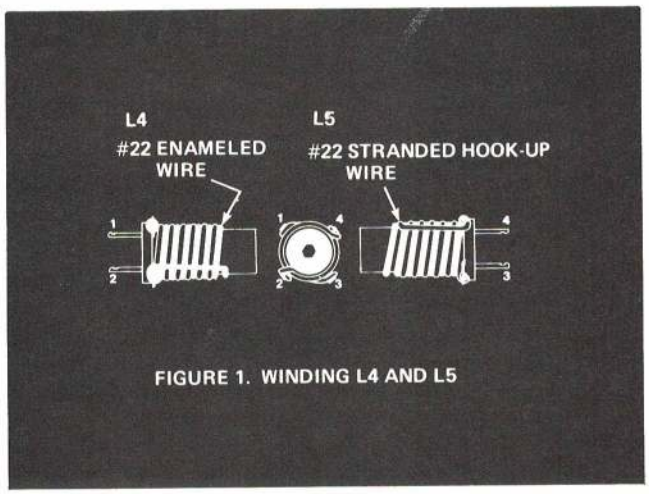
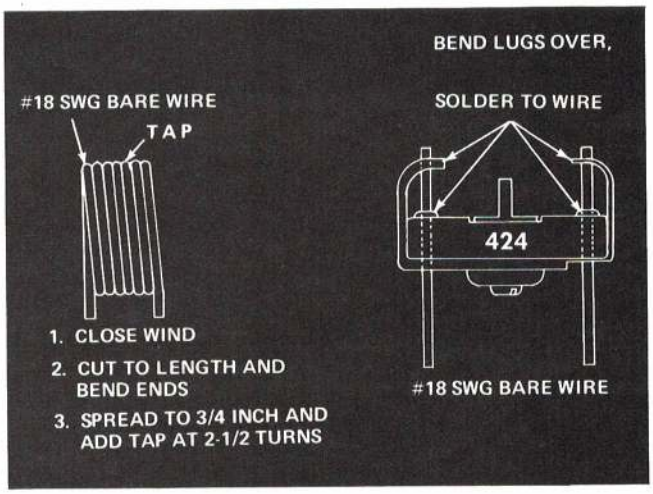
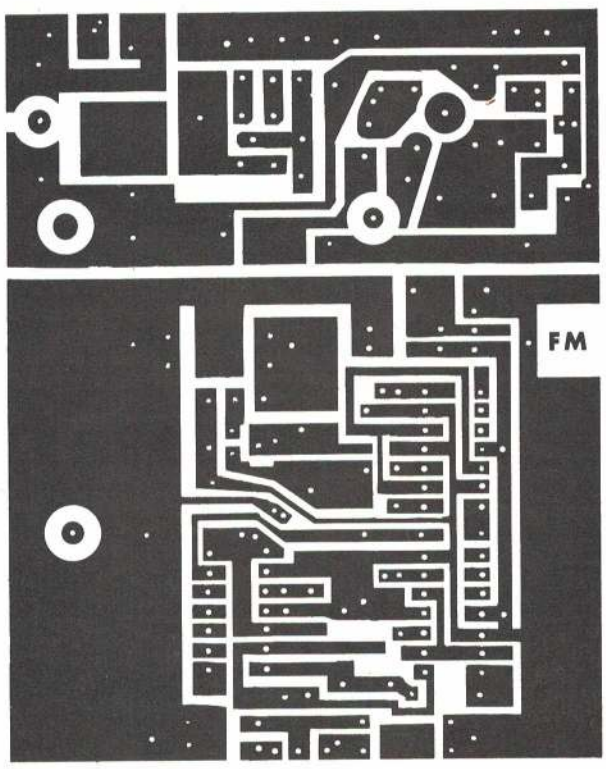
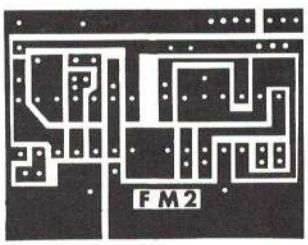


FIGURE 1. WINDING L4 AND L5







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RC Scale Champion

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WITH FLAT BOTTOMED, HIGH-LIFT WING SECTION

WINGSPAN: 69"
ENGINES: .40 to .50
WING AREA: 740 Sq. In.

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$31.95

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This new version of Maxey Hester's Citabria scale design responds gently to the controls, but will also stunt in the tradition of its full-size lightplane counterpart. Ideal for beginners in Scale R-C flying or Sport Scale competition.

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Combination Free-Flight
May be Converted to Miniature
1" SCALE
ENG
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Molded Canopy
Authentic Decals
Covering Material
Hardware Package
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Molded
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AKROBA

Designed and Flown by Mike S

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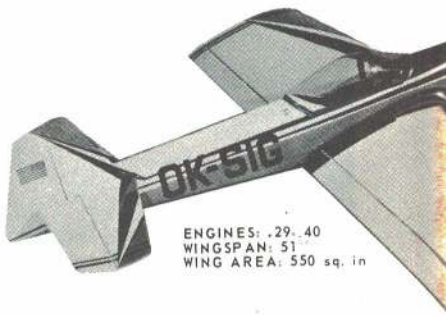

ENGINES: .29-.40
WINGSPAN: 51
WING AREA: 550 sq. in

Maxey Hester's KOMET

DESIGNED FOR AMA AND FAI AEROBATIC COMPETITION
BUT TAME ENOUGH FOR THE AVERAGE SPORT FLYER

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For .45 to .60 cu. in. ENGINES
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Balsa Skin $37.95
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A contest proven design. Flies the stunt pattern without yaw, pitch or oscillation. Precise response for difficult 4 point rolls and knife edge flight.

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Large Detailed Plans With Construction Isometrics
Special Rubber Power Prop Instructions
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34" WINGSPA
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Easy to Adjust and Fly
Covering Material
Die-Cut SIG Balsa
Easy to Build
Full Size Detailed Plans

Designed by Jim Clem

WING AREA: 570 sq. in
WEIGHT: 22 28 oz

THE ULTIMAT
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IE NEW KITS

IN CONTROL-LINE, FREE-FLIGHT AND RADIO-CONTROL

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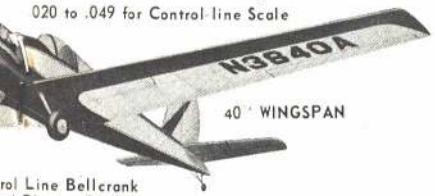
CIZER 1-30

ght or Control-Line Flying Scale
ure R-C Single Channel Pulse Equipment
NGINES: .010 to .020 for Free-Flight
.020 to .049 for Control-line Scale



40" WINGSPAN

rol Line Bellcrank
ed Plastic Cowling
Cut SIG Balsa and Plywood
iled Plan With Construction Isometrics

MUSTANG 450

HOT NEW RADIO CONTROL PYLON RACER

Designed by Hank Pohlman

KIT RC-28
$29.95

MOLDED PLASTIC FUSELAGE TOP
TINTED CANOPY
TOP QUALITY SIG BALSA & PLYWOOD
MOLDED PLASTIC CARBURETOR AIR TUNNEL

WINGSPAN: 49½"
ENGINE: .40 Cu. In.

FORMED ALUMINUM LANDING GEAR
EASI-BUILD CONSTRUCTION
MOLDED PLASTIC CHEEK COWLS
PRECISION CUT FLITE FOAM WING CORE
COMPLETE PLANS WITH ISOMETRIC CONSTRUCTION VIEWS
DETAILED FIBERGLASS RESIN BASE FAST FINISHING INSTRUCTIONS

A sleek-lined speedster that has been flight-proven on the Formula One Competition trail. Simple structural design for low building time. Balsa-based construction provides strength, durability and light weight. Grooves around the racing circuit with precision and style.

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O CONTROLS

Heavy-Duty Bellcrank
Plated Flap Horn
Nylon Elevator Horn
Complete Hardware Pack

Decals for Scale Markings
Two Big Plans Sheets
Isometric Views and Instruction
Die-Cut SIG Balsa and Plywood

Formed Plastic Engine Cowling
Molded Plastic Canopy
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Leadout Wire

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$14.95

CABINAIRE

RUBBER POWERED SEMI-SCALED FLYING MODEL

WINGSPAN: 22"
WEIGHT: 1 to 2 Oz.

DESIGNED BY PAUL McILRATH

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$1.50

KIT FEATURES:
* Complete Building and Flying Instructions
* Detailed Plans with Isometric Construction Views
* Formed Plastic Propeller
* SIG Contest Rubber Strip for Maximum Turns and High Flight Performance
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m and Bob Hanford

KIT FF-16
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NED FOR THREE CLASSES OF FLYING

FLYING SCALE SUPER CADET

1" Scale
35" Wingspan

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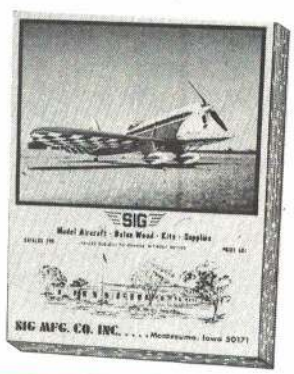
Hardware Package
Control-Line Bellcrank

.020 to .049 Engines in Free-Flight
.049 to .099 in Control Line

For Free Flight, Rubber Power or Control Line
May be Adapted for Miniature R-C Equipment



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SIG MANUFACTURING CO., INC
401 S. FRONT STREET
MONTEZUMA, IOWA 50171

AAM Commander

(continued from page 52)

ception—one 1/8 watt resistor is used per servo. There are four colored bands around the bodies of all the resistors. These will be discussed as the first, second, third, and fourth colors. The fourth color is always silver or gold, while the first color is never silver or gold. Thus, the first color band is quite simple to distinguish. In addition, the first color band is usually closer to the end of the resistor body than the fourth color.

The fourth color identifies the tolerance of the resistor; gold is 5 percent and silver is 10 percent. All the resistors used in the AAM Commander have a silver band. The colors of the other three bands are identified by the following resistor color code:

Color	Number
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

The preceding identify the value of the resistor, in ohm's, as follows: (a) The first band gives the first digit of the resistance value; (b) The second band gives the second digit of the resistance value; (c) The third band gives the multiplier for the value, i.e., the number of zeroes which must be added.

As an example, consider a 270 ohm resistor; the first band is red, for a two, the second is violet, for a seven, and the third is brown for addition of one zero. A 15,000 ohm resistor is identified by brown (one), green (five), and orange (three zeroes). In the schematics, large values may have the multiplier 1000 identified by a k, such as 15k for 15,000 ohms, etc.

Capacitors

The marking of the tantalum capacitors is quite clearly stated; however, disc capacitors may have varying markings. The capacitor will always have two, three, or four digits indicating the value of capacitance. However, there is inconsistency in the characters that follow the digits. For example, a 10 picofarad (10pf), which is the same as 10 micro-micro farads, may have only the number 10 printed on the body. A 250pf may be marked "250Z," a 47pf may be marked 47k and a .05 microfarad (mf) may be marked .05. Nevertheless, the basic value is always marked; the difficulty is in determining the multiplier, if any. The following will be useful in determining the value:

Value in pf	Same Value in mf
1000	.001
2200	.0022
4700	.0047
5000	.005

Most of the values which are .01 or larger are simply identified that way. Quite often, disc capacitors will have markings to identify the voltage rating such as 10v or 1kv; do not confuse this with the value of the capacitors.

The physical size of the capacitor will be determined by its capacitance and the voltage rating. It is desirable to stick to the physical sizes to be shown on the overlay drawings, otherwise things won't fit.

Transistors

The basing arrangement for transistors varies. Figure 2 presents the basing for transistors which will be used in the system. It is hoped that the preceding data will be posted above the work bench during construction.

As indicated earlier, the transmitter and servo will be constructed first. There are some preassemblies that can be done before transmitter construction is started. These subassemblies are shown in Figure 3.

Wind L4 and L5 on the CTC 2173-3-3 coil form as shown in Figure 3. The technique to be used is as follows: Using two pair of pliers, grip the ends of a 24-in. length of No. 22 enameled wire and stretch slightly to straighten and "set" the wire. Scrape 1/4 in. of enamel from one end of the No. 22 enameled wire and solder to terminal No. 1 of the coil form. Strip 1/4 in. of insulation from one end of a 24-in. length of No. 22 stranded hook-up wire. Solder to terminal No. 3 of the coil form. Coat the area of the coil form onto which the coils are to be wound with 5-minute epoxy. Wind simultaneously, clockwise viewed from the top, both the enameled and hook-up wire as shown in Figure 1. Note that the hook-up wire proceeds 1/2 turn to terminal No. 1 before winding of L4 starts. Wind both until about 8 turns are on the form. Hold the coils in place until the epoxy sets; the wires can be unwound as needed with no difficulty.

Working carefully, unwind the hook-up wire until 5-3/4 turns are on the form, i.e., count up 5 turns from terminal No. 3, then on around 3/4 turns to terminal No. 4. Bring the hook-up wire straight down, strip 1/4 in. and tin, then solder to terminal No. 4 to complete L5. Unwind the enameled wire until 6-3/4 turns remain, i.e., count up 6 turns from terminal No. 1, then proceed 3/4 turns more to terminal No. 2 for a total 6-3/4 turns. Bring the wire straight down, scrape 1/4 in. of enamel at the junction to terminal No. 2 and solder. This completes L4. Recheck the completed coils against Figure 3. The epoxy will hold the coils in place.

Wind L7 as shown in Figure 3. The middle size X-acto knife handle is exactly the right size (approximately 1/2 in. diam.) form to wind L7 on. Wind exactly 7 turns of No. 18 enameled or bare wire, bend the ends straight down, and clip to 1/4 in. Remove from the X-acto handle and carefully spread all turns evenly until the coil is exactly 3/4 in. long. Add the tap at 2-1/2 turns

(continued on page 95)

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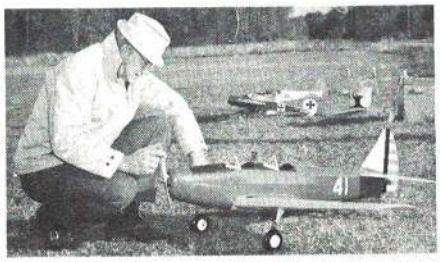
WHERE THE ACTION IS

RADIO CONTROL

DON LOWE
SPORT AND PATTERN

Youth Oriented Club: A news release from Fort Meade, Maryland describes the activities of the Meade Modelers Club. The club, which is open to military and civilian employees of Fort Meade, takes particular interest in attracting and encouraging youngsters to enjoy modeling. President Walt Cislo reports an annual Delta Dart Contest for Boy Scouts with free planes and trophies provided by Special Services. He also encourages newcomers with an offer of flight instruction whether they own their own aircraft or not. We commend this very positive civic-minded attitude.



Meade modeler Walt Cislo prepares his PT-19 for flight.

Rockland County RC Club "Flying Circus": The Rockland County Radio Control Club (RCRC) held its first Annual Model Flying Circus and Auction in New City, New York, November 7, 1971.

This event featured a highly successful "auction" of models, engines, and other supplies, in addition to manufacturer participation, static displays, and a "Swap Shop." A demonstration of RC and UC flying created added interest.

RC flying was demonstrated by George Messetler, using a powered glider, Lou Paretti, with his beautiful Spad 13, and Bob De Grossa, flying his Span-Aero Cub. Bill Simons and Bob Hunt gave terrific demonstrations of UC pattern flying. Extremely gusty wind conditions prevailed throughout the day and forced cancellation of planned RC pattern flights by Jim Martin and Tony Bonetti.

Swap Shop activity at Rockland County RC Club's First Annual Flying Circus and Auction. Note twin-engined pattern ship.

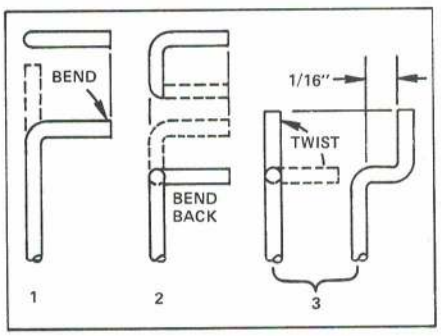
Inside over 1,000 people viewed the many static displays, among which were Walt Moucha's Fly Baby and Jenny, Josh Titus' Ensaldo SVA-5 and Sal Gross's beautiful B-25.

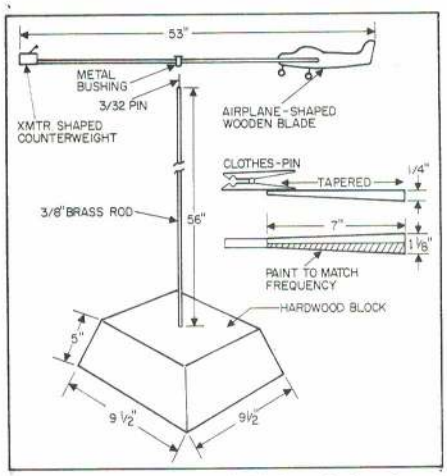
The auction was the highlight of inside activities with over $1,500 worth of merchandise exchanging hands.

Due to the success of this first Model Flying Circus and Auction, it appears that it certainly will become an annual project for this active club. Coming as it does just before the Christmas buying season, it gives manufacturers an excellent opportunity to display their wares to an active segment of the modeling fraternity and the general public.

Automatic Stickum: From the Twin City R/Cer's Newsletter comes word of a contact glue for foam wings which tells you when it's ready to join the skin to the foam. Montgomery Ward's Abrasive Disc Cement No. 84-3209, available for $1.49 per pint, is a latex material using water and ammonia as a solvent. In the can it is gray in color; when spread onto surfaces it turns black in about 10 min., depending on humidity conditions. After color change, it's ready to do its job. . . convenient, eh?

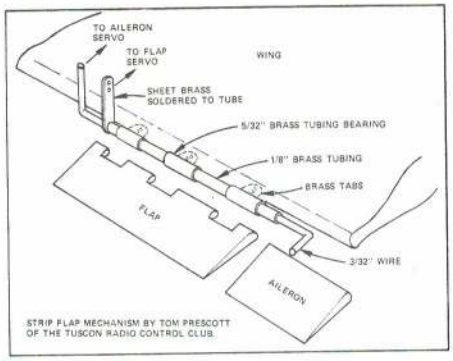
Super Simple—If You Know How: Have you wondered how to make a Z-shaped bend at the end of music wire for various linkage needs? The problem is getting a short straight section for the bearing since even the tip of needle nose pliers is too wide. The secret is revealed by the following sequence. The idea was taken from the Newsletter of the Valley Forge Signal Seekers RC Club.





Nifty wind direction indicator designed and made by Industrial Arts class of Orchard Ridge School for the Madison (Wisc.) area RC group. Clothespin clipped to rod when frequency is in use.

Strip Flap Mechanism: The construction of this mechanism is relatively simple. First, cut 1/8" OD brass or aluminum tubing for the length of flap desired. The flap will actually make three flap bearings out of 5/32" OD tubing about 1/2" long. Solder a mounting flange to the bearing and install on the 1/8" tubing. Install a piece of 3/32" music wire inside the 1/8" tubing and cut and bend per

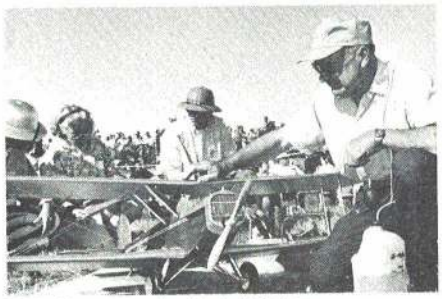


STRIP FLAP MECHANISM BY TOM PRESCOTT OF THE TUSCON RADIO CONTROL CLUB

aileron requirements. The flap mechanism can then be installed on the wing. After the mechanism is installed, the flap, made from aileron stock, can be epoxied to the 1/8" tubing. Occasional lubrication with a little oil will result in exceptional service from this system.

CLAUDE McCULLOUGH
SCALE

Meet The RC Scale Team—II: Bob Wischer has been a familiar face on the RC contest scene since 1956 and has competed in Scale at six Nationals. Before '71 he also always flew in Pattern. Concentrating strictly on RC Scale at Glenview resulted in 2nd place and a coveted spot on the U.S. Team to the Scale World Championships at Toulouse, France, Aug. 2-7. Bob has eight RC scales in his hangar including a Nieuport 17, Bonzo, Sopwith 1½ Strutter, Waco YKS and Cessna OE-2. All have been flown extensively—the Sopwith for example having won eight trophies, including three 1st places at the Rhinebeck WW-I affair.



Scale team member Bob Wischer.

Bob's experience has led to the development of a logical pet theory—wings should be kept as light as possible, especially near the tip. The Douglas M-2 Mailplane he flew last year is a heavy model as far as total weight goes, but the bulk of the poundage is concentrated in the fuselage and landing gear. Ample wing area also aids performance by providing a moderate loading of only 17 ounces per sq. foot.

A product design coordinator at Cutler-Hammer in Milwaukee, Bob lives in nearby Delafield. His wife Dolly is a scale builder also and her Pilatus Porter was featured in a construction article in the Sept./Oct. 1963 **American Modeler**. Bob did the OE-2 in the July 1962 **American Modeler**. Next month: Maxey Hester.

Rare Japanese WW-II pusher fighter design modeled by Tom Tjarda. Has Rossi 60 and retracts.

Help Wanted: Don't forget to send in a contribution to the Scale Team Fund, AMA, 806 15th St., N.W., Washington, D. C. 20005. Put your money where your model is! Let's top those other category funds.

1"=1": Hale Wallace, '70 RC Scale Team member, has been bitten by the homebuilt

fever and after getting his pilot's license last fall, started construction on a Steen "Skybolt," a new 24-ft. span 2-placer by LaMar Steen of Denver. Like many homebuilders, Steen is an ex-RC flier and his aerobatic biplane is set up not unlike a DeBolt RC pattern design.

Since it is difficult to find a really ideal prototype for scale modeling that doesn't have one or more inherent problems, a possible solution comes to mind. Join the homebuilders group, the EAA. Design and build a full-size ship that has lines, areas and shapes tailormade for modeling, wheels and spinner sizes that are even multiples of model sizes, ample space allowed for servos and radio equipment, etc. Take a lot of pictures before test-flying—just in case! Scale down your construction plans and build a model of your "prototype." Should be good for the highest scale presentation at the least.

Gerry Fingler of Canada with his WW I Spad, powered by Merco, guided by Logictrol. Nice flying site there.

C.A.P.: In this case it doesn't stand for Civil Air Patrol but Complete-A-Pac, the outfit in Scotland that started with a line of RC Scale plans and expanded them to canopies, spinners and parts, then to full kits. Among their products are such names as Stuka, Mosquito, Skyraiders, Jungmeister, SBD, and Gladiator. Bud Nosen, of Nationals P-47 and Skyraider fame, will be offering their extensive selection and hopes to be handling other plan lines for scale models soon. List available from Bud at Box 105, Two Harbors, Minn. 55616.

Try It—You'll Like It!: Anyone who does fiberglass work will appreciate Mike Stott's handy putty formulation. Simply mix talcum powder into resin until it is thick and pasty. Add the usual amount of catalyst. This will fill seams and pits, without running or dripping. It is especially useful for building up or changing molds and patterns for vacuum forming or fiberglassing. The stuff smooths on easily and adheres just as well as raw resin. After it is partially hardened it can be cut cleanly with an X-acto knife or carved to shape like a bar of soap.

BOB STOCKWELL
PYLON RACING

Rule Changes for 1972: As you may have heard elsewhere by now, though I'm told that quite a number of people hadn't even known there was going to be a contest board vote until they read about it in my November column, the NMPRA proposals were approved, with one exception, by the AMA Contest Board. The proposal they did not approve would have allowed novice fliers to have their aircraft landed by experts, without disqualification, provided that the novice had completed his ten laps and received the checkered flag. I wish a few more of the CB members had tried to land a hot pylon ship deadstick on a tight field before they voted. The planes groove and fly relatively easily. A beginner can take off and fly a decent, if high, course long before he can land without tearing up his machine. Ron Schorr, who ended up 19th for the season in So. Cal.—good show, when you consider there were 93 *active* Formula I fliers in So. Cal. this season—might still be building planes to replace the ones he crashed on landing if he had not had Whit Stockwell, Larry Leonard, and Bob Smith around last season landing pylon racers for him at some of our smaller fields.

D.C. May's Minnow—a very consistent flying machine. D.C. is S.E. NMPRA Vice-Pres.

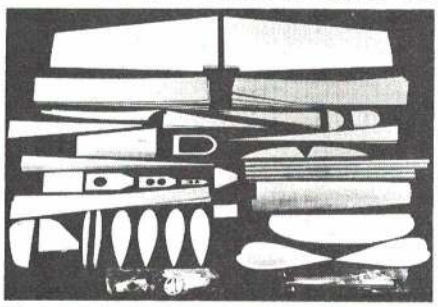
But they did approve the very sensible "stock engine" qualification: namely, that engines may only be altered by removing parts or material from parts—no material or parts may be added. And they approved the engine inspection proposal: post a $25 bond if you want another flier's engine inspected by experts (*not* including yourself, even if you're an expert). You get the bond back if the engine is declared illegal, and the owner of the engine keeps your bond if he's within the rules.

They also approved a safety provision which allows the starter to "black flag" any dangerous flying—and it is not subject to protest. They finally got rid of the old handicapping system, too. All starts are at 1-second intervals (about as fast as the starter can drop the flag four times in succession), and starting position is determined by lining up the aircraft from best to poorest and assigning numbers, with the relative position being determined by scale fidelity, workmanship, and excellence of appearance as judged by experts. Preprocessing has been deleted from the rules.

Kits and Parts: PB Products (8509 Lennox Ave., Panorama City, Calif. 91402) has finally solved the problem of wheelpants for us all. They make a beautiful set, each pant already in one piece with an inset for the collar/holders which are supplied (for 5/32" wire). You shape your fairing smoothly up around the holder, and everything is held on just by the collar outside the wheel. It's neat, light, and (in our experience) foolproof.

PB Products is also kitting the Miss DARA now, a beautiful fiberglass fuselage (epoxy resin) and a very clean, fast wing. Though Bob Smith and his immediate group were the only ones flying it last season, we expect to see a lot more of them this year.

Another exceptional kit from last year is John Garabidian's Miss Dallas. It's all-balsa, with pre-shaped turtledeck and nicely fitting parts. Lee Frey (4th in Southern California) flew it with great success all season, and

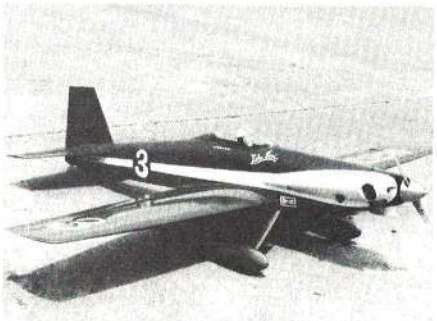


Display of the Miss Dallas kit by John Garabidian.

Nupen/Faber (2nd in So. Cal.) turned to it during the latter half of the season with equally good success. John's address is 909 N. 3rd St., Montebello, Calif. 90640.

Season Championships, 1971: There was no overall grand champion in 1971, nor even a National NMPRA Champion in Formula I, Formula II, or FAI (except that the team which won the Nationals and the Internats, Telford/Violett, was declared NMPRA Champion and the whole USA delegation had shirts supplied by NMPRA). Instead, there were district championships declared in the two most active districts: Northeast and Southern California. Under the system used in previous years, the Southern California Champion would also have been the National Champion, since he accumulated substantially more points than anyone elsewhere. But the whole point of changing the system was to give the fliers outside of California a better chance to compete, in the national standings, against the vastly larger point-gathering population of Southern California. It is no accident that the Southern California champ was also national NMPRA champ in 1968 (Granger Williams), 1969 (Whit Stockwell overall, Jack Hertenstein Formula I), and 1970 (Terry Prather and Larry Leonard overall, Terry Prather Formula I).

The reason there was no NMPRA Grand Champion, or others, in 1971 is that the intended "Tournament of Pylon Champions" fell through at the end of the season, mostly because communications had broken down and the accumulated points of most fliers outside of California and the Northeast had not been reported. In the Southern California District the Formula I Champion was Terry Prather again, with the Nupen/Faber team second and George Killeen third. Terry had 327 points, Faber 319, and Killeen 315. Just a point back was Lee Frey with 314. In the Northeast, champions were declared in both Formula I and Formula II, and the Grand Champion in that district was Hal deBolt. He was second in both Formula I and II, but he accumulated the most points overall. First in Formula I was Adam Sattler, who was also third in Formula II. Kent Landefelt was first in Formula II and third in Formula I. Do you get the feeling that the three of them had things sewn up tight in the Northeast? Hal deBolt has collected so many NMPRA championship shirts over the last four years that he could wear a different one every day of the week.



From Rhodesia, John Hancock's beautiful Little Toni FAI racer. Note laminar, but thick wing.

The 1971 Winter Nationals: If you weren't at Marana Air Park over Thanksgiving, you missed some great racing. The results, through the first five: (1) Whit Stockwell 1:43.5, Shark, Supertigre; (2) Dan McCan, 1:41.1, Miss DARA, H.P.; (3) Nupen/Faber, 1:45.0, Miss Dallas, Supertigre; (4) Mike Barna, 1:42.0, Minnow, K & B; (5) Ed Hotelling, 1:44.0, Shark, K & B. The race was attended by half a dozen fliers from Texas (Ed Rankin placed 6th), by Norm Page from Chicago (he won the fly-off in Pattern, but over-rolled into the ground with his pylon ship), and by competitors from all over the west.

This is the first race we've seen where there were almost as many Supertigre ABC's as there were K & B Torpedoes. All the Texans had Tigres, as well as Stockwell (special thanks to Roger Owen and Terry Prather for that one, which was absolutely stock but beautifully set up and broken in), Nupen/Faber, Prather, Hertenstein, and Lee Frey. The two H.P.'s, McCan's and Ron Schorr's (tied for 8th) also did well. The Torpedoes are still the most widely used engines, and likely to remain so with the new '72 series (though they may even be harder to get than an ABC with the limited production). The season coming up will be an interesting one: K & B is determined to win the Nats this year; the list of formidable ABC fliers has grown in '71, and both groups have their work cut out for sure.

This is also the first race we've seen where only two of the top ten finishers flew Minnows; there were three Sharks, two Miss Dallas's, one Miss DARA, one mid-wing Cosmic Wind, one Midget Mustang, and two Minnows. How's that for variety, and a nice change of scenery?

WHERE THE ACTION IS *Continued*

FREE FLIGHT

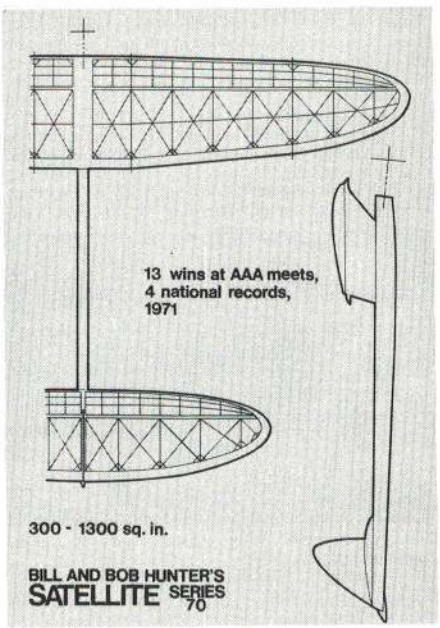
BOB MEUSER
SPORT

Directory of Free-Flight Suppliers: These suppliers are sources of the necessities and conveniences for the serious Free-Flight modeler, for which the demand is insufficient to induce the regular hobby shops and distributors to keep them in stock. Those who sell only hopped-up or old-timer engines have not been included, as my information on them is incomplete, but I will generate that information if there is sufficient demand. I will also add to the list in future columns as more suppliers come to my attention. Space limitations permit the presentation of only a brief general description of the items stocked. Write directly to the supplier for complete lists and prices. (This listing does not constitute an endorsement of either the supplier or his supplies.)

AERO LITE, 36659 Legestone Dr., Mt. Clemens, MI 48043; indoor balsa and supplies, torquemeters.
BAHRMAN, George, 10644 Burbank Blvd., N. Hollywood, CA 91601; fiberglass booms, pacifiers, Teflon thrust washers.
BALDRIDGE, Bill, 1464 S. Lafayette, Denver, CO 80210; Bartel's fiberglass props to 11-in. dia., Seelig timers.
CLEMCRAFT, Jim Clem, P. O. Box 524, Sand Springs, OK 74063; OkieBird kit, ½A Medicine Man plans.
DONDE, Arik, 1541 E 191, Euclid, OH 44117; thin-walled aluminum Coupe, Wakefield, and Unlim motor tubes.
F.A.I. SUPPLY, 1112 W. Mission La., Phoenix, AZ 85021; full line of kits, supplies, accessories.
F AND D HOBBY SUPPLIES, 46 West Walk, West Haven, CT 06516; Bartel's fiberglass props, all sizes.
FREE-FLIGHT SPECIALTIES, 6255 S.W. 47th Pl., Portland, OR 97221; Wakfield prop hubs, photo-reduced old-timer plans for 020 engines, etc.
GALBREATH, Doug, 707 2nd St., Davis, CA 95616; Seelig timers, Bartel's props, Rossi 15 engines.
HI-FLY ENTERPRISES, 7212 Vassar Ave., Canoga Park, CA; hand-launch glider kits; 020 sport, and competition kits.
JASCO, Frank Zaic, P.O. Box 135, Northridge, CA 91324; graded series of educational and sport models, Year Books, Pirelli, misc. hardware.
M AND L MODELS, 145 Forest Hills Rd., Rochester, NY 14625; geared two-motor prop unit.
M & P ENTERPRISES, 1222 Briarcove Dr., Richardson, TX 75080; competition HL and tow glider kits, gas kits, misc.
MARLOW ENGINEERING, 6850 Vineland Ave., North Hollywood, CA 91605; machine—cut balsa prop blanks, sport kits, rubber—power hardware.
McDONALD, 2523 Greenport, Dallas, TX 75228; chrome and clear mylar, ½ and 1-mil.
MICRO-DYNE, Box 2338, Leucadia, CA 92024; indoor and scale kits, plans, supplies.
MICRO-X, 5200 Seven Pines Dr., Loraine, OH; indoor supplies and accessories.
NFFS SERVICES & SUPPLIES, P.O. Box 322, Dallas, OR 97338; large variety of plans.
NFFS, P. O. Box 521, Franklin, MI 48025; Meisnest props for FAI Power.
OLDTIMER MODELS, 7454 W. Thurston Circle, Milwaukee, WI 53218; rubber-power kits, plans, supplies, accessories.
PLANS & THINGS, W. C. Hannan, P.O. Box A, Escondido, CA 92025; sport and scale plans, rubber-power supplies.
SATELLITE CITY, Bill Hunter, 9486 Sandusky, Arletta, CA 91331; plans of Satellite for 049 to 65 engines, mylar covering.
SCHAFER, R. L., 1802 Pennsylvania Ave., Coer d'Alene, ID 83814; lightweight towline for A/1.
SOBOLA, Dan, 1720 N.W. 138 Ave., Portland, OR 97229; pre-WW2 superfine tissue (half the weight of regular tissue).
TAYLOR, James, 9608 Parsifal Pl., N.E., Albuquerque, NM 87111; Wakefield front ends, aluminum motor tubes, engine pans for FAI-Power.
VAN NEST, Bob, 11026 Quill Ave., Sunland, CA 91040; own brand fiberglass props and engine pans for FAI-Power.
WHITING PRODUCTS, Box 176 Wall St. Station, New York, NY 10005; glider and rubber-power kits and supplies, including the adjustable stick-model thrust bearing used on Jimmy Johnson's record-breaking Unlimited (October 1971 **AAM**, page 40).
WILDER, Bob, 2010 Boston, Irving, TX 75061; torque meters for Coupe and Wake, winder with ball bearings and turns counter, custom machine work.

Red Face Department: January 1972 **AAM**, page 37, two inches from top of first column, should read "However, the calm-air types tend to have more rearward CG positions. . ," as the graph shows. Sorry.

Walter Prey, strongest advocate of Class-D power event displays his beautiful Satellite 1300.

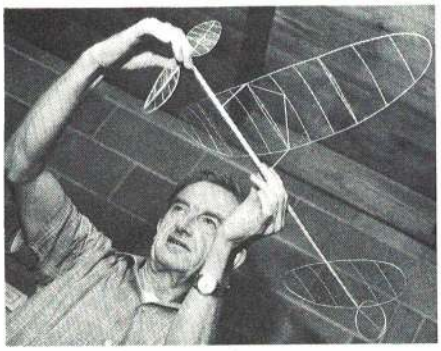


Second Orbit of the Satellite: In 1958 the model press accurately described the Satellite as the "winningest ship in the U.S.," and it appears to be headed toward regaining that title, if its 1971 performance is any indication—four national records (C Open, A Junior, B Junior, C Junior) plus *twelve* first places at western AAA meets, in addition to a first in C-Gas at the Hurricane AAA meet in Florida. (Not bad for a non-kit model!) The original version looked like a Goldberg Sailplane on a Metrecal binge, employed built-up fuselage, undercambered multi-spar wing with sliced ribs. Series 70 features a slab-sided box fuselage, flat-bottom 9%-thick airfoil, and diagonal ribs. Plans for six versions from 300 to 1300 sq. in. are available from Satellite City (see directory).

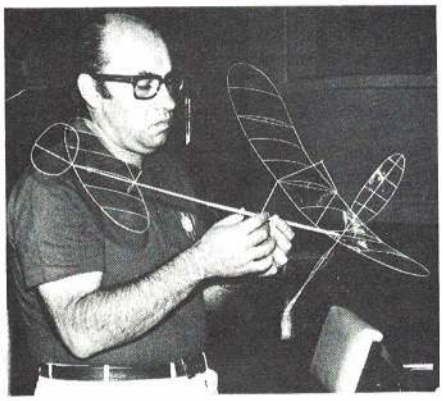
BUD TENNY
INDOOR

Contest Action: Cat. II contests are planned for March and April at the Brig. Gen. Richard L. Jones Armory in Chicago ('71 Nats site). Contact Pete Sotich, 3851 W 62nd Pl., Chicago, Ill. 60629. The Annual LIAMAC Indoor Meet is April 30, 1972 at Cantiague Park, Hicksville, L.I. Contact J. G. Pailet, 30 Emerson Rd., Brookville, Glen Head, N.Y. Tech Model Aircrafters' Annual Indoor Meet will be held in the M.I.T. Armory, Cambridge, Mass., April 8, 1972; contact Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778.

Why Rubber Lube?: Beginners to rubber model flying often fail to appreciate the need for rubber lube. Any time a rubber motor is wound up tightly, the individual strands rub against each other and scruff up the surface. Rubber lube coats the rubber and prevents scuffing. It also permits the rubber to slide easily as it unwinds, thus wasting less energy. Good rubber lube can be made by mixing surgical jelly and glycerine in equal parts. Rub this mixture into the motor until it is thoroughly covered, removing the excess to keep it off the model.



Indoor is certainly international. Photo shows Boyd Felstead of Australia preparing to launch his plane at the 1970 Australian Nats. Other picture finds Alberto Barilari of Argentina checking wing mount at his National meet.



Prop Wobble?: Inexperienced indoor fliers sometimes assume that a wobbling or fluttering prop is out of balance. Indoor props are so light, and turn so slowly, that weight is almost never a problem. Rather, if the two blades have different pitch (blade angle), one blade pulls harder than the other and creates the out-of-balance appearance. Check the blade angle by returning the prop to the block it was built on, or sight along the end of the prop to compare angles. Twist the spars until the blades appear to have the proper angles, then test fly. When the wobble disappears, you've got it right. Another cause of wobble is damage—if the leading edge is broken, or a couple of ribs are loose, that blade is not structurally balanced with the other and causes a wobble. Repair and test fly to see if the blade angles are satisfactory. Finally, if a prop wobbles under high power and not in the cruise, the structure is unbalanced (strength-wise) and a new prop will most likely have to be made.

BOB HATSCHEK

GADGETS AND EQUIPMENT

Free-Flight Finders: This is the windy time of the year in many parts of the country, which means longer chases than later in the summer. But no matter what time of the year, it's always a good idea to improve your retrieval odds.

One item that can be especially valuable, particularly in rough terrain or at an unfamiliar flying site, is a good compass. Two types that can be worth more than their weight in hopped-up Rossis are the string compass and the lensatic (or engineer's) compass. With either type it's possible to take a reading of the model's line of sight, then take back-sights to where you launched from so you know you're still on the right track. At prices ranging from a couple of dollars upward, no serious free-flighters can afford to be without one.

Binoculars are another invaluable aid, but the variety available makes it difficult to pick the best pair for our purposes. Since most of them have never even seen a real hot model airplane, they're virtually at a loss to suggest what type of binoculars are best for the job.

If you can afford it, you may even want to get two pairs of glasses—one for upwind, and one for downwind (that is, one pair for use at the launching site, one pair for a retriever to carry).

What's required upwind is the type of binoculars birdwatchers use. Magnification greater than 8 is no good—the glasses get too heavy, the field of view is narrowed, and they're extremely difficult to hold steady for a 3-minute max much less a 5-minute one. Six-power is plenty, though some modelers prefer 7X or 8X. Anything greater than that should be avoided.

Moderation is also called for in light gathering power. That's the second number in binocular specifications, such as 7X50. The second number identifies the diameter of the objective (the front lens) in millimeters. Hence a 7X50 magnifies the view 7 times and has a front lens 50 mm in diameter. Actual light gathering ability is found by dividing objective diameter by magnification (50/7 = 7.1 in the above case) to find the diameter of the exit pupil (7.1 mm) and then squaring this (7.1 x 7.1 = 50).

We fly most often in the daytime, and in broad daylight the human eye won't benefit from a 7.1 mm exit pupil, since the pupil probably will be contracted to less than 3 mm. Thus a pair of 6X30 glasses, with an exit pupil of only 5 mm, will still seem as bright even though the brightness index will be only 25.

This also cuts both the size and weight of the binoculars, and results in a lower price as well. Prices vary considerably, but some pretty good glasses can be bought for under $30.

Downwind is another story—light weight and small size are vital. For this purpose your Power columnist uses a pair of 6X18 Nikon ultra-compact binoculars. The 3-mm exit pupil is more than adequate in all but the murkiest weather, they're under 3 x 4" in size, and they weigh about 8¼ oz. The typical discount price was $45.

Another excellent downwind binocular is the Bushnell 6X25, giving a bit more brightness, but heavier (12 oz.) and more costly (about $55) than the Nikon.

Erector-Set Optics: One assembly that seems to do everything for the flier but retreive the model is the device put together like an Erector Set by Frank Paulin (see photo). Mounted on a standard camera tripod and carefully aligned with one another are, from bottom to top, a pair of 7X50 binoculars, a telescopic rifle sight, and a string compass.

To understand what Frank Paulin is doing, see column. Remember FF is inexpensive and you only need a Honda 50 to chase the plane, too.

Frank tracks the model with the binoculars. When it lands, he locks in with the cross-hairs in the rifle sight. And then he takes his compass reading. Until the model is actually picked up, Frank clamps the tripod head and attaches a sign telling people not to fiddle with the settings.

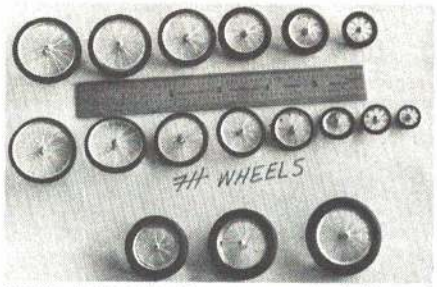
To make things even easier, Frank has taken a number of aerial photos of his regular flying site (Galeville, N.Y.) and the surrounding terrain. These are covered with acetate plastic, and any number of sight lines can be drawn with grease pencil—not to be erased until each ship has been retrieved. The system really works!

WALT MOONEY

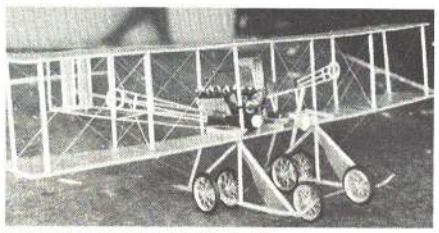
SCALE

Flightmaster's Annual Meet: This year's Jumbo Scale contest was again won by Hal Cover flying his D.H. Pussmoth. It climbs out like a Wakefield and leaves the competition far below. Kingsley Kau, who looked like he had a good chance with his Taylorcraft, was wiped out when Walt Mooney's D.H. Hummingbird flew between Kingsley and his holder during the winding operation. Kingsley was well clear of the takeoff area and the D.H. was launched in the other direction in the takeoff area but the perversity of inanimate objects took over. The Hummingbird survived quite well, due to birch dowel leading edges and MonoKote covering, but the Taylorcraft did not fare nearly so well.

More Hungerford Products: Some columns back we recommended the wire spoked wheels manufactured by Fulton Hungerford. (Pictures indicate the wide variety available.)



Here's Hungerford's new product line of spoke wheels for peanut models.

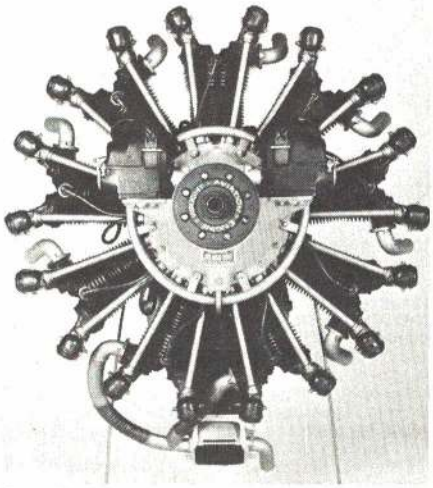


Hungerford's Wright "Baby" racer.

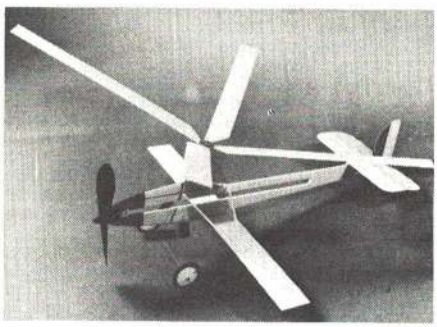
He also builds beautiful scale models. His Wright "Baby" racer is a superb example. It uses six of the wheels, which add to the scale appearance of his model.

The Williams brothers have come up with another superb addition to the modeling art. They have just released a 1½" to 1' scale model kit of the Wright J-5 "Whirlwind" engine. This engine was used in many famous aircraft including "The Spirit of Saint Louis," the Bellanca "Columbia," the Stinson "Pride of Detroit," and Richard E. Byrd's Fokker trimotor "America." It's a beautiful kit and I predict it will inspire a rash of 1½" to the foot scale models.

Model Autogyro: Bill Hannan is one of a handful of model builders who can make a model autogyro fly well. His semi-scale profile Avro 611 is an interesting example. It flies quite nicely and, according to Bill, a little better without the wings than with them. He has always maintained that the record-holding model autogyros are more airplane than gyro and wings are not necessarily a help, so the characteristics of this model are very pleasing. If you are interested in a challenge, try an autogyro some time.



Complete kit for 1½" to foot Wright J-5 Whirlwind will inspire many a project. Available from Williams Bros.



Hannan's Avro 611.

Peanut Scale Model Struts: Peanut scale models of World War I vintage often require struts of very thin cross-section. The problem is how to make them both strong and light. Piano wire is strong, but if kept light enough, it is prone to bending. In addition, it usually requires a balsa fairing that is difficult to cement in place and breaks easily. Sig Manufacturing Co. of Montezuma, Iowa markets 1/64" thick birch plywood which can simply be cut into Peanut Scale type struts. It is light, strong and flexible enough to give a little on impact and so absorb the shock instead of breaking. It is also easy to cement in place. The struts on the Peanut Scale Fokker D VI pictured are cut from Sig 1/64th plywood and were colored with felt pen.

BOB STALICK

GLIDER AND RUBBER

The Starting Point: Jerry Farr writes of the success of the Key City Prop Twisters in developing a model aircraft program for youngsters. It should be no surprise that Frank Ehling's ubiquitous AMA Cub is the nucleus of the activity. Jerry states: "The program was part of the summer activities planned by

Guess who won Key City Champs for 11-year-olds? Yup, she did.

the parks department. Eight sites in the city were selected for the building and flying in the elimination contest. The top three times in each age group from each site went to the city championships two weeks later. This means 72 kids to fly off the top place. Radio stations, newspapers and TV talk shows with the Chamber of Commerce, plus the TV news coverage gave the AMA and modeling in general a great shot in the arm.

"Any club that hasn't sold this idea to someone, somewhere in their town just isn't trying! Abilene, Texas has a population of less than 90,000 and we had no trouble getting this contest off the ground.

"Our thanks to the hobby industry and AMA for this program and the help that comes with the package."

To add a few words to Jerry's enthusiasm, it is fitting to say that the Delta Dart program has been successful in towns of all sizes around the USA. All that is needed is a little push and some organization. Write to AMA for the full details.

To Continue: It is a pleasure to report on a very successful young man who has progressed past the AMA Cub phase at age 15 into the more expert field of competition Wakefield. George Lewis indicated, at the 1971 Toledo Conference, that his son Peter was having a go at Wakefield for the upcoming FAI team selection program. Peter intended using the reliable Frank Heeb StratoWake design, which had been pretty much completed by then. He was very intent on doing all of the work himself and considered Dad an interference to his ambitions, so Dad chuckled a bit and let the boy alone.

The qualifying trials came and Pete was ready. In fact he qualified for the Bong semi-finals by recording the necessary 14-plus minutes in seven flights. I met Peter again at the 1971 Nationals. This time he was busily engaged in getting his StratoWake ready for his third official in Unlimited Rubber. Sure enough, while his father and I were gabbing, Pete moved away so he could concentrate on what had to be done. It paid off too, and even though he had help on the retrieval end, he did all of the rest on his own, including the winding and launch times. He won fourth in Unlimited and third in Wakefield for his age group.

Peter Lewis lets his Dad hold the model for winding and does the launching himself. Quite a story here—see the text.

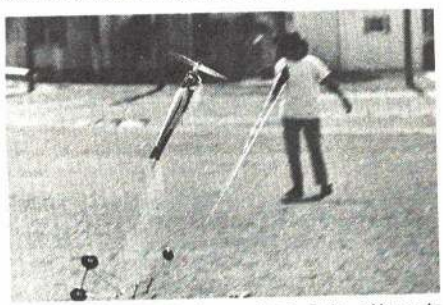
Then came Labor Day with the Bong Semi-Finals. There were 18 qualifiers in Wakefield—some impressive competition, especially for a 15-year-old. Some old hands had been on previous FAI teams, but Pete didn't mind. He ended in 9th place, just two places from going to the USA finals. Better watch out two years from now—he'll have that much more competition under his belt. **AAM** extends its congratulations to a fine young competitor and wishes him continued success.

NFFS Supplies and Services: The National Free Flight Society has undergone some massive changes recently. One of the most exciting for free-flighters is the new supplies and services division, now beginning to gather all NFFS supplies under one roof and to research and develop new FF items. If you have some ideas that you would like to see produced, but can't find anywhere, drop a note along with your suggestions to NFFS Supplies and Services, P. O. Box 322, Dallas, OR 97338. NFFS Symposium reports, plans, back issues, epoxy and other items are also available at this new address.

CONTROL LINE

BILL BOSS
SPORT AND SCALE

Scale Data Source: At one time scale modelers were able to obtain almost unlimited information from various governmental agencies—in the form of tech orders, maintenance manuals, etc.—which helped the scale builder during the construction and detailing of his models. Over the years these sources of technical data have all but disappeared. A source of these documents on a wide range of aircraft has recently come to my attention and I would like to pass along this information. Air Service Caravan Co. Inc., Municipal Airport, New Bedford, Mass. 02747 has copies of many manuals on maintenance, engines, structural details and instrumentation. For a listing (43-page catalog) of all the manuals available, send $1.00 to the above address. Should you place an order for a manual, the dollar fee charged for the catalog will be credited toward your purchase.

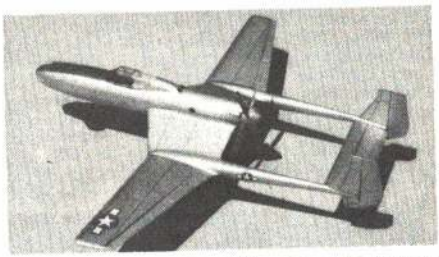


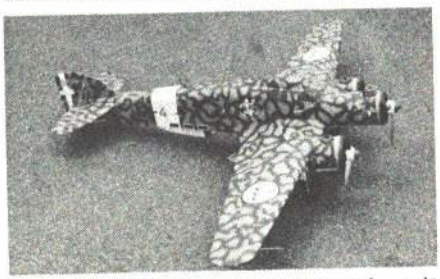
Anxious moments here. Rod Sato attempts "dolly" takeoff with 40-powered Voodoo and lines snagged on the grass for just this second.

Make Your Own Decals: While putting the finishing touches on a model, sometimes a special design or insignia is required. This is particularly true with the scale builder who is fashioning his model after a craft used in a particular theater of operation. If no decals are available for the special insignia or design, the usual method is to try and paint it on. This procedure leaves no room for error. Therefore the following suggestion by Marv Wentz will allow you to make your own decals and preserve that final finish.

Start by determining the exact size of the design, numbers or insignia required. Make a frame of 1/8" square balsa that is slightly larger than the design. Next, clear dope a piece of tissue to the frame along the edges, and when dry water shrink the tissue.

When the tissue is thoroughly dry, draw or trace the design on the tissue. A very soft lead pencil should be used so as not to puncture the tissue. Paint the traced design with appropriate colors applying several coats if required. Allow to dry thoroughly. Now remove the painted design from the balsa frame and cut out the design with a pair of scissors. Your homemade decal is now ready for application to the model. One word of caution—use dope sparingly so as not to soften the paint too much. A great advantage of making your own special designs in this manner is that if a mistake is made, the plane's finish is not damaged and all that is lost is a little time and effort. It's better to have to do the design over than to repair the plane's finish.





Dave Dulaitis' unique low-powered scale Ukies are the Dornier DO-335, Vultee XP-54, both using 35's, and his Savoia Marchetti 79 which uses three 19's. Most modern scale jobs use big 60's.

Helpful Hints: All of us are constantly looking for a better way of doing something or perhaps trying to figure out how it was done. Each month the Club Newsletters sent in are scanned for Helpful Hints and Tech Tips. If you should have an idea or tip on how to do something special we'd like to hear about it. The following tips have been taken from recent newsletters.

Tint Canopies—Use any clothing dye. Prepare according to instructions in a container large enough to immerse the entire canopy without bending it. (If bent the hot solution will reform the canopy to an irregular shape.) If the canopy has a salvage edge, leave it on until tinting is completed. Darkness of the tint is controlled by the time the canopy is held in the dye solution.

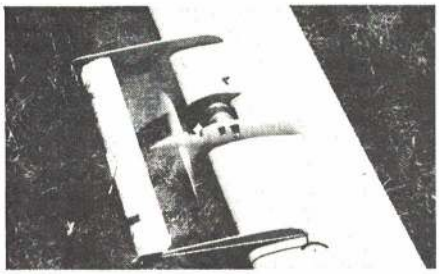
Fiberglass Filler—Automotive lacquer putty is great for filling pin holes and minor abrasions.

Balsawood Filler—Vinyl latex base spackling compound can be used for filling nicks and gouges in balsa before covering. The filler is water soluble and sands well after it sets. Compound can be purchased at local paint or hardware store.

Wing Tip Weights—Modelers can find exact size wing tip weights by obtaining automobile wheel balancing weights from local gas station or wheel alignment and balancing center. The weights come in ½ oz., 1 oz., 2 oz., etc. sizes.

HOWARD RUSH
COMBAT

Canards: The canard configuration, in which the tail goes first, has the wing and stabilator both lifting in the same direction—a big advantage if the plane can be made stable. Bob Dick of Riverdale, Maryland located the CG at the wing leading edge to get a stable-flying canard Winder. Bob experimented with ½A models to find the dimensions and CG location that worked for the Winder.



A canard for Combat? Sure, and it does cut the ribbon. Wonder how he starts it? Looks awkward, but is stable—yet turns tight. See text for more on Bob Dick's odd Winder.

FAI Activity: Stephen J. Fauble of Dixon, Illinois suggests an informal, FAI-size combat contest after official competition hours at the 1972 Nationals. Let me know if you are interested. We'll organize it and take streamers.

Seems Voodoos get altered regularly. Here's Jack Bell's six-engined (all 049's) version. Note that two are pushers!

Fuel Recipes: The best fuels we've found for sport and combat flying have three components: nitromethane, methanol and synthetic oil. For sport, stunt, and slow combat, use 5 to 15% nitromethane. For competition combat 30 to 40% nitro works best in Fox and Supertigre engines. All formulas use 20% oil. The remainder is methanol. Almost all nitromethane available now comes from Racing Fuels, Inc. of Dallas and can be bought from a speed shop which supplies serious drag racers. It is yellow because of an added indicator dye. If the dye turns blue, it indicates that the nitro has become sensitive to shock and is a potentially hazardous explosive. Straight nitromethane has a specific gravity of 1.13. It is wise to take along a hydrometer while shopping for nitro because diluted nitro is often misrepresented as the real thing. Synthetic oils burn cleaner than castor oil, mix better with nitromethane and seem to lubricate more effectively. Examples of these oils are Union Carbide's Ucon LB-625 and Klotz Special Formula, which can be found in motorcycle or go-cart racing shops, as can methanol. Many commerical fuel manufacturers have already switched from castor oil to synthetics. Sig, whose fuels are now made with Klotz oil, supplies Klotz, Ucon and other lubricants to the home brewer. Custom Blend fuels, made by Randy's Model Aeronautics (340 Diana Dr., West Carrollton, Ohio 45449) can be ordered in the above formulas or custom-mixed to your specifications.

Other Ingredients: Amyl nitrite and nitrobenzene are very poisonous and do no good for glow fuel. A pinch of propylene oxide (about 2%) will help starting in cold weather and make needle settings broader. In very hot fuels, ½% of tricresyl phosphate will help prevent piston and sleeve scoring.

JOHN SMITH
SPEED AND RACING

Line Clips Which Way To Go: This column, along with other model publications, has frequently discussed the problems of line connectors or clips. Many types have been found suitable for catching fish, but fall short when holding a fast moving model in the circle. The flyaway of the model B-29 at last years' NATS model air show appeared in all the magazines and opened up a few eyes to the problem some of us had been looking at for the last few years. Independent tests of the more popular slide clips show that the advertised strength sometimes varies greatly. For example, a clip with a 46 lb. test actually lets go at less than 25 lb., while another clip from the same pack tested out at over 50 lb.!

Different people from different parts of the country have had the same type of results from their tests. The slide part of the clip, unless properly seated on the clip, will, under certain vibration periods, "walk" on the clip and allow the clip to open. Props out of balance will cause this vibration along with tail flutter and other design vibration harmonics. At the last three NATS I have purchased the Sullivan clips and had all contestants replace the slide clips with this type. Dale Kirn also has a ½A bellcrank that does away with clips completely. It uses a Monoline type button on each ear of the bellcrank and the control lines have end loops that simply slip over the grooved button. In theory, this is the safest way out. An added bonus is that the airplane gains a little speed as there is no drag from the clips. If someone could make a bellcrank-handle combination using the buttons on each, then we could have a factory-assembled line with quality-controlled manufacture of the end loops. This should solve all problems of line connectors once and for all. Any more ideas, anyone?

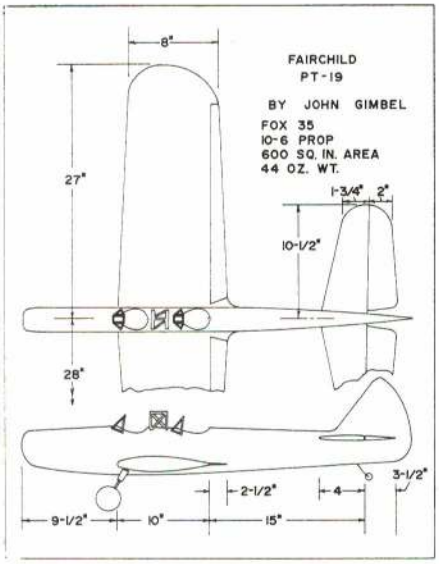
This was Genk, Belgium in 1963, where Franco Marcenaro of Italy made a demo flight with his homemade jet. Anyone have some jet ideas for this column? Send some photos and stories.

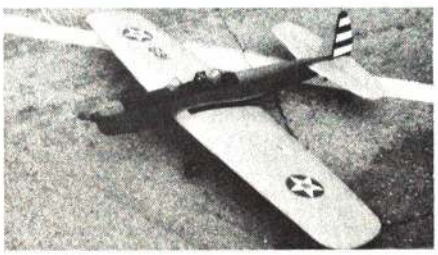
Wings and Things: For a super strong, light, and pretty wing, pick up a piece of Urathane foam (most packaging firms stock it), and build up a wing with it by using a hardwood spar (maple is good), add a root and tip rib, gluing the foam between them. Sand to airfoil section using the tip and root ribs as a guide for the sanding block. Now, wrap a skin of .003-.004 thick aluminum over the wing, from the trailing edge forward and around the leading edge and back again to the TE. After fitting the skin, remove it and apply a coat of of contact cement to the wing core and also the inside of the skin. Carefully align and bond the pieces together. The contact cement will not effect the Urathane foam. Ordinary drinking straws imbedded in the foam will serve as tunnels to run leadouts through. For those who can't find them, or don't want to use aluminum, try thin, smooth surfaced art board found in artist supply stores—this comes in many colors. Use the dull side of a kitchen knife to crease the bend for the leading edge. (Crease inside surface.) One coat of Hobbypoxy or resin will finish it.

JOHN BLUM
CARRIER AND STUNT

Control Line Booklet: A first class booklet entitled "How to fly U-Control" is now available from M & P Enterprises, Garland, Texas. The Aerosports Series No. 100 booklet is a wealth of information on UC including history, checklist, solo and advanced techniques. Written and created by well-known modeler Dick Mathis, the booklet is available for $1.00 by mail or at hobby shop.

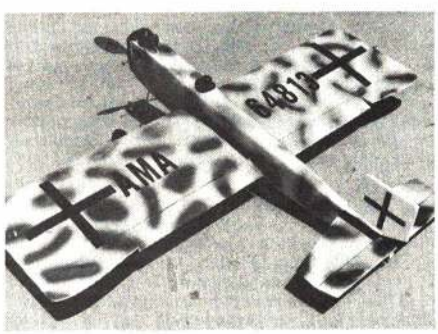
Florida Stunt Model: John Gimbel of Hialeah, Florida, relates summer's succession of wins with the Fairchild PT-19 Semi-Scale Stunt.





John Gimbel's nice semi-scale PT-19 with the traditional Fox 35 power.

John doesn't say if his model is from magazine plans or built from scratch. A good flyer, the design is often given credit for starting a trend in semi-scale stunters back in 1964-65. An article and set of plans can be found in the 1965 **AM Annual.**



Would you believe two antiques? Charles Bauer's Junkers is powered by a Super Cyclone on ignition. Old type planes also make fine stunters.

Column Content: Ideas, sketches and photos from the readers will enhance this section. Send to: John Blum, 2417 Glen Pl., Granite City, Ill. 62040, or to **AAM.**

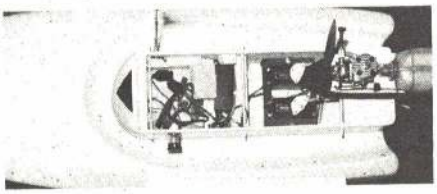
WHERE THE ACTION IS *Continued*

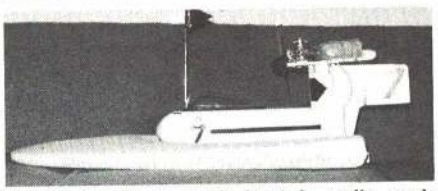
special interest

CLIFF PETERS
RC BOATING

Paddleboard Hits High Speed: With the help of an Enya 19 and an air prop, a styrofoam paddleboard hits speeds never intended by the designer of the original board. Built by Edwin J. Moore, it uses an air as well as a water rudder—the latter for maneuvering better at slow speeds.

A little more than two ft. long, with a beam of about half that amount, it is a stable sailer, attains speeds much greater than would be expected and is a real fun boat. At slow speed it sails flat on the water. At full bore it rests only on the last 6" of the hull.





Simple two-ft. long air boat is easily made from a child's paddleboard. Text describes it. Two-channel radio is all that's needed for guidance and power.

The basic design places an air pocket area in the forward portion of the hull and at speed, it is an air boat in a double sense—water to ride on and an air prop to drive it. With plenty of air under the bottom, it is riding on air as well as water. As the photos show, there are three principal longitudinal runners which help to give it excellent stability in the turns.

Ed Moore uses a two-channel RC rig which takes care of the throttle and rudder. Because it is inexpensive and easy to build, it is an ideal boat for a beginner. We have used a somewhat similar type, with balsa replacing the styrofoam. It was so stable that at full speed it could be turned at literally a square corner.

Dumas supplies two sizes, both inexpensive and easy to build. Any model boater will be pleasantly surprised at how simple an air boat is to construct and how much fun it is to run.

Ping Pong Balls Go To Sea: Many a model boat has gone to the bottom because of an unnoticed crack or leak where a seam opened up and water leaked into what was thought to be an "air-tight compartment."

Too often a speed boat has hit a floating object or has been damaged by running ashore when control has been lost. By filling that watertight compartment with almost weightless ping-pong balls in the flotation compartments, it actually does become watertight.

Before the days of fiberglass hulls, the problem was not as serious. But we often forget that fiberglass does not float. By itself, it is heavier than water and thus the hull must be watertight and have some form of flotation compartments. For flotation use, ping-pong balls can be of the very cheapest variety. The most inexpensive ones are just as buoyant as the best ones available. Because they are so light, they add negligible weight to the boat, even when four or five dozen are used. A few drops of glue dribbled over them when once in place will anchor them so they won't rattle around in the compartment.

Model Sailboat Association: The A.M.Y.A. Reader mail indicates a growing interest in sailboats and the writer often asks if there is a national model sailboat organization? There is—The American Model Yachting Association—and it is growing fast.

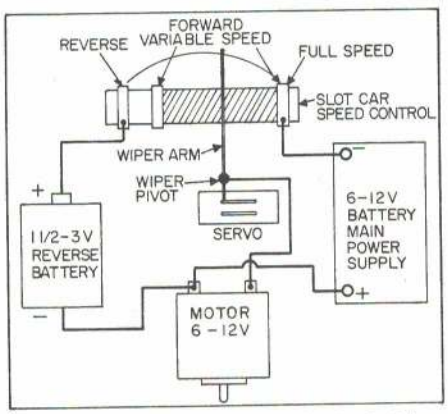
A lively and comprehensive newsletter is sent to members several times a year and contains for the newcomer as well as for the old timer much interesting and valuable information regarding regattas as well as detailed yacht class specifications. The dues are most nominal. Full information can be obtained by writing to Secretary-Treasurer Ben A. Hogenson, P.O. Box 127, Woodlyn, Pa. 19094.

New RC Frequencies Opened: Now that there are three new frequencies available for model boaters, there is one way to keep them and to justify to the FCC that they should continue to be available for boat as well as other RC hobbyists, and that is to use them. The frequencies are 72.16, 72.32, and 72.95 MHz.

Custom-made Sails Available: Custom sails cut to your individual specifications, completely made in the U.S. are now available. Individual striping of sail suits can be supplied to meet your requirements and thus make your yacht stand out in the fleet. Made of the finest Dacron, they have heat sealed edges, reinforced head, clew and tack. Registration numbers are hand-lettered to class specifications and are guaranteed not to peel or chip. For further information, write to Carr's Boatyard, Chevy Chase, Md. 20015.

Speed Control for Electric Boats: Letters from electric boat builders indicate that speed control is their principal stumbling block. Here are two methods for solving the problem.

The first was submitted by Richard R. Nelson and gives smooth control for scale model craft such as cruisers, tugboats, freighters, etc. The letters often mention the desire for scale speed, which, if attained, would not be satisfactory. For example, a 36-ft. cruiser having a top speed of 18 mph would give a three-ft. model one-tenth the prototype's speed, or 1.8 mph. This is about 2/3 as fast as most of us walk—a little too slow. Three to five mph will make the boat look much better when under way.



Dick uses his control in a tugboat driven by a large Pittman motor. As he describes it, one must "obtain a controller for a slot-car track and throw all but the resistor in the junk box. Make a mount for the resistor and servo. Bend a piece of 1/16" piano wire for a wiper arm. Adjust the pivot point for adequate throw and hook up the power supply as shown. The result is variable forward speed and single speed reverse. A 1½V dry cell is used for reverse; it is inexpensive and there is no loss at full speed. If any part of the resistor winding burns out, just advance the throttle past that point and bring the boat to shore."

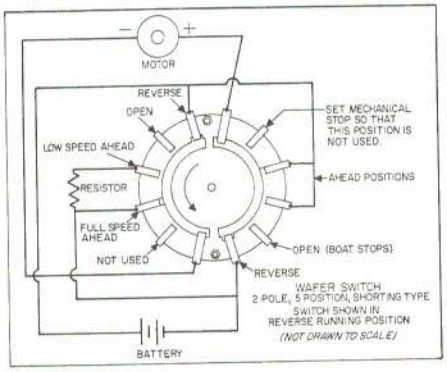
When higher speeds are desired, the control problem becomes slightly more difficult if smooth control is necessary. It is then advisable to use stepped control, that is, inserting a fixed resistor or resistors in series with one of the leads from the battery.

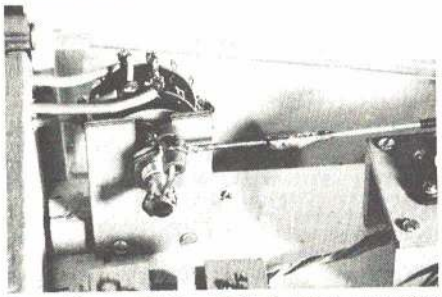
We've shown electric boats in action before—here's another one to illustrate the speeds the new electric motors offer.

Using voltage-dropping resistors becomes the most practical and inexpensive method for controlling motor speed. It is, unfortunately, impossible to give in advance the exact resistor value in ohms (which will be low) or the wattage of the resistors. These values will have to be worked out empirically. It appears to be a difficult task with so many variables, such as propeller diameter, pitch, boat weight and draft, hull shape, motor size, etc., but is not as difficult as it seems.

If small motors are used so that the current requirements are low, then smaller wattage resistors can be employed. The ideal switching arrangement is obtained by a wafer switch which can be either single deck or several decks. Be sure to remove the detent ball. The wafer switch shown in the photograph is a double-decker, each being the two-pole, five position, shorting type. The respective contacts are parallel connected. This carries 50 amps and after several months of use shows no signs of contact burning.

For normal use in scale type boats, we have found that having about four or five one ohm, 25-watt, wire wound resistors available will provide plenty of experimentation for determining a satisfactory intermediate speed. At full-speed position, no resistors are in the circuit. These resistors are relatively inexpensive—50 to 85cents, depending upon where they are bought.





Proportional servo operates lever on wafer switch. Mark your transmitter to show corresponding positions for multiple speeds, forward, reverse and stop.

All these tests can be run with the boat floating in the bathtub. Never test with the boat out of water because there would be no load on the prop and the tests would be invalid.

The resistors should be connected to a terminal strip and the leads brought to the switch. Don't attempt to connect resistors directly onto the wafer switch. When the right combination of resistors is found for what seems to be the correct speed, note whether or not the resistors are warm or very hot. If very hot, then use resistors of higher wattage.

We have deliberately stayed away from discussing ohms law because of space limita-

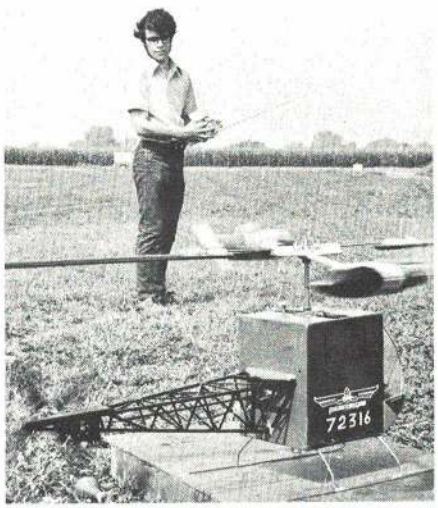
tion. Much of the trial and error method can be minimized when a voltmeter and ammeter are used. If the voltmeter is connected across the resistor, the meter will read the voltage drop caused by the resistor. Connect the ammeter in series, any place in the circuit. If, for example, the voltmeter reads four volts and the ammeter shows three amperes draw, multiply the two readings which will be 12 watts consumed by the resistor and given off as heat. If we used a 12-watt resistor, it would be very hot because it would be operating at its very maximum dissipation capability; therefore, the 25-watt resistor would be necessary. Even this will become hot but not excessively so. Always place the dropping resistors where plenty of air can ventilate them.

The best part we saved until last. When "static" testing the boat in the bathtub, there is more load on the motor than when it is free to run in the pond or lake and will result in the reduction of the current requirement, more voltage getting to the motor and less power being consumed by the resistor. The condition is analogous to running a car with the brakes on—the engine would have to work harder and more fuel would be consumed.

JOHN BURKAM

HELICOPTERS

Young Helicopter Enthusiast: Dan Banks, age 15, of Champaign, Illinois, has won fame at local and state science fairs with his twin engine helicopter. His drive system—two propellers pulling the rotor around without exerting a torque on the fuselage—was also tried by early helicopter builders such as Bruno Nagler, Arthur Young, and Curtiss-Bleecker. Perhaps Dan, by using modern technology and materials, can solve the problems they couldn't—such as high alternating stresses in the prop shafts and blades, gyroscopic effects, and the vibrations due to yawed (slanting) airflow through the propeller disks in forward flight. Dan's model has lifted off the ground with tether lines attached, but



Dan Banks in action. Quite a story on this young heliophile, see text.

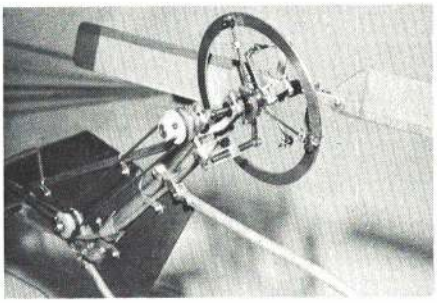
he has had great difficulty getting both engines to run simultaneously. Dan may not yet have all the answers, but he has shown exceptional intelligence and initiative in his approach to one of the most demanding of all models to build. In his writing Dan shows an understanding far beyond his years. May the next one fly, Dan!

Learning to Hover: By now, enough people should have flyable helicopters so that a word on flying may be in order. Once in the air and going forward, a helicopter (with a Hiller rotor and a horizontal stabilizer, and a vertical fin) is just like an airplane. That leaves the problem of learning to hover.

Some form of tethering lines is a must. You can't just start making short hops and expect to learn everything at the same time. While you're concentrating on keeping it level and in one spot, the tail will swing around very quickly and you have to set it down before you've had time to even observe the results of your first control movements.

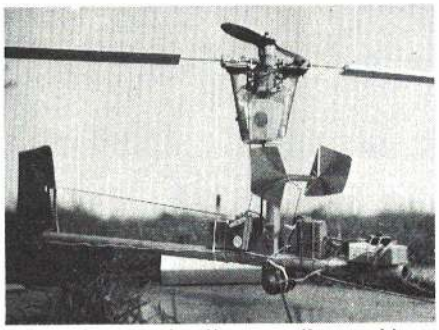
Horace Hagen tied a short line and a brick to each wheel of his wide landing gear. Gene Rock mounted a birch boom on his first electric-powered practice model, allowing the boom to reach almost to the edges of the rotor. Tether lines extended from those. I tied lines to my tail boom and to a boom sticking out the front and led them out sidewise to tie points on the floor at diagonally opposite corners of the garage in which I was practicing.

The theory is: tackle just as much as you can do successfully and safely by intense concentration; practice that until it becomes easy; give the model more and more freedom until you can coordinate all four controls with the model completely free; then practice spot landings and takeoffs and altitude holding. The throttle is about the last control you really learn, other than just chopping it when you get in trouble.



Gene Rock's belt-drive helicopter is the only one known to use a gyro-controlled tail rotor. This photo shows much of the details. Complete story on this fabulous machine coming in AAM.

For hovering practice, the ground cushion effect helps to regulate the height for you and is effective up to about one rotor diameter above the ground. Ground effect makes spot landings difficult because you think it's coming down nicely just where you want it. About a foot from the ground with no change in throttle, the thing just bounces back up a foot or two and coasts way off target. Try again. . .and again. . .and again!



The surfaces under the propeller are blown for horizontal flight. They work well, even too much. (A rapid horizontal flight becomes a dive!)

RC Helicopter Designing: For those who want to design their own helicopters, the following tables, based on actively flying RC helicopters may be of some help.

Powered FF

	small	large
Rotor Size	24 in.	36 in.
Weight	5 oz.	15 oz.
Engine	020	049
Rotor rpm	1000	900

RC

	small	medium	large
Rotor Size	48 in.	60 in.	72 in.
Weight	4 lb.	6 lb.	8 lb.
Engine	15-19	23-45	60
Rotor rpm	700-1000	500-900	500-800

Tail Rotor: 1/4 to 1/5 main rotor diameter.
Tail Rotor rpm: 4 to 5 times main rotor speed.
Gear Ratio: Peak hp speed of engine; maximum speed of rotor.
Total Blade Area: *main rotor:* .04 to .06 times rotor disc area; *tail rotor:* .1 to .12 times tail rotor disc area.
Airfoil: Clark Y or similar section. Blade collective pitch about 7° above zero lift angle.
Blade Construction: Birch leading edge, remainder balsa.
Configuration: Single main rotor and tail rotor best for control and stability, coaxial next best. Side by side rotor and tandem rotor have worst stability problems.
Transmission: Steel on steel or steel on aluminum spur gears need good lubrication and accurate alignment. Timing belts running on plastic or aluminum pulleys have long life, no lube required, and alignment not critical.
Horizontal Stabilizer: About 1% of main rotor area. CG slightly ahead of main rotor so model hangs about 5° nose down. If scaling down a Bell, Hiller, or Lockheed, make the stabilizer bar or servo at least twice scale size.

BOB BECKMAN

RC CAR RACING

Are Spectators Human?: "Where did you buy that?" "Did you make that yourself?" "Does it run on batteries?" "How do you get the little man to turn when you want him to?" Sound familiar? Or this: "Please, everybody, stand back from the track. Don't get in front of the driver. Don't touch!" Do you sometimes get the feeling that all spectators should be tied in bags and dropped off a bridge?

The arguments against such an extreme measure should be obvious. For one thing, if all the spectators were done away with, there wouldn't be anyone to support the construction of those lovely parking lots. And, more important, there wouldn't be anyone to provide the audience while we make like Fangio, Brabham, and McLaren all rolled into one. Most important of all, there wouldn't be anyone to get the bug and come out to add to the people enjoying our sport.

They can be annoying though, can't they? Spectators always seem to be under foot, and they are forever asking those same dumb questions that you've heard a hundred times before, usually just when you're trying to get ready for the next heat. In fact, they seem to be guilty of the cardinal sin of being interested in what we're doing.

At a recent club race I was surprised and dismayed to find that a lot of the club members were "too busy" to answer questions from spectators. Everybody gives lip service to the long-term benefits of keeping the spectators interested, but they don't feel there's enough immediate payoff to do anything about it.

But the payoff is there! I learned long ago that by being courteous and informative to the spectators I got three immediate payoffs. First, my pit area is not disturbed, even if I'm not there. The people around it have some feeling for what is involved (I answer the "how much" questions), and the small fry are controlled by their parents or other adults. Second, I usually wind up with a pretty good rooting section; there's nothing better to make you want to get out in front and stay there. And finally, when I'm having trouble and dash for the pits, they're out of my way and turning a deaf ear to the blue smoke from my exhaust.

It really isn't that hard to satisfy the spectators' curiosity. Most of their questions are the same ones you also wanted answered at one time or another. And keep in mind that while it might be the hundredth time you've heard the question, it's the first time they've asked it. How they react to what they hear could have a bearing on whom you race with in the future, or even if you race at all.

Club Newsletters: The Washington RC Racing Association (WRCRA) publishes an excellent newsletter called the "Servo." The WRCRA is a very active group with members throughout the DC metropolitan area. The "Servo" is edited by a member with professional experience who donates his services. Articles are submitted by club members (and sometimes their wives) and cover all aspects of our sport. Printing and mailing of the 6- to 8-page monthly publication is paid for by the club treasury. This is a fine example of what can be done with a little effort. Those interested in receiving a copy of the "Servo" should write to Wendel Green, 4421 Medford Dr., Annandale, Va. 22003. I would appreciate receiving copies of any club newsletters. Send them to me c/o, **AAM.**

Blue Ribbon

(continued from page 14)

The engine used was a Veco 19 RCSM with the high compression head and the Veco carb and a Kavan carb, both of which present an installation problem. When using the Veco carb, the throttle arm would hit the engine mount before full open. The solution is simple: the throttle arm on the Veco is of a soft material so with a good pair of pliers, bend the arm back so that the full open position clears the engine mount. It only takes 3/16" bend—don't overdo it.

The Kavan carb must be mounted backwards on the engine to get the needle valve on the right (top) side of the engine. This leaves the fuel line pointed at the flywheel. Either solder on a 90° bend in tubing or secure the fuel line away from the flywheel. The author spent a very frustrating weekend at an enduro race with a balky engine because the fuel line had come adrift and the flywheel made a small hole in the line.

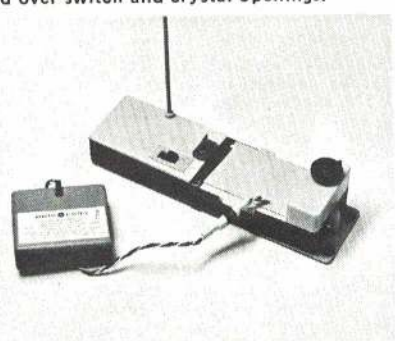
It is important that the fit between the exhaust manifold and the engine port be tight. The Thorp manifold is machined accurately. The engine used in the test car required some dressing of the exhaust port; if required, it amounts to only a few thousandths of an inch so do it carefully. Caution: do not get filings inside the engine. Stuff exhaust port with Kleenex to keep it clean.

One real problem with a Thorp car involves the engine location. Access to the glow plug is restricted by the rear axle. To eliminate this problem we rigged a lead from the glow plug element to the rear of the car. The lead is soldered to a strip of brass, which is in turn soldered to a 1/8" ID wheel collar. This is attached to the plug by the collar's set screw. The lead is affixed to a short insulated post at the right rear corner of the chassis. The glow plug is now heated by clipping battery leads to the plug lead post and grounding to the chassis.

With both carbs, a Delta air cleaner was used to keep the engine-destroying dirt out. Never run an RC car without an air filter on the engine intake.

The fuel tank used is a 4 oz. Dynamic with a brass door pull sump on the bottom and a similar pull used as a vent on top. This arrangement prevents leaning out (or flaming out) in the corners when fuel level gets low and provides a direct fuel line run to the carb.

Modified receiver/servo unit with rechargeable battery pack and plug, taped side seam, and shield over switch and crystal openings.



The tank was mounted with slot car axles in brass tubes soldered to the side of the tank. Remember, total tank volume must not exceed 4 oz. with the sumps added.

Several months ago AAM reviewed the Jerobee 1/12 scale car and its radio. The product was seen as a well-engineered toy item. Recently, after seeing several Jerobees in use and noting their reliable performance, we tried the radio in a bigger car. It fit easily and so we requested a Jerobee radio for use in a Blue Ribbon Review, hence its application in this Thorp 1/8 scale machine. Here, then, is the radio from a $109 toy product (1/12 scale car with radio) giving entirely satisfactory performance in a $99 model car for which it was not intended. To do so, some basic and easy modifications to the radio were needed and are described below.

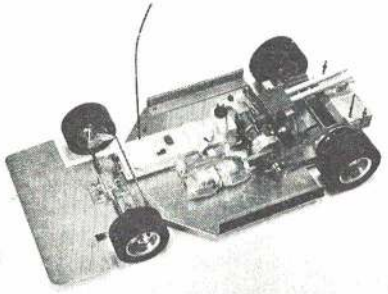
This modification requires removal of the dry-cell holders and desoldering of the three wires to it. Don't just cut the wires short, as you must add a plug here. We used a 3-pin gold-plated Deans plug. Solder the wires from the radio to the Deans male connector. Red is +4.8v, white is +2.4v and green is Ov. A Heathkit 4.8v centertapped 500 mah battery costs only $12 and is readily available. We recommend it and also suggest using a Heath battery charger. Solder the wires from the battery to the Deans female connector. No switch is needed in the battery leads as Jerobee's self-contained switch is convenient and of good quality.

The radio case must be sealed from water and dirt. Do this by taping along the side seam and by putting a plastic sliding cap over the switch head and crystal. With this done, our Jerobees have been driven in the rain with no difficulty.

The installation of this radio is straightforward. The package fits between the engine and front suspension and requires drilling only 3 holes. Visible in the photograph, the linkage is not complex and is easily accessible for adjustments. The position of the throttle/brake servo in the Jerobee package is excellent. Both throttle and brake linkage are simple, leaving fewer things to fail in the heat of competition.

Throttle function is operated through a 180° control-line type bellcrank while brakes are operated through a 90° bellcrank. A clevis in the brake linkage provides adjustment. It is my

Note off-set position of radio package to clear the engine and front axle pivot. Battery located to balance the car laterally.



(continued on page 88)

RCX4

(continued from page 33)

sheet. If you are using a 60 instead of a 71, modify spacing accordingly. Be sure outside edges of mount assembly are straight and square, then glue to doublers as shown in plan, being careful to keep them absolutely even and perfectly aligned. Weight down on level work top until dry.

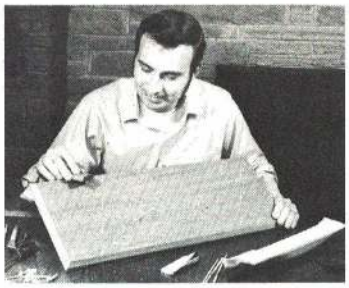
Tape a long sheet of paper to work top, and mark out entire fuselage pattern. The fuselage frame is laid out bottom side up on the outline. Tack-glue formers F-2, 3, 4, 5, F-6B and balsa plate T-2 on outline. Lay doublers flat on work top, insides facing up, and glue in 3/16" square spruce stiffeners. Then lay mount and doubler assembly over formers and T-2. Double check for exact alignment and glue together. Weight down and allow to dry, then glue in 1/8 x 3/4" maple ply supports for main gear platform. These go down from spruce stiffeners to G-1. Cut two pieces 3/32" ply (5/16" wide and 4-1/4" long) to glue on outside ends of supports and under edge of doubler. Block sand edge of these filler strips even with ends of platform supports, and glue on G-1 as shown. Glue in two 1 x 1¼" 3/32 ply under edges of doubler at rear hold-down locations, then two more 1 x 1¼ x 2 on top of them; also the 2" ones at the front hold-down locations. Install tank supports to fit your tank, and main gear on G-1. (G-2 goes in later.)

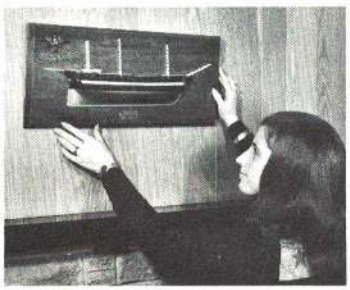
The beveled balsa corners are cut from 1/2 x 36 light balsa on a small table saw. Use a thin, fine blade set on a 45 degree angle. Take measurements from fuselage cross section on plan and check fence setting on saw table with scrap wood before running through balsa. Glue on balsa corners and rear end fill to F-6B.

I used polyurethane foam for the rear block T-1 because it can be fiberglassed. If you use styrofoam, resin or

(continued on page 72)

A Genuine Sil-O-Craft Assembly Kit





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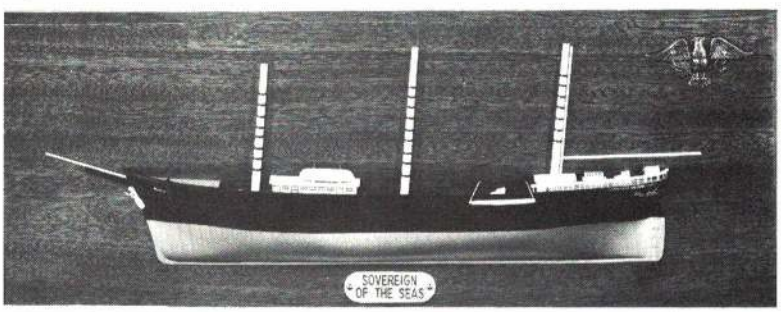

KIT 1001

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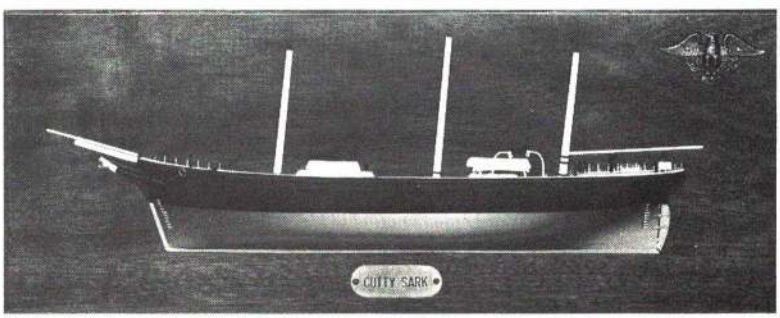
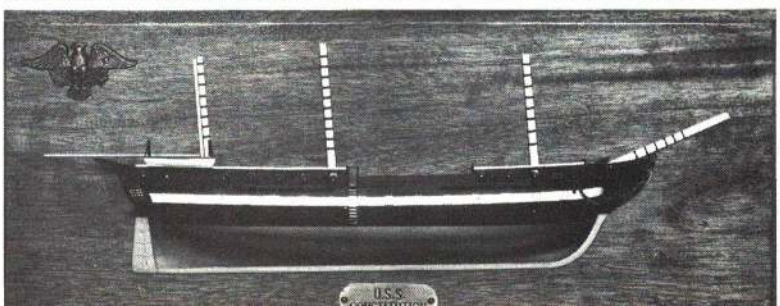
9½"x26" Machined Mahogany Base



KIT 1002

U. S. S. CONSTITUTION

9½"x24" Machined Mahogany Base



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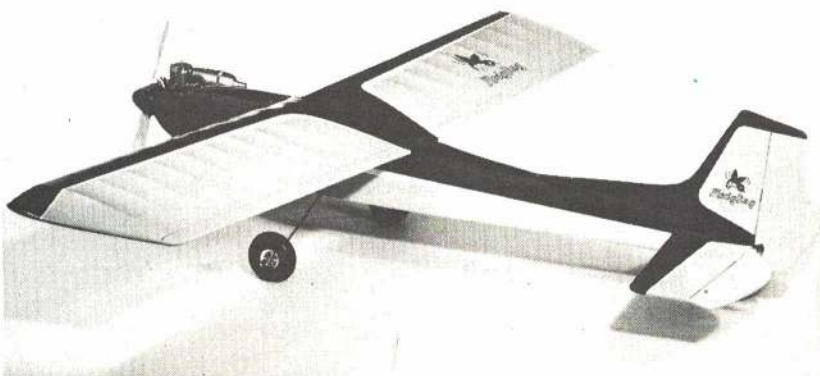

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You ought to try one for a real change of pace. The three models shown above are all real beauties . . . and scale too.

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Use .020, .049 engine or the new Brown CO_2 motor for power. You can build them simple, or super detail scale them, including moveable controls from the cockpit, etc. Included in the all die cut Balsa kits are authentic decals, detailed plastic units such as engine, cowl, pilot, machine guns, side plates, etc., as needed.

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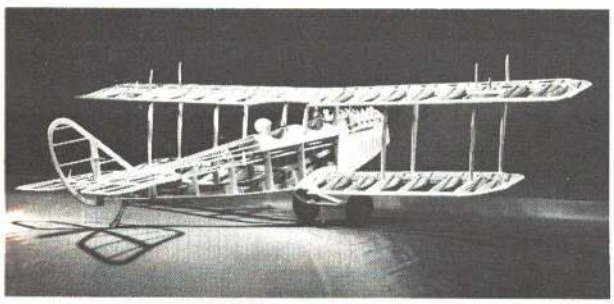
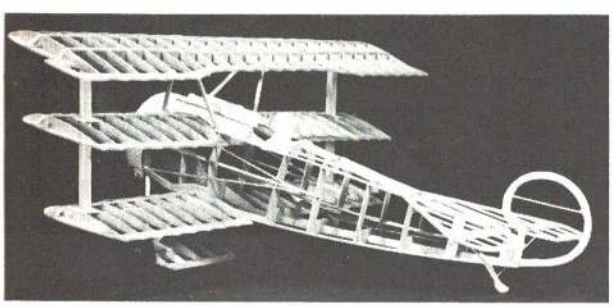
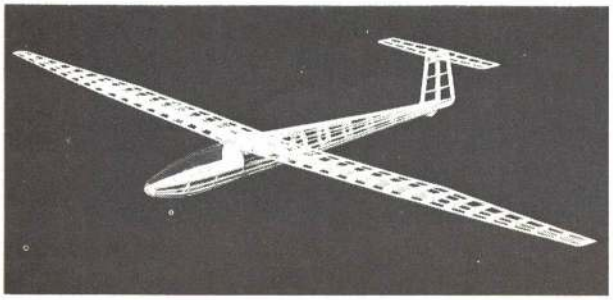
KIT E2 FOKKER DR 1 TRI PLANE
Scale 1" = 1 Ft. Span 23½"

KIT E3 DIAMANT SAILPLANE
Scale 1⅜" = 1 Ft. Span 74"







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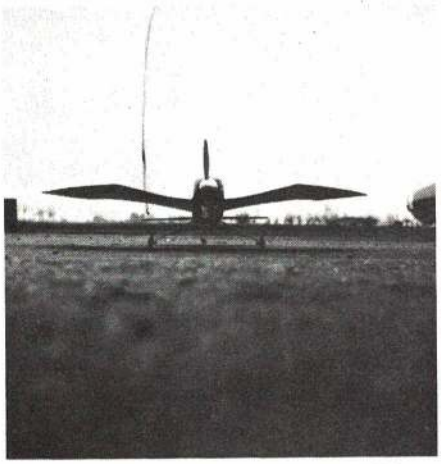
RCX4

(continued from page 68)

dope will melt it. Install foam block a little oversize; do not finish off until later. The 3/16 x 3 x 36 balsa sides and bottom sheeting is next, and then F1-T, F1-B, 1/8" ply triangle braces and 1/2 x 1½ x 2-7/8" balsa sides back of F1-B. Keep well weighted until dry.

Remove fuselage from work top, remove main gear bolts and glue down G-2 from inside. Use enough epoxy glue so it oozes out around bottom ends of



Has plenty of spactator appeal, doesn't it?

platform supports; reinstall gear. Check wheel sizes and height of main gear and install nose gear so plane sets within 3/8" of being level. Actually, this should be checked out as close as possible before buying the gears. I used an Ugly Stik gear—it's stronger than it looks. Sand down fuselage in area of first tank support (see fuselage cross section) and 1/2" balsa sides up to F1-B, then epoxy glue a piece of 1/32" ply to cover underside. This will give ample room on inside for nose gear control arm. Steam or wet for easy bend. Rough carve and hollow out front end light balsa blocks. Install engine with blind nuts and remove. Engine sets level with not more than 1 degree right thrust, or straight. Install tank, glue in balsa blocks and begin carving.

Cut the front ends of the T-3 assembly perfectly square at the front and glue down, up to back side of F-6B, and it will be easy to set in F-6T. The rest of the tail section is self-explanatory.

Cut 1/8" thick balsa formers FA to FF, also laminate wing hold-downs as shown on plan sheet using epoxy glue. Draw outline of fuselage on top of wing and fasten wing with pins or tape to its proper place on fuselage. Fit hold-downs over top of wing and against inside of double doublers. Set C clamps where top holes will be, drill bottom holes and install 6-32 bolts. Remove clamps, drill for and install top bolts.

There will be 3/8" between hold-downs and fuselage line, so fill in with 3/16" balsa to the height and length of front and rear hold-downs over top of wing. The outside 3/16" side sheeting will then come out to fuselage line.

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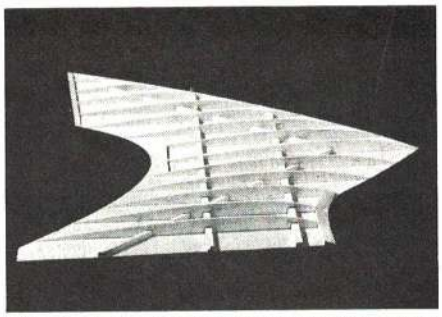

Well-designed wing structure is fairly easy to build. Airfoil is flat bottomed so it's not a real stunter, but will sustain inverted flight.

Align and glue formers and beveled balsa corners.

Measure out and cut the 3/16" balsa sides, cut out for R-1 plus 1/16" sheet thickness. After these are glued on, install 3/16" top sheet and round off corners.

A P-C-S set was used with servos mounted on Draft-Hayes plastic trays. This gives double rubber cushioning—don't tighten them down too tight. For battery and receiver, cut a soft foam block to fill entire compartment, then cut holes in which to drop them, taping a 1/2" foam pad over top. Go to every end possible to eliminate vibration; you will have a lot less "unexplainable" radio trouble. I don't even use spinners, for just a hair out of line on a large spinner at 11,000 rpm can cause unnoticed damaging vibration.

Standard white nylon control horns were used. We started out with kwik-links or clevises in third hole as shown. After a few flights the second holes were used.

Flying

Engine used was Supertigre G-71 with Perry carburetor, 12-6 Top Flite Super M prop, 10% nitro fuel. Takeoffs were smooth and graceful—no problem. Allow a good run first few times, later progressively cut down distance and you will be surprised how this large ship moves out and takes off in a fairly short run.

There is one thing to which you need to get accustomed—when coming in for the landing, it will be going faster than it appears to be going on the approach and it's easy to slightly overrun the strip. At a safe height, practice stalling speed to be better able to judge your approaches. If possible, do your initial test flying where you have four to six hundred feet of strip.

As you become accustomed to flying the "X4," you may want to put the kwik-links in first holes on horns to demonstrate its agility through loops, rolls, etc. You won't have a contest stunter, but if there are any people anywhere close around, you will soon have a crowd of spectators.

A late model 60 in the I-plus H.P. class should handle this ship without any trouble.

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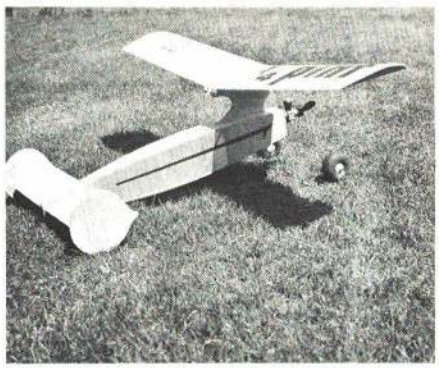
Quarter Pint

(continued from page 26)

beveled slightly, and one tip elevated three in. Glue the wing halves together using a piece of 3/8 x 1/16 ply laminated to the spar to make a strong dihedral joint. Cover the top of the wing with 1/16th sheet balsa, and add the wing tips made from soft 1/2" balsa. It is now ready to be sanded and covered. The rudders and stab are cut from appropriate thickness of sheet balsa, sanded, assembled and covered with tissue.



Quarter Pint should be a challenge and a real success with the Tenderfoot modeler.

The fuselage is made over the plans in the standard manner. Be sure to insert the blind mounting nuts for the engine before sandwiching the landing gear wire between the firewall and former No. 1. Former No. 1 is drilled with 1/16th holes and the landing gear wire is sewn to it with heavy thread or soft wire. When sandwiching these two pieces together, use two-part epoxy glue. After finishing the 1/8th square construction of the fuselage, fill in between formers 1, 2, 3 and 4 with 1/16th sheet balsa on the sides and the bottom. The pylon is laminated from three pieces of 1/16th medium hard balsa and is glued in place between formers 2 and 4. It is braced by filling in on each side with 1/16th sheet. All of the fuselage is covered with Jap tissue and given three or four coats of hot fuelproof dope.

If the plane is tail heavy when test gliding, put shims under the trailing edge of the wing; if nose heavy, put shims under the leading edge. Even though it test glides flat, put downthrust in the engine or it will loop under power and get you from the rear before you can get out of the way. To make thrust washers for your planes, go to any plastics dealer and buy a foot or so of ¼" Teflon rod. Drill the proper size hole in the end of the rod, then slice your own washers to the thickness desired. It makes fine bearings too. Fly it to the right with rightthrust under power, and make it turn to the left when gliding by bending the trailing edge of the rudders.

This is a fine small field flyer. Many times I have caught Quarter Pint without moving more than three or four steps from where it was launched.

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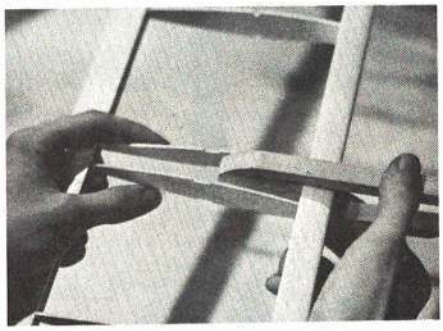
Squeeze-Banger

(continued from page 40)

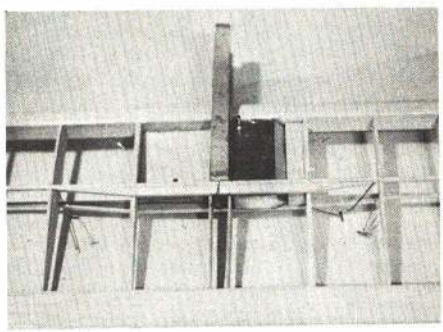
bearing wear and eventually a useless motor.

Now glue on the top part of the trailing edge and pin in place. At this time cut out the bellcrank mount and, if necessary, build the tank. If you build your own tank as I did, make sure it is not thicker than 3/4" so it will fit between the spars. Two tanks are shown on the plan. The smaller one is for diesel engines, the larger for glow. Both these tanks should give the five min. motor run necessary for combat flying if you like to stay up the full round. The small tank has to be blocked in to prevent it from shifting. In both tanks the fuel pickup tube exits at the bottom in order to clear the leading edge. If you buy a tank which has the tube coming out the front you will have to change it to make it fit.

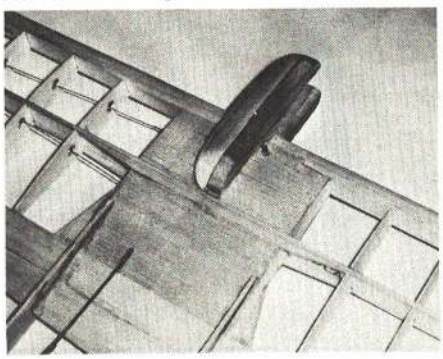
Motor mount separation is planned in advance to fit your engine. As a pre-assembly, it is installed between center ribs.



Diesel fuel tank installed here. Balsa spacer makes up for its smaller size. Note spruce spar reinforcement.



Tank fits completely inside wing, only vent, fill, and feed lines emerge. Some builders prefer to cover wing before adding tail booms.



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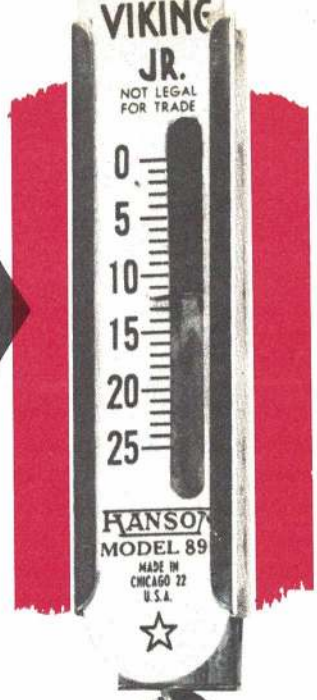

Stop for a moment and examine the picture on the right. What you see is a stop action shot of the pulling contest between Royal's retract servo and a spring tension scale. Even though the scale was eventually victorious, the contest emphasized a very important point. By reaching the 12 pound mark, it attested to the fact that our servo has triple the pulling power of any conventional servo on the market. In fact, this 2 ounce actuator rather impressively demonstrated an ability to lift nearly 100 times its own weight.

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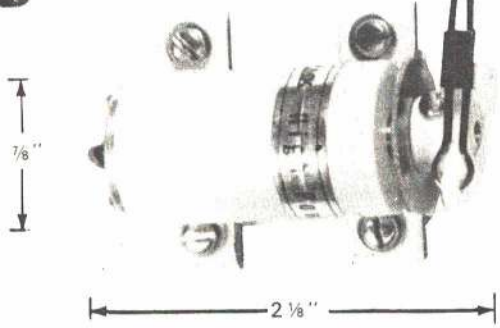
Price for the main retract servo $18.95
Price for the Aux. retract servo $18.95



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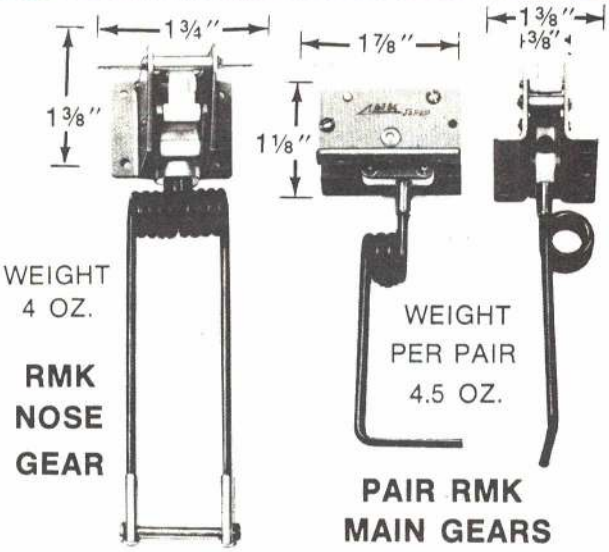

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Cut out the tail booms and stabilator, install the hinges and drill the holes for the elevator horn in the stabilator. Remove the wing from the board. The two ply center ribs are put into position slightly spread apart from the final position. The motor mount assembly is coated with epoxy where they are to contact the ribs and leading edge and is then slid between the ribs. The ribs are brought together and clamped to the motor mounts. Glue the ribs to the leading and trailing edges and make sure everything is properly aligned. Make sure that no glue lies along the upper and lower surfaces of the ribs, as this will present a problem when sheeting the center section. While this is drying, cut out the 1/8" flap (which is all one piece), the two tips and the triangular tip braces. Glue the bottom spar into place followed by the two 1/8" balsa center ribs. While the ribs are still wet, the bellcrank mount and the tank should be glued into position and the two ribs slid up against them.

As this is drying, take a suitable bellcrank and fix the leadout cables and the pushrod to it. Install the bellcrank assembly and then glue the top spar into place. Now glue the webbing between the top and bottom spars and between the top and bottom members of the trailing edge. The webbing should be light (1/16" sheet) and the grain of the wood must be vertical. This webbing is important because it adds rigidity to the airframe, and so is a must. Glue the tips into place and add the triangular braces. Glue the leadout tubes in the position indicated and epoxy the 1/2-oz. tip weight in place. Glue the flap along the trailing edge and make sure it is level. Taper the spruce center section spars as indicated and glue them into position.

The center section can now be sheeted. The sheet will have to lay on top of the leading edge where it covers the tank. The gussets on either side of the center section aid in the covering of the model—these should be added now. Drill holes in the motor mounts for the

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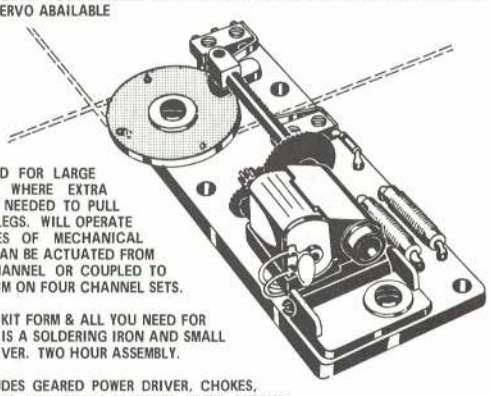

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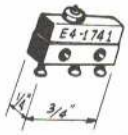

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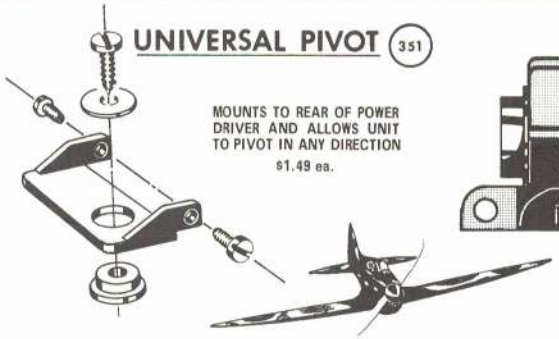

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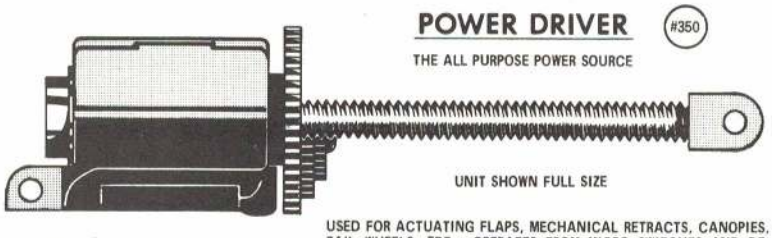

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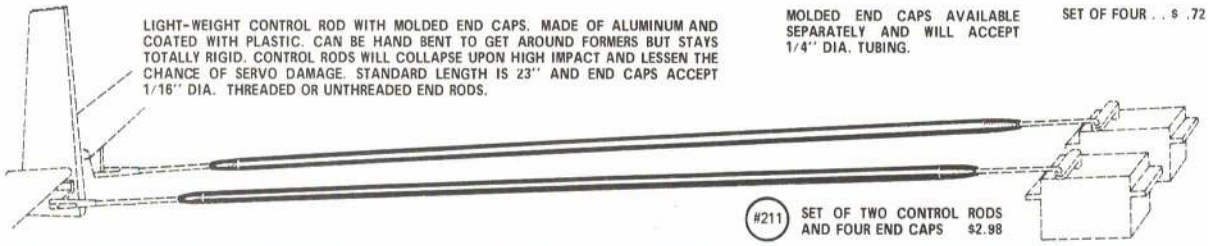

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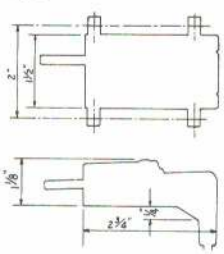

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ANNOUNCING a new contest to be run in **JUNIOR AMERICAN MODELER!** The JAM Model Contest will start in the March-April issue of Junior American Modeler with a new contest every two months. The prizes will be awarded every two months with the first prize being a Dremel Moto-Shop or a Dremel Moto-Tool Kit. This contest is open to both boys and girls! You can build straight kit-model or go crazy and send us a design of your own as long as its origin was from a kit.

motor and install blind nuts. The nacelle block should be epoxied to the motor mounts at this time. This nacelle block is another must, as it adds a great deal of rigidity to the mounts and cuts down on motor vibration, therefore allowing it to run faster. It also insures the mounts holding together in the event of a crash which can occur in Combat. The nacelle is cut from a block of medium light balsa and shaped with a block plane and sandpaper. Add the tail assembly, making sure the hinges move freely and are strong. Bend the pushrod, install the elevator horn and form the loops in the leadout cables so as to give level control when the leadout loops are even.

The model can now be sanded smooth and covered. Sand the leading edge so that it is slightly rounded to prevent the model from stalling during tight maneuvers.

Covering is a matter of preference—I've tried Silkspan and MonoKote. If you want it really light, cover it with Silkspan. Nylon or silk would be a little heavier, but a lot stronger. Clear dope the model to a shiny finish. (Color dope is heavy and a great deal of dead weight will be added if you color dope the entire model.) I generally dope the center section and the tail assembly—only where the model is exposed to fuel.

When you have finished doping the model, put the motor on and balance the plane at the point indicated. If the motor you are using is a rear rotor type, the engine will have to be moved forward and, as a result, lead ballast must be epoxied to the tail booms. In any case, no matter what engine you use, always try to keep it as close to the center of gravity as possible to keep the weight down.

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No. 0701, Suds — Nimble RC for sport or competition. One-piece construction, 40 to 60 engines. Build fast from standard balsa sizes. By Joe Dolan. $4.25

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No. 0112, Toothpick — Long thin winged combat CL ship is both fast and quick turning. For hot 35's. $2.25

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No. 0211, Cobra—Steve Wooley's great, smooth-flying CL stunt ship for 35's. Light model, ideal for both FAI and AMA patterns. $3.50

No. 0212, Voodoo—Converted Goldberg kit for streamer-towing RC combat, by Ed Sweeney. Two servos with 19 engine. For new event. $2.75

No. 0213, Guillotine—Modified from CL for RC combat. Maneuverable, fast, responsive, and fun. Glides well. For two servos and 19 engine. For new event. $2.75.

No. 0312, EKKO—A compact FAI pattern and sport model for 35 engines. All wood low-winger. $3

No. 0311, Skydancer — Two-channel-equipped RC boost glider using aileron and elevator control. Lofted by new, powerful rocket motor. $2

No. 0411, P-51 Mustang—Semi-scale 60-powered with ARF Lanier or Dee Bee wing on balsa fuselage. Realistic and quick construction. $3.25

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No. 0615, Santana—Jon Davis' contest-winning towliner A/1. Uses fiberglass boom, stiff warp-resistant wing. $2.00

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No. 0812, Hot Canary—Unique Formula II/FAI racing biplane by Bob Sigelkoff. Although unusual-looking, it is fast and quickly built. $3.25

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No. 1111, Longster—Large-size free flight scale ship for 09 power, also ideal as small RC. Construction similar to real plane. $2.75

No. 1112, Buster—Built-up profile Goodyear racer well-streamlined and a winner. For hot 15's. $1.75

No. 1113, Bippi-Bipe—Delightful scale-like rudder-only or GG model for single channel and 09 engine. A fun plane. $2.75

No. 1211, Fireball—Jim Walker's great design presented as it was by Bruce Lund. For ignition 23's or smaller on glow. $2.00

No. 1212, Brooklyn Dodger—Sal Taibi's great old-timer FF job presented as it was by Bob Harrah. For ignition 23-35 or smaller glow engine. $1.75.

No. 1213, Canus—Sixty-powered and large-size FAI aerobatic RC plane. Very quick building. $4.00

No. 0125, Firecracker—FAI scale RC pylon racer with special fast airfoil and homemade retracts (in text), a winner by Bob Root. $3.50

No. 0121, Penguin—Unusual scale CL flying model of post-WWI pre-flight trainer. Simple and RC-able. Uses 19 to 35 engine. 3-views on plan. $2.50

No. 0122, Pay-Up—TeeDee 020-powered AMA Pay Load event winner also nice for sport FF. Simple and sturdy. $1.50

No. 0123, Nifty Novice—049 thru 15 power for monoplane or biplane Tenderfoot CL trainer. With power, bipe is stuntable. SPECIAL PRICE $1.00, decal included.

No. 0124, P-38—Semi-scale WWII fighter with single 049 flies rudder-only pulse RC with ACE mini-foam wings, others useable. $1.25

No. 0221, Big Flapper—Large high wing is docile flyer for a 60 engine and 4 channels. Nice trainer/sport plane. $3.50

No. 0222, BV-170—Three 35's power this sort-of-scale German profile fighter. It is big, pulls hard in flight, stunts too. $4.75

No. 0223, Canard Drop-Off—Rubber pusher sport flyer drops its prop and rubber when unwound, then drops a piggy-back glider. All balsa and flies great. $2.00

No. 0224, Cardinal—Excellent FAI European-type RC pattern plane of foam/balsa construction. Up-to-date ship if for 60's, suitable for retracts. $4.50

No. 0321, Turbo-Pilatus Porter—Fine flying CO2 or Rubber powered FF scale model and scale floats for ROW. All on one plan. $1.50

No. 0322, Little Bird—Midwing RC pattern plane handles wide range of power up to 71's, yet is small in size. $3.50

No. 0323, Two For the Show—Biplane CL stunt for 049 Tee Dee. This one offers precision flying in small areas, great for practice. $1.50

No. 0324, 2T—ACE-foam-winged RC trainer for 049 power carries 2-channel bricks with case. Ample wing area for long glides too. $2.00

THIS MONTH'S PLANS

No. 0421, Quarter Pint—A 020-powered Tenderfoot free flight patterned after an antique design of 30 years ago. With decal. $2

No. 0422, RCX4—Bat-like winged sport RC plane for big motors, 4-channels, and crowd pleasing flights. $4.50

No. 0423, Squeeze-Banger—FAI combat anyone? Fast flying 15 ship from Canada is a winner. $2

No. 0424, Dragonette—Compact version of Kraft's Dragon Fli uses hot 40 and flies just like a big one—fast and smooth. $3

Dragonette

(continued from page 48)

flights. It was later changed to a K&B 40 for the extra power sometimes desired. Both engine hole patterns are shown on the drawings and other engines can certainly be adapted.

There are no restrictions on the radio equipment employed, except for the aileron servo. It must be small enough to fit between the two WIA ribs. This means a KPS 10, 11, 12 or similar type servo. The smaller servos will help to keep the overall weight down and they are certainly recommended if you are planning to purchase new ones. Servos as large as the KPS 9 variety may be used in the fuselage, but should be placed carefully to avoid weight and balance problems. F6 may be omitted by extending the rear balsa wing block back to F7 to give better access for the two aft servos. Before beginning the construction of the airplane, plan all servo locations and linkages and provide the necessary holes through the fuselage frames and wing ribs as you cut them out.

Neither of my Dragonettes have retracts—simply a matter of personal preference. The airplanes have performed so well in spite of the gear that I did not give it much thought during their construction. I certainly do not want to discourage their use however, and I am including my thoughts on the subject as a guide.

The rear (wing mounted) wheels should fold inward toward each other. Since the wing is tapered toward the tip, greater wheel well depth is available toward the center. The landing gear wire should be formed so the main spar brace will not need to be cut. This brace was designed to absorb the shock of landing. It is also highly desirable to have the gear bolt to the main spar brace, for the same reason, even if this is a bit inconvenient.The worst restriction imposed by this wing is the one inch of available wheel well depth. Actuators, however, will find ample room between the main and secondary spars for mounting.

The nose gear restrictions are even more severe. To fold the nose wheel inside F3 requires a pivot point no farther aft than 1/4" behind F2 and it must reside at the lower end of F2. Most probably the lower half of F2 will need to be partially cut away to allow room for the folding and locking mechanisms. A 2¼" wheel will disappear inside the cavity below the tank floor without problem, and the steering bar should not encounter any particular problems.

The only commercial gear available, which I have seen and which might hold promise, is Carl Goldberg's new one—it weighs only 5 oz. and needs only one in. of wheel well depth. The others I have seen are too large.

If you have the time and patience I suggest you design your own gear. For more on retracts, see January 1972 AAM where all commerical retracts are shown. Also, a homemade retract system is presented in that issue which could be shrunk to fit Dragonette.

Construction

You will need to obtain a commercial canopy to cut to fit this model. The model shown has a homemade canopy. A diagonally cut off tear drop canopy will fit this design.

Carefully cut all fuselage frames, the two 1/32" plywood doublers, and the two 1/8" balsa side pieces from the plans. The lower edge of the balsa side pieces between F7 and the tail should come up to the 1/4" bottom sheet (refer to F9 and F6 for details). Cement

(continued on page 90)

R/C MULTI CHANNEL

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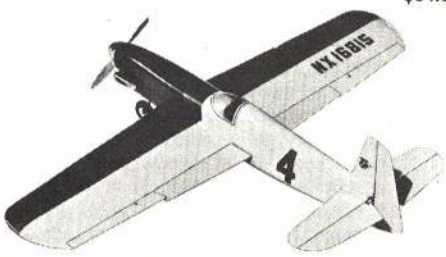

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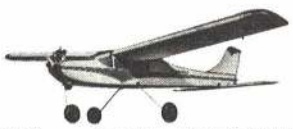

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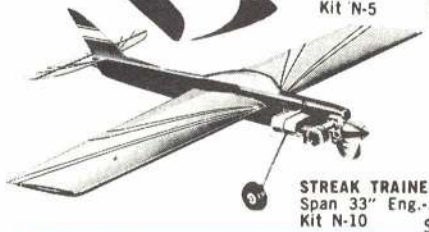

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Blue Ribbon

(continued from page 67)

preference to use only a very slight brake action while driving, but the Jerobee radio offers fail-safe mode. In the absence of transmitter signal, the throttle servo moves a bit beyond low throttle position and locks the brakes—a safety feature.

The radio performed without fault in this car. With the 500 mah battery pack there was no lack of servo torque and the steering response was positive. The throttle servo was somewhat slower than what would be ideal; however, this was compensated for by mechanical advantage in the throttle linkage.

The road test portion of this review was actually done with two identical Thorp cars. One had an Orbit radio installed and was raced during the summer and early fall. The second car, with the Jerobee radio, was run during the late fall and winter.

When properly set up, the characteristics of this car are such that it can be driven with abandon. As per our standardized procedure, the car was driven around a 20 ft. radius circle at increasing speed, both right and left. Adhesion was approximately the same as that of other cars tested on the same track surface, with one difference: the Thorp car with capped tires was far more stable at high speeds. The car could be steered with the throttle and when it did spin, there was a visual warning: the rear end would "get all bent out of shape."

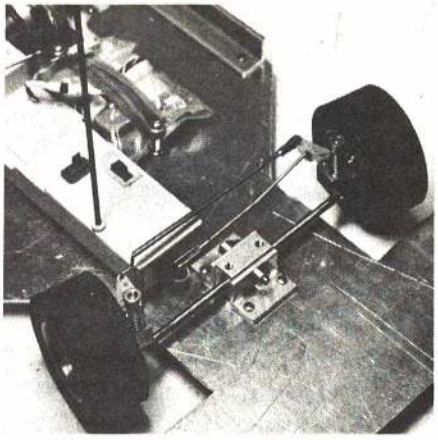
To get max performance from this car it is mandatory that a wing be used. There are no wing components included in the kit. However, kits being shipped now have the rear axle bearing blocks drilled for a wing mount.

One of the features that contributes to the handling characteristics of the Thorp car is the pivoting front axles. The front axle can pivot on the centerline allowing undulations in the surface to be absorbed without the tendency to lift a rear wheel, which is the case of a normally suspended RC car. The spring pressure of each front wheel can be adjusted to obtain whatever characteristics are desirable for the surface being utilized (stiffer front tends to promote understeer, softer front tends to reduce understeer).

Caster, camber and toe-in are specified in Thorp's directions. CG is 45% front, 55% rear. Asymmetrical handling for oval racing is best achieved by power-induced steering. Tilt the top of the kingpin rearward slightly at the outside wheel.

The belt drive arrangement has proved to be very reliable. In six months of hard competition only one belt was replaced, and that because of racing on a rocky surface. The replacement belt for less than $1 beats several bucks for a gear after a few races.

The clutch must be kept clean to prevent grabbing. It only takes one set screw to remove the clutch housing to clean so this can be done frequently without a major disassembly job. A



No servo saver springs were needed as the Nylon steering servo output arm seems to handle road and impact shock loads adequately. Throttle linkage has spring action for hand blipping when in the pits.

word of caution, however—the drive pins are held in place by the outer ball bearings. When you remove the clutch housing, keep the outer bearing in place or you will be out of commission while you try to find the drive pins that just fell out on the pavement.

Gear reduction by the belt drive is 4.8:1. At 10,000 rpm the top speed is 26 mph. Theoretical speed at 20,000 rpm is 52 mph.

At the 1971 ROAR Nationals we had several well-tuned cars running over 50 mph down the back stretch. Thorp was one of them.

The capped tires, first introduced by John Thorp, offer some real advantages and some problems depending on the track surface and condition. They don't wear out for a long time. Their absolute maximum adhesion is very high, but, when they break traction control is lost completely. In other words, drive faster but cautiously. Uncapped sponge tires offer less traction and more gentle handling.

The Thorp car is a simple, reliable racing machine that is, and has been, winning races. The car handles so well that it makes a novice look good and an expert uncatchable. It is built to the exacting standards of a craftsman to meet the requirements of RC car competition.

The Jerobee radio can be used in a 1/8 scale car in serious competition without any apologies to anyone. The Thorp/Jerobee combination looks, acts and runs like a winner

Source for the above car information is Thorp Manufacturing, 350 East Commerical, Pomona, California 91766 and the radio, Jerobee Industries, Inc., Dept. A, York Center, Redmond, Washington 98052.

Dragonette

(continued from page 86)

the sides to the doublers using a white glue. F3 and F5 are next cemented to the sides. Use epoxy to cement F3. Next shape the motor mounts and epoxy them into the fuselage assembly along with F2. Place a spacer between the motor mounts when pulling the sides inward toward F1. Proceed with frames F5A-F9 using regular cement. Next slot the two 3/8 x 3/4" strips for the fin and cement them along the fuselage frames. Add the 1/8 x 1/4" stringers, the 3/8" triangle strips and the 1/4" bottom sheet. Lay the fuselage aside to dry.

Cut the two large fin pieces from 3/16" balsa, and two each of S1-S5. Build up the stabilizer omitting the top half of the trailing edge and the top sheeting. Install hinges to the lower half of the trailing edge. Use epoxy and pins to fasten it securely. Add the top half of the trailing edge and the top sheeting. Cut appropriate slots into the stabilizer center and add the fin pieces, making sure the fin is straight and square. The elevator is made of two 3/16" sheets to simplify hinge installation in a manner similar to the stabilizer trailing edge. The rudder is made of a single 3/16" sheet, and its hinges are installed in a conventional manner.

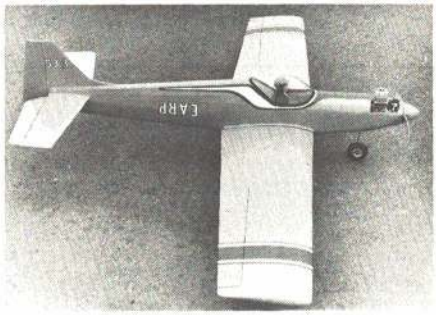
When the fin-stabilizer assembly is dry, add it to the fuselage assembly. Accurately align it with the fuselage making sure the stabilizer is at 0° incidence. Add the 1/8" sheet around the stabilizer and fill in the rear of the fuselage sides with 3/16" balsa scrap. Add F4 and the 1/8" sheet around the canopy. Add the tank tray with its 1/8" square braces, F2A, F3A and the 1/8" sheeting between F2 and F3. Add the tank cover dowels. Install the nose gear and epoxy the screws in place. Add soft blocks on the bottom of the fuselage forward of F2, the nose block, and F1. When these are dry, install the engine at 0° incidence, 0° thrust and cut away the nose blocks as required to obtain a good fit. Sand the inside of the engine compartment, and coat it and the inside of the tank compartment with epoxy. Use enough for good coverage but do not overdo a good thing.

The wing is constructed as one piece. Cut out all the ribs and assemble the main spar using two 5/16" square X 48" long strips and the two 1/8" plywood spar braces. Add the wing ribs to the main spar, and the secondary spars to the assembly (do not cement either). Secure the assembly to a flat surface with the top side down. Secure spacers under each rib at the secondary spar and secure the main spar against the flat surface.

The wing is now in the proper contour and will be flat and straight if covered this position. Cement all ribs to the main and secondary spars. Add the 1/16 x 3 x 48" center balsa sheet to the lower wing surface (now facing upward). Next add the 1/16 x 4 x 48" lower wing trailing edge balsa sheet. When the wing is thoroughly dry, remove it from the board and add the

For comparison get out your January 1971 AAM and review Phil Kraft's full-size Dragon Fli.

The Dragonette's only apparent aerodynamic change is to have a less laminar-type airfoil, making it smoother during high "G" situations.



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1/16 x 3 x 48" center balsa sheet to the upper wing surface. Check the wing for warp. Add the 1/16 x 3/16" balsa strip at the leading edge and the two 3/16 x 1/2" leading edge strips. (See W1 for details). Recheck the wing for warp. Sheet the bottom of the wing from the leading edge to the main spar, again checking the wing for warp. At this point the wing should have sufficient resiliency to maintain its shape. Warp may creep in at any time, however, so it is wise to check it after each piece is added, making corrections immediately. If an assembly is not warped before you add a new piece and is warped afterward, then the new piece must have stressed the structure in some way. Find the stress and relieve it.

The ailerons are added next. Some of the aileron pieces and skin are already in place. The ailerons on this airplane are assembled into the wing and cut away after assembly. Locate the aileron hinge line on the top surface of the wing along the center of the upper secondary spar. Cut away the outboard half of this spar. Cement W6B and W11A to the lower 1/16" sheet. Shape the 3/4" square aileron block to fit between W11A and W6B. Remove it and cement a 1/16" plywood control horn back plate of your own choosing to the 1/16" aileron sheet. Cut a relief into the shaped aileron block for the control horn back plate and lay it aside. Shape the 1/4" balsa wing strip which fits between W6A and W11 and supports the hardwood hinge support. Lay it aside. Cut the 1/8 x 1/2" hardwood hinge strip to length and install three hinges between it and the shaped aileron block. Epoxy and pin as required. Slide the hardwood strip into place in the wing and cement carefully (fold the shaped aileron block upward out of the way). Cement the 1/4" thick shaped wing strip below the wing hinge strip. Cut away the outboard half of the lower secondary spar, and fold the shaped aileron block down against the sheet. Cement it into place. Add W7A, W8A, W9A and W10A. Add the 1/8" aileron sheet. Install the aileron control mechanism of your choice and finish sheeting the wing. Add tips, servo mounting blocks, 1/4" dowels, rear wing hold-down blocks, and sand the entire wing working down to 400 grit paper. Carefully free the ailerons by making a cut between W6 and W6B, and W11A and the wing tip. Trim away the 1/16" lower sheet and the ailerons should come free. Sand the edges. Turn the wing over and carefully cut away for the landing gear blocks. The slots provided fit Sig landing gear blocks obtainable from your hobby dealer. Cement these blocks with epoxy. Bend the landing gear to shape and drill holes for the hold-down straps.

The only construction job left is the fitting of the wing to the fuselage at 0° incidence. Tape two strips of 1/32" plywood to the upper wing surface so they will rest against the fuselage sides. Place the wing under the fuselage and shape the fuselage cradle for a close fit at 0° incidence. Remove the 1/32"

Tiger Moth

(continued from page 28)

plywood strips from the wing and shape them to the final configuration. With waxed paper between the wing and the fuselage cradle, epoxy the two 1/32" plywood strips to the fuselage. Cut the 1/16" plywood fuselage doublers to size and cement them in place; add the wing hold-down block (1/4 x 3/8" maple). Assemble the wing to the fuselage and pull the rear hold-down screws tight. Check the wing for 0° incidence. Add F3B using epoxy to hold it in the final position (F3B is used to allow a last minute correction in wing position). Cover the lower fuselage between F2 and F3 and add the wing filler blocks. Shape the underside of the fuselage and sand all over working down to 400 grit.

MonoKote is strongly recommended for covering. One roll and a foot of a second roll easily cover the airplane, and it weighs very little. If you use other finishes, keep in mind the 4.5-lb. maximum flight weight.

For the first flight I would recommend the following center to extreme throw on the control surfaces: rudder, .90 in.; elevator, .45 in.; aileron, .40 in. With these settings you will find the airplane very sensitive but you will have enough control to handle any emergency. Final center to extreme throw on Dragonette II is as follows: rudder, 90 in.; elevator, .40 in.; aileron, .30 in.

My thanks to R. L. Earp for his invaluable advice and assistance.

deck in place of the original fabric, and the new 130 hp Gipsy Major engine. Called the DH.82A, it quickly went into mass production for the RAF, where it was known as the Tiger Moth II. By 1936, the military was getting all the Tigers it needed, and so some 70 went to flying clubs which were involved in training pilots for the expanding RAF.

By the time World War II began in September, 1939, more than 1400 Tiger Moths had been built: almost 1100 in Great Britain, more than 200 in Canada, almost 100 in Portugal, and others in Norway and Sweden. Practically all of the civilian Tigers in Britain and Canada were drafted into military service. Even though the type was already nine years old, it remained the primary trainer for the RAF all through the war, and was in production until 1945. By then, more than 8000 had been built, almost half by Morris Motors. About 1500 of them were built in Canada with modified interplane struts, landing gear struts and closed cockpits for the hard Canadian winters. Another 1100 were built in Australia, mainly for the RAAF, but with some for Indian, the Dutch East Indies and 18 for the USAAF.

After the war was over, the Tiger Moths were dumped on the civilian market, where they found scores of

pilots eager to get into the air at minimum cost. Training and touring were the main uses to which the civilian Tigers were put, and they adapted to peace as quickly as did the weary population. Camouflage color schemes were replaced by much sportier ones, at least by the rather sedate British standards of sportiness.

But if they looked less exciting than comparable American planes, they were certainly put to some novel uses. On the seventh anniversary of the start of the war—Sept. 1, 1946—the 15-year-old Tiger Moth made its debut in air racing with the first of a long series of fine performances in handicap races, in which its obvious lack of speed was balanced out by an early takeoff time. Highlight of the Tiger's racing career came in 1958, when the 27-year-old design was flown to first place in the classic King's Cup Races; that airplane is still flying today as a float-plane, operated by the Tiger Club. Since speed is of little importance in handicap racing, Tiger Moths can still be seen rounding the pylons in England. And while they did little to improve the breed, they certainly did help keep air racing alive until Formula One could get into action.

Another area in which Tigers have played a major sporting role is aerobatics. With a history of fancy flying going back to its earliest days, the proud biplane was a natural not only for extensive air show flying in the post-war years, but also for aerobatics competition. For many years until the cleaner, more powerful types like the Zlin came along, the Tiger Moth was the most popular competition machine in Great Britain. And even today, while they are rarely seen in major events, the Tiger Club continues to hold its annual contest for Tiger Moths only. Most, if not all, of today's top British aerobatics pilots learned on Tigers.

Perhaps the most extreme example of the Tiger's versatility has been its movie career. While the need for stock Tigers in films is obviously limited, there has been a steady demand for Fokker D.VII's and other World War I airplanes that are almost impossible to find—or too valuable to risk. Up steps the Tiger, gets its face lifted and its tail bobbed, and presto: a quicky pursuit plane. Experts can tell the difference, but the average moviegoer cannot.

Not satisfied with the pair of tandem seats in the Tiger Moth, lightplane de-

Bearing Canadian registry, this Tiger Moth has enclosed cockpit, common in Canada due to the rigors of wintertime flying. Note slatted top wing.

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signer Ron Prizeman proceeded to turn it into a four-seater by stretching the fuselage, while leaving practically everything else the same. The result was the Thruxton Jackaroo, a useful cabin plane of which more than two dozen were built. Other modified Tigers have found their way into agricultural use, equipped with chemical tanks and spray gear.

For an airplane that really isn't outstanding in any respect, the Tiger Moth has compiled quite a record. Since its first flight in October, 1931, it has done an amazing number of jobs without a whimper. And even though there are all sorts of new airplanes which have taken its place, there are still a hundred flying in Great Britain, plus 10 Jackaroos—and others in the U.S., Canada and elsewhere. Any airplane that can remain in action for 40 years can probably make it to 50.

Dimensions

Wing Span—29' 4"
Length—23' 11"
Height—8' 9½"
Wing Area—239 sq. ft.
Empty Weight—1115 lbs.
Gross Weight—1825 lbs.

Performance

Cruising Speed—90 mph
Maximum Speed—105 mph
Rate of Climb—635 fpm
Range—300 mi.
Service Ceiling—14,000'

AAM Commander

(continued from page 56)

from the end as shown in the overlay drawing. Set aside until needed.

Prepare the antenna trimmer C18 as shown in Figure 3. This is done to provide solid mounting for C18 with the adjust screw accessible from the pc side of the board. Set aside until needed.

Suppliers

ACE R/C
Higginsville, Mo. 64037

Royal Electronics Corp.
2119 S. Hudson St.
Box 22204
Denver, Colo. 80222

World Engines, Inc.
8960 Rossash Ave.
Cincinatti, Ohio 45236

Components, Inc.
(order through ACE R/C, Royal Electronics, World Engines, or from Doss Electronics, Inc.
6660 Security Blvd.
Baltimore, Md. 21207
(Doss has a $25 min. order)

Sprague, Motorola, Fairchild, GE, CTC, Switchcraft, Elemenco, CRL, Belden, Miller-National
(order though Allied Radio)

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27635 Forbes Rd.
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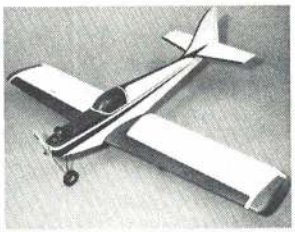
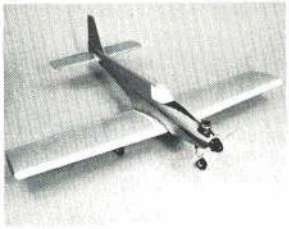
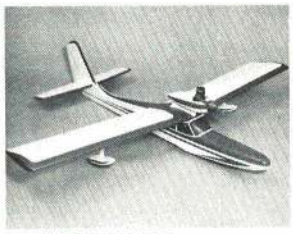


SNOWBIRD
Span-57" Length-43"
Engines-.40-.60
$69.95 Net

SCIMITAR
Span-60" Length-48½"
Engines-.45-.60
$69.95 Net



NYTRON
Span-62" Length-49½"
Engines-.45-.60
$69.95 Net



WATERKING
Span-75" Length-63½"
Engines-.50-.60
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MODEL AVIATION

Official magazine

A.M.A. NEWS

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RC Plane Helps Build Power Line

Two issues ago in this section we told of the exceptionally bad press aeromodeling had received because of a reported sighting of a model airplane by an airline captain in the Terminal Control Area of JFK Airport in New York. This month we are pleased to report about the good publicity modeling received in December, as the montage below indicates, which resulted from widespread reprinting (and also broadcast by Paul Harvey News and others) of an Associated Press story.

It is a great news story concerning a unique use of RC for constructive purposes. Here's what AP writer Werner Vollman had to say.

An Austrian power company is telling proudly how a model plane came to its rescue.

It needed a device to take pilot lines across rough terrain as a start on a 110,000-volt power line. The pilot lines are used to pull increasingly bigger ropes across obstacles. Eventually the wires attached to ropes are winched into position.

Bigger and richer companies sometimes use helicopters to place pilot lines. Austrian company, Kelag, has used rockets at a range of 400 yards, but it had to bridge 700-yard gorges for the Katchberg project.

Someone thought of using the skills of Hanno Prettner, 20. His remote-control model aircraft have made him Austrian champion and won a place at the 7th Aerobatic World Championships at Doylestown, Pa., earlier this year.

His father Hans, an earlier Austrian champion, assisted in the project to construct an aircraft which could fly the pilot line to its destination, drop it and return.

The difficulty was to estimate the pull of the pilot line. The two Prettners constructed a new aircraft, with a slightly larger wing span than usually used in competition, and a bit slower.

The craft's takeoff weight was 3.1 kilograms. The pilot line, a cord one millimeter in diameter, weighed about one kilo or 2.2 pounds.

The craft's remote control had to have a dropoff device for the pilot line.

The two Prettners started tests at a meadow. In October they drove to the construction site.

"Everything worked fine, despite strong winds and the rather bad terrain in which the plane had to land," Hanno said later. The plane carried four pilot lines across the gorge in seven hours.

The company spokesman observed: "It was definitely a success." Young Prettner is trying to develop a two-station wireless transmission, so that a craft in flight can be controlled from two separate points and thus achieve a longer flying time.

"With two remote control stations we should be able to fly over two kilometers," he explained. That's about 1¼ miles.

RC/WC photos of Austrian Hanno Prettner (Chuck Shade photo) and his father Hans (inset).

Model Plane Flies to Austrian Power Company's Rescue

By WERNER VOLLMAN
Associated Press Writer

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Model Plane Does A Herculean Job

KLAGENFURT, Austria (AP) — An Austrian power company is telling proudly how a model plane came

Model Airplane Helps Build Power Line

Klagenfurt, Austria (AP)—An Austrian power company is telling proudly how a model plane

Model plane comes to 'rescue' of company

BY WERNER VOLLMAN
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Radio Control Aerobatics World Championships Team Program

The three-man U.S. RC Aerobatic Team for the 1973 FAI World Championships (currently scheduled for Italy) will be selected by means of a Team Finals flying competition planned for the weekend of September 23-24, 1972, at a reasonably central U.S. location. To be admitted to the Team Finals will be approximately 30 qualified AMA members from throughout the U.S. plus the 1971 Aerobatic Team which is automatically qualified. A qualification program will be in operation from April 1 through Labor Day, September 4, to enable as many AMA members as possible to have a chance to fly in the Team Finals.

The team selection program used in 1970 for the previous RC Aerobatic Team selection was generally liked by most participants and will be implemented again with a few changes. The changes will be in the length of the point accumulation period, and the rules to be used for the Team Finals. Note that in the previous program only about 40 competed. If this occurs again the chances of practically all entrants going to the Team Finals are excellent. Furthermore, the new program makes it easier to accumulate points–previously only those in the top three at meets (other than the Nats) could qualify. Now, the bigger the meet the more who can gain points. At the same time more people can get points at smaller meets. In fact the point system is designed to generate more competition in the program as a whole, especially in those localities where the number of contestants is usually low–this can help Contest Directors of smaller meets to get more participation. The new program, therefore, makes it easier to qualify, both in large and small meets.

It can also be less expensive. In the previous program the cost was $20 (instead of $5) for those who waited until after May 1 to enter the program. In this year's program the deadline for getting into the program for only $5 has been extended to June 1. After that date the cost is $10–half of what the late entry fee was before.

In any case entries should be made as soon as possible to avoid late fees and a late start. The program begins in April–before the late fee deadline. Points can, therefore, be accumulated sooner than before.

Two Ways to Qualify for the Team Finals

1. BY NATIONAL CONTEST PERFORMANCE. The 10 top Nats RC Pattern flyers who have the FAI Stamp ($1.25 from AMA HQ if not purchased with license) and have paid a special $10 FAI Team Program fee (in addition to regular Nats entry fees), prior to Nats flying, will be qualified for the Team Finals. Such fee is to be paid at the Nats prior to the start of the Pattern event. The special fee will not apply to the point system part of the program, nor will point system fees apply toward the Nats special fee. Nats placing will not count toward the point accumulation part of the program.

Hobby dealers–Clubs–Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.

2. BY ACCUMULATED POINTS AT AMA SANCTIONED MEETS OTHER THAN THE NATS: 20 flyers may qualify for the Team Finals. By this means a system of point accumulation is again used, as in 1970, but a more equitable basis so that more entrants can get points at most meets. Points are given for placings in proportion to the number of contestants who fly in a Class C Expert or Class D Expert event at AMA sanctioned Class AA or larger meets held from April 1 through September 4, 1972, as follows:

> Points (P) will be awarded to contestants based on the number of contestants (N) making official flights and their place in the final event standings (p) as determined by the following equation:
>
> $$P = (N+5) \div 2p$$
>
> Note: If the event is Class D (FAI) then P will be increased by 10 percent.

The three team members from 1971 are pre-qualified for the 1972 Team Finals so they will not be competing for points in 1972. Their effect on point accumulation in any contest where they participate will be interpreted as if they were not present at the contest. That is, the number of contestants for point computation will be reduced by one for each 1971 team member (Kraft, Whitley, Chidgey) in the contest, and the point standings will be adjusted accordingly.

The same will be true for the Nats qualifiers. These 10 flyers will be removed from the points standings as will their effect on all contests in which they flew prior to the Nats as well as after. The points will be recomputed after the Nats from the certified records of the flyers prior to the Nats, and new points standings will be published.

How to Enter the Program

Entry in the points part of the program may be made only by mail in either of two ways: a. By mailing $5 Advance Entry Fee (check or money order payable to AMA) to AMA HQ, identified for "RC Team Selection", postmarked no later than June 1, 1972. b. After June 1 and up to and including Labor Day, September 4, 1972, by sending $10 Late Entry Fee to AMA HQ. Each program entrant must have an FAI stamp on his AMA license ($1.25 from AMA HQ if not purchased with license).

Program participants who mail in entry fees will receive certification forms which they must have signed by Contest Directors of meets in which the contestant has placed sufficiently high to gain points (see point system formula). A Late Entry, as per "b" will be permitted to have points counted for one, but only one, meet held after April 1, in which he placed prior to entering the program–all other points must be scored in meets held after the date of entry postmark. It will be the contestant's responsibility to obtain certification for placing in these meets and submitting same to AMA HQ.

In the unusual case that both Class C and D Expert events are held at one contest, and a flyer places in both, he may submit certification forms for both, but only the highest point score will be credited.

All entrants in the program who are not subscribers to the AMA Competition Newsletter will receive photocopies of information published therein concerning the program. The newsletter will be the official source of continuing news and details of program progress, which will be reported monthly.

The Team Finals

FAI World Championships rules will be used. This concerns model sizes and weights as well as meet procedures including judging, insofar as is practical. Note: models must be within weight limit WITH FUEL, ready to fly.

All finalists will be required to pay a Team Finals fee of $10 before flying.

Judges are being sought from all over the country, as in the previous program. Also, as before, the RC industry is being asked to provide sponsorship which will cover the cost of transporting and housing the judges and other key program official (administrative and jury members).

Basic manpower and site is anticipated to be provided by one or more AMA chartered clubs located in the midwest (site to be within 600 miles of Kansas City). The local club members will run the meet, assisted by national officers who will assure compliance with FAI requirements.

Program Administrator

Tom Rankin, Ellicott City, Md., continues as administrator of the current program to select 1972 U.S. RC Aerobatic Team Members. Questions or communications concerning this program should be sent to AMA HQ for transmission to the program administrator.

HOWARD McENTEE FUND ESTABLISHED

Last month's magazine featured AMA's 1971 Model Aviation Hall of Fame award. The recipient, Howard McEntee, passed away shortly after that issue went to press, in January. Since that time a special fund has been established in his memory. Before he died Howard indicated a desire to help AMA continue doing many things on behalf of model aviation.

The fund has been created in response to many of his friends who asked for a means to help carry on, in Howard's name, whatever efforts he had greatest interest in, such as international RC activities, Junior programs, new and unique contributions to the technical advancement of designs and equipment.

Contributions should be designated to the AMA Fund for Howard McEntee; send to AMA HQ, 806 15th Street, N.W., Washington, D.C. 20005.

In the meantime, see Bill Winter's editorial this month for some reflections on Howard McEntee, also last month's Hall of Fame award. The latter was a particular tribute to Howard–it had the unanimous endorsement of all of AMA's Council of Past Presidents.

PRESIDENT'S MEMO

An international aeromodeling experience—and reason to be proud!

It was quite an experience! I attended the annual Plenary Meeting of the International Aeromodeling Committee of the Federation Aeronautique Internationale. The FAI is the world's sporting aviation governing body. I had some idea of what to expect at this meeting as I had been briefed; I knew this was where the rules, attitudes, and scheduling for international model airplane competitions were put together. And I had been studying reports of past meetings and actions. But to attend the meeting was a new experience.

Immediately I was astonished! I was astonished because, among the 24 countries of the world that were represented, more than 50 individuals were involved. Twenty-four countries felt that model aviation was an important, serious, and dignified activity worthy of their sending so many delegates to coordinate it and to be part of it on an international basis. When I asked myself "why?", the answer was a sobering and inspiring one. HERE WERE 24 COUNTRIES OF THE WORLD'S PEOPLES WHO HAD FOUND A COMMON CAUSE AND COMMON MEETING GROUND AND HAD TRAVELED FAR TO ORGANIZE THE MEANS FOR EXISTING SIDE-BY-SIDE, AND WITH UNDERSTANDING AND RESPECT. And aeromodeling was the tool they were using—the catalyst.

We sat through two days of interesting meetings. The official languages were English and French, but at least a dozen languages were being spoken around the tables. And I was so impressed by the fact that everything was conducted so respectfully. WHAT A CONTRAST this was to what we are used to seeing in the meetings of statesmen and diplomats from these same countries when they meet in the shouting matches of the United Nations and other international meetings.

The FAI meeting room was crowded, so that even with some of the countries whose governments would not think of being that close to other countries, the aeromodeling representatives were close to each other, not just in body, but in spirit and friendliness. It is hard to believe that there could be an activity thought of as SO IMPORTANT that its problems could be discussed and acted upon respectfully and pleasantly by representatives from countries with such different viewpoints as, for instance, Egypt, Poland, United States, Czechoslovakia, Great Britain, both East and West Germany, Italy, Russia, South Africa, Bulgaria, Hungary, Greece, Spain, and all the rest. Aeromodeling knows no international barriers!

Reunion at the December meeting of the FAI Committee for International Aero Modeling. L-R: Ron Moulton (England), CIAM Technical Secretary; Sandy Pimenoff (Finland), CIAM President; John Clemens, AMA President.

In direct contrast to this fine atmosphere, John Worth, AMA's executive director, and I walked the few blocks through the colorful streets of Paris to where the Paris International Peace Conference usually convenes each Thursday. From across the street we watched the heavily police-protected diplomats from the various countries arrive at carefully spaced intervals. Just outside the entrance to the conference building a battery of press and TV cameras had been set up. As each group of diplomats arrived they took their turn striding to the cameras and microphones and shouting their points of view for this session. Or if they did not enter into this international shouting match they would go to the other extreme and completely ignore cameras, microphones, public, and the whole world, as an expression of complete disdain.

I COULDN'T HELP BUT THINK that this shouting and name calling has been with completely negative results, and I believe it has been going on for about three years. And just a few blocks away at our FAI meeting 24 countries were working in harmony and were ACTUALLY CREATING more useful effort and friendship in just TWO DAYS than the diplomats had created in THREE YEARS!

After witnessing the Paris FAI meetings and making more new international friendships for ourselves, AMA, and the USA, and thinking of the wonderful international friendships that were made at AMA's World RC Championships at Doylestown, and then looking again at those ridiculous Paris Peace Conferences, I came to a conclusion.

We should all chip in a few bucks and BUY ALL THE WORLD'S DIPLOMATS MODEL AIRPLANES! This would do for them what it does for us. It would keep them busy, mellow them, give them a sense of values, and let them forget their greed and bitterness for at least a little while each day. They would be much more realistic people, nicer to be around, might even learn to smile a little and show respect for each other. They would probably find that world affairs are a lot like modeling, in that everyone's problems are about the same. And one tremendous benefit: they would not find it near so easy to make nasty speeches while chewing model airplane glue off their fingers! LET'S GIVE THE WORLD'S DIPLOMATS MODEL AIRPLANES!

John E. Clemens
AMA President

DECEMBER FAI MEETING

Because of the previously announced four year freeze on FAI rules, the December 2–3 annual meetings of the Committee for International Aero Modeling (CIAM) at Paris, France, did not result in any alterations, with respect to model specifications, to the official rules for FAI competitions or World Championships. It was announced at the outset of the meeting that proposals could not be adopted concerning model specifications, records, and general rules for World Championships, although provisional rules could be modified as could administrative details concerning World Championships.

Twenty-four nations were represented in the meeting. Attending from the U.S. were Maynard Hill, CIAM delegate; John Clemens, AMA president; John Worth, AMA executive director; and G. H. Stine, chairman of the CIAM Space Models (rocketry) Subcommittee. John Patton, CIAM RC Subcommittee chairman was taken ill two days before the meeting and could not attend.

One of the most important subjects of the meeting was to arrange the calendar of World Championships for 1972. Highlighting the subject's importance was the fact that, previous to the meeting, no organizers had come forward to host the Scale (CL and RC) and Indoor World Championships, and there loomed the possibility that these events might be cancelled. France had tentatively agreed to sponsor the Control Line World Championships in 1972, but there had been advance information that this offer might be withdrawn.

Hosts were found during the meeting for all of the scheduled 1972 World Championships: Scale (CL and RC) at

Opening of the December CIAM meeting. Charles Hennecart, FAI Director General, speaking.

Toulouse, France, August 2–7; Indoor at Cardington, England, August 25–28; Control Line (Speed, Team Race, Stunt) in Finland, probably in July.

One of the other events which was scheduled, likely to be of interest to a number of American modelers, is an open entry RC Pylon Racing International Contest to be hosted by England concurrently with the Indoor World Championships, August 25–28. An International Contest is only one step beneath the status of a World Championship.

Both the Indoor and RC Pylon groups will be lodged at Cranfield Aerodrome, north of London. The Pylon Race will be flown at Cranfield, while Indoor contestants will be bused to Cardington, about a half hour away.

The Pylon Race International Contest is not limited to three team members per nation, and any AMA member wishing to participate may do so at his own expense (AMA cannot obtain team transportation for contests other than WC's). The entry fee is $75 per person, to include three night's lodging and all meals.

For 1973, the Radio Control Aerobatics WC is tentatively scheduled for Italy, and Austria intends to be host to the Free Flight WC.

Other CIAM actions of particular interest to U.S. modelers:

GENERAL. Rotary piston (Wankel) type engines have been accepted for FAI records and competition. The right of a reigning World Champion to participate in World Championships, whether or not he qualifies for his national team, was conditionally approved, but if not a team member his score will not be included in team results; conditional approval means that it is being submitted to FAI's Committee for International Sport Aviation (CASI), which was to meet in February, to determine if the new rule may be applied in 1972.

Chartered Club officers who receive the AMA Monthly Mailing found out in February what was February's big modeling news. Did you? If not, ask your officers why not?

FREE FLIGHT. The minimum weight for Coupe d'Hiver models (provisional rules) was increased from 80 to 100 grams. Conditionally approved, subject to CASI approval, was a proposal to permit a Nordic towline glider flyer to release his launching cable (such as by a panic button) without being penalized, provided the launching device itself is not thrown.

CONTROL LINE. The Speed and Team Race minimum control wire diameter has been redefined as "0.03mm plus or minus .01mm", to allow for manufacturer variances; in English measurements, this converts to .0118 inch plus or minus .00039. Conditionally approved, subject to CASI approval, was a U.S. proposal to decide individual Stunt World Champions by a flyoff of the top 15 placers who would be given two additional flights.

RADIO CONTROL. Slight revisions to the Aerobatic maneuver descriptions were accepted: 4-pt. roll, delete references to knife edge flight, and add "the approximate time of the maneuver shall be 5 seconds"; horizontal rolls, change time of maneuver from 4 to 5 seconds; landing, delete steep approach as a reason for downgrading.

OFFICERS. Sandy Pimenoff of Finland was reelected president of the CIAM for 1972. Also reelected were Ron Moulton (England), technical secretary, and Guy Revel-Mouroz (France), general secretary. Newly elected vice-presidents are V. Kmoch (Yugoslavia) and L. Bovo (Italy). The following subcommittee chairmen were elected: RC, Maynard Hill, U.S.A.; CL, K. Rosenlund, Sweden; FF, L. Bovo, Italy; Scale, H. Ziegler (Germany).

Appointed by the subcommittee chairmen as representatives from the U.S.: CL, Laird Jackson; FF, Dave Linstrum; Scale, Claude McCullough.

AMA AND TRANSPO 72

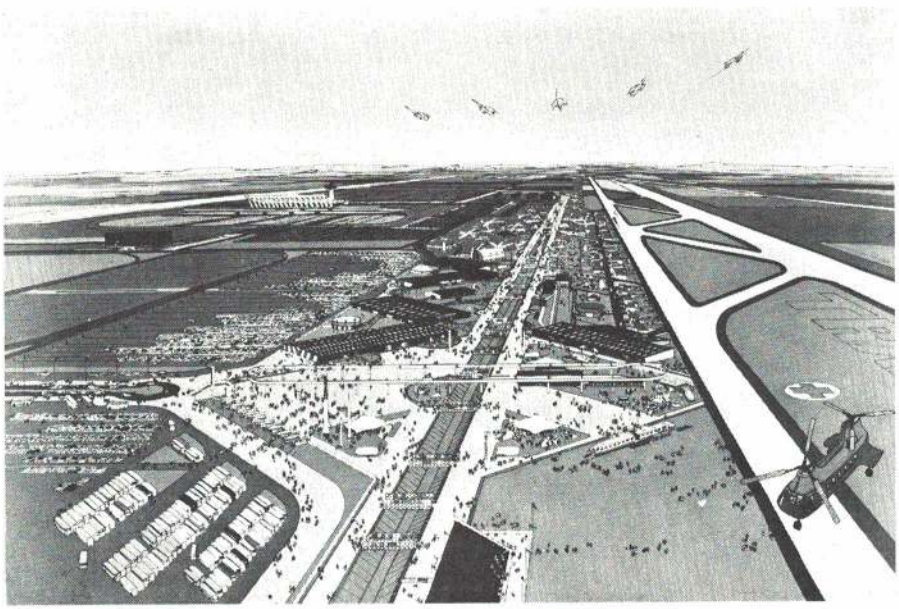
The greatest opportunity ever to present itself to show off model aviation to the general public and influential business, political and military leaders will take place at Dulles International Airport, near Washington, D.C., from May 27 to June 4, 1972. During this nine-day period will take place the U.S. International Transportation Exposition known as Transpo 72.

AMA will have a big hand in the aviation portion of the event through its participation in air shows scheduled on each day. In addition, model planes will be exhibited during a special hour and a half mini-show to be presented as a preview on May 26, for the press and the U.S. congress.

Transpo 72 is basically intended to be a showcase of transportation products and progress, in many ways resembling a world's fair. But rather than simply an assembly of static exhibits, Transpo will be alive with activity, especially during the daily air shows which will feature all aspects of aviation. AMA will have a team of a dozen flyers on constant call each day to perform scheduled and unscheduled model aviation shows before grandstand crowds. There will also be a static display area shared by AMA and all the divisions of the National Aeronautic Association.

The event is being put together by the U.S. Department of Transportation as America's greatest ever air show, designed to outdo the famous bi-annual Paris Air Shows. The federal government has already allocated six million dollars to the project, and may add more shortly.

The event will receive a maximum effort from AMA–which will be reported regularly between now and opening day in May.



Artist's conception of TRANSPO 72 scheduled for May 27 to June 4 at Dulles Int'l Airport.

WC TEAM FINALS SITE POLL RESULTS

As reported last month (page 64), AMA President John Clemens has called for polls to be taken among previous World Championship Team Program entrants, and among team finalists for the current Free Flight Team Program, to decide whether the next programs will have Team Finals at a single site (central or otherwise) or at two or more sites. This is not applicable to programs which depend heavily upon a judgment factor for determining winners, such as RC Aerobatics, CL Stunt and CL Team Racing; for such events a single flyoff site will be used, and the location will be decided by poll only if a reasonably central site is not available.

The Free Flight and Control Line polls have been concluded, producing the following results.

FREE FLIGHT. Slightly better than 90% of the team finalists responded, and by a margin of 61.17% to 38.83% they indicated that the July 4, 1972, weekend dates would be acceptable for a single Team Finals at a central location (within 600 miles of Kansas City). An abandoned airfield at Caddo Mills,

Tex. (approximately 30 miles east of Dallas, conforming with the "central" definition), has been offered for these dates under the combined sponsorship of the Dallas Cliff Climbers and Ft. Worth Plainesmen.

AMA President Clemens has authorized planning to proceed for the Caddo Mills site on the dates of July 1, 2, and 3.

The poll of FF finalists showed strong support for a single Team Finals whether central or not. Of those responding 74.1% favored a single non-central site if a central one should not be available. For the current program this means that a single non-central Team Finals site would be used if Caddo Mills later on should be unexpectedly withdrawn.

CONTROL LINE. The next CL World Championship Team Selection Program (for Stunt, Speed and Team Race) isn't expected to commence until 1973. The poll results, therefore, can be incorporated in the basic program details when initial announcement is made.

Previous program entrants who responded (about 70%) showed a preference for a single "central" Team Finals location. They also indicated that the concept of the previous program generally was satisfactory, with the majority favoring no change to the criteria for qualifying. Another interesting point is that nearly all favored a separate team program rather than simply using the Nats results.

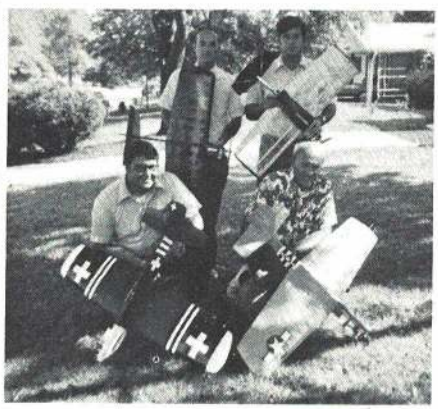
AMA News Bits

AMA Name Change?

It seems we're better remembered outside of the modeling fraternity as the American Model Association. Because of this and other public relations difficulties in getting our name recognized and remembered, AMA Public Relations Director Bob Lopshire has suggested that the Executive Council (AMA's board of directors) consider a name change. The Executive Council is open to suggestions. The most commonly recommended words in connection with the name proposal are: National, U.S., American, Association, and Miniature Aircraft. It might be helpful to try to incorporate one or more of these in any proposal. If you have a recommendation send it to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005.

Modeling Treat for Football Fans

The AMA chartered Hot Heads Model Airplane Club of St. Louis (Mo.) provided a Control Line flying demonstration for 46,179 fans of the St. Louis Football Cardinals at Busch Memorial Stadium early in the football season.



Pictured are the four flyers who participated; (Standing L-R) Gary Frost and Mark Pattie, (Kneeling L-R) Mike Tallman and Lou Woolard. Tallman (AMA 790) and Woolard (AMA 551), both from Wichita, Kansas, flew a formation Stunt pattern. Frost (AMA 21741) and Pattie (AMA 76966) flew a slow Combat match, arousing the crowd as each plane made a "kill" on the other.

Class C RC Stations in Canada

The Department of Communications in Canada permits United States Class C licensees attending Canadian model aircraft demonstrations and contests to operate their model control equipment under the auspices of a Canadian General Radio Service Licensee. This procedure is similar to that in the U.S., where aliens coming into the U.S. are permitted to operate a Class C station under the control and supervision of the U.S. licensee.

Club FCC License Confusion

Recently there has been some confusion regarding the club FCC license concerning where the license may be used. Some have said that the license is valid only at the club's field.

But what the FCC says is that the license may be used by members only in connection with the official club activities under the control and responsibility of the club officers. That doesn't necessarily limit club activities to the club field. The club license can be used anywhere that club officers authorize it to be used. If the club authorizes its license to be used by club members at other fields, meets, or activities of other clubs, then the license is good for such purposes. The only thing that counts is what the club officers approve for use of its license.

It is suggested, however, that a photocopy of the club license be carried by each club member together with a statement signed by the club president indicating how the club authorizes its use by individual club members. It might, if it is the club's intention, state that the license may be used by club members at all AMA sanctioned contests regardless of location. The basic idea is to provide documentation for each club member which clearly shows what use of the license the club authorizes.

Contest Workers Rewarded

Finding modelers who are willing to help run a contest is vital–but it can be a difficult task. The AMA chartered Tucson Radio Control Club (Ariz.) discussed methods of rewarding contest helpers in preparation for their three day contest: those who help on all three days receive one year's club dues and AMA membership from the club; two day helpers–a year's club dues; one day helpers–1/2 year's club dues. The club hopes that this plan will encourage more to help.

New '72 AMA Records

New national flight records were started on the first of January for Coupe d'Hiver and Free Flight Gas models. In the case of Coupe d'Hiver, the rules were revised to call for a heavier model–minimum weight increased from 80 to 100 grams (100 grams equal 3.53 ounces). In Free Flight Gas, both Landplane and Seaplane, and in both Category I and Category II, the flyoff procedure was revised from increasing max flights (with constant engine run) to reducing engine runs (with constant max flights).

Flip Card Scoring System

The AMA chartered FORKS Club (Fairfield Ohio Radio Kontrol Society) has received nothing but good comments regarding the use of its flipcard scoring system. The scoring display card is similar to those used in diving and skating meets; each judge is supplied with score cards numbered one through ten of a sufficient size (12" by 14") so that they may be read from 300 feet away. In the photo, two judges are shown displaying their individual scores to the scorekeeper/timer behind them, and also to other contestants and the general public.

Flip cards are particularly beneficial to spectators who may wish to follow a certain flyer's scores as his flight progresses. FORKS' Contest Director Jim Slater (AMA 26568) says, "It also tends to make the judges a little more serious about their job, since all scoring is openly displayed. The system is easily operated and requires no more additional people than normal. It's just a matter of technique."

Delta Dart Program Still Strong

AMA clubs throughout the nation are using the cold weather months for added community and youth involvement by running Delta Dart programs for schools, Scouts, boy's clubs and others in the 8–13 year age group. It's a service which elevates modeling in the eyes of the general public.

The program isn't new. Over 80,000 Delta Darts have already been distributed in this venture sponsored by the AMA and the Hobby Industry Association of America. The kits are provided free by the HIAA, and the only cost for a club to participate is an AMA sanction fee of $5 per hundred kits. Clubs should send to AMA HQ for additional information and the special sanction request form. And if the club isn't already AMA chartered, ask for free club charter information at the same time.

AMA Chartered Clubs

Most of the AMA Chartered Clubs were listed in this section last month (March AAM, pp. 60-64 and 66). The remaining clubs are listed here. Contact the person named—for the clubs of interest—for meeting time, place and date.

OREGON

Eugene Prop Spinners, Stephen Roberson
1481 W. 24th Place, Eugene 97405
Eugene RC Aeronauts, Inc., Roger Breedlove
3604 Gilham Road, Eugene 97401
Flightmasters Klamath Fls., R.J. Wickline
P. O. Box 623, Klamath Falls 97601
Fly-A-Ways RC Modelers Club, Walt Brooks
15570 South West 79th, Tigard 97223
Flying Tigers Flying Club, George Petty, Jr.
Rt. 3, Box 233 No. 57, Milton-Freewater
Nor'Wester, Dale Adams
612 SE 130th Ave., Portland 97233
Portland Stardusters, Stanley W. King
10630 SE Boise, Portland 97266
Rogue Eagle RC Club, Robert J. Hawkins
4790 Fern Valley Rd., Medford 97501
Salem RC Pilots Assn. Inc., Robert Ellison
1595 19th St. NE, Salem 97303
Sky Knights, Fred Beem
15113 Wyeast Ave., Clackmas 97015
Tri-County RC Club, Marvin Peterson
1421 N. 9th, Redmond 97756
Willamette Mod. Club Inc., Robert Stalick
1120 Shady Lane, Albany 97321

PENNSYLVANIA

Aircraft Modeler Assn., George Reader
3359 Longshore Ave., Philadelphia 19149
BARFS, William Henderson
202 Williams Road, Butler 16001
Bath Area Modelaires, Clayton Ott
770 Washington Ave., Bethlehem 18017
Beaver County MAC, R.J. Chiappetta
104 Tuscarora Dr., Beaver Falls 15010
Bucks County RC Club, Harry J. Zoble
3102 Steele Avenue, Bristol 19007
Buc-Le-Sportsman, Stanley Bucior
519 Richhill Rd., Sellersville 18960
Carlisle RC Club, Richard M. Lane
438 W. Penn St., Carlisle 17013
Central Dauphin MAC, Richard H. White
Lisa Lake TC, Lot 65, Middletown 17057
Ephrata RC Club, Clyde Wealand
207 Main Street, Akron 17501
Erie Model Aircraft Assn., Linley Reichel
3301 Cindy Lane, Erie 16509
Erie Model Controliners, William Hayes
1348 W. 28th St., Erie 16508
Flying Dutchman MAC, Philip Spillman
5227 Eton Pl., Mechanicsburg 17055
Flying Tigers, Joseph J. Hudak
537 Cooper Dr., Warminster 18974
Gateway RC Soc. Inc., William G. Isherwood
4425 Burma Rd., Monroeville 15146
Glenside Air Scouts RC Club, John Salisbury
2909 Joyce Road, Roslyn 19001
Golden Eagles, Donald A. Reed
371 Southcroft Road, Springfield 19064
Greater Pgh. Aero RC Soc., A. DePoutiloff
1089 Green Lawn Dr., Pittsburgh 15220
Indiana County MAC, George R. Krempels
2242 Wilson Ave., Indiana 15701
Johnstown RC Club, Gerald E. Black
603 Demuth St., Johnstown 15904
Keystone Clippers RC Club, E.H. Wisser
1521 Summit St., McKeesport 15131
Keystone RC Soc., Inc., John Landis, Jr.
704 Haldeman Ave., New Cumberland
Lackawanna Aero Modelers, Ted Mynyk
402 Newton Rd., Scranton 18504
Lancaster Co. RC Club, Eugene F. Eshbach
18 Casey Dr., Willow Street 17584
Laurel Highlands MAC, Edward L. Federico
R.D. 2, Box 332A, Latrobe 15650
Lebanon Valley RC Club Inc., H.J. Rittle
207 N.R.R. St., Myerstown 17067
Lehigh Valley RC Soc., Elwood Haggerty
114 S. 8th St., Copley 18037
Levittown Flying Bucks, R. Leishman
167 Goldenridge Dr., Levittown 19057
Merco MAC's, Wes Mitchell
185 S. Mercer St., Greenville 16125
No. Hills Cloud Dusters RC, E. Eversmann
783 Thompson Run Rd., Pittsburgh
Olean MAC, George M. Ward, Jr.
155 Harrisburg Run, Bradford 16701
Penn-Ohio Radio Kontrol, T. Montgomery
1639 Katherine St., New Castle 16105
Philadelphia Sky Pirates, Arnold Waldner
337 W. Durham St., Philadelphia 19119
Quaker City RC Club, Herbert Zemble
7716 Summerdale Ave., Phila. 19111
Rangers RC, William Moffa
2620 Mifflin St., Philadelphia 19145
RC Aeronautics of Altoona, B. Plunket, Jr.
1610 21st Avenue, Altoona 16601
RC Club of Erie, Inc., Richard Thaler
P.O. Box 8132, Erie 16505
Skylarks of Sharon Pa., Henry Smith, Jr.
269 Prospect St., Sharon 16146
S.P.A.R.C.S., Jay Gerber
811 Triumphe Way, Warrington 18976
State College RC Club, Don Frazier
269 Ellen Ave., State College 16801
Sunday Flyers, James L. Renner
406 Seville St., Philadelphia 19128
Susquehanna Valley RC, James Rechel, Jr.
967 High Street, Williamsport 17701
Tri Co. Wing-Snappers Inc., David Klein
765 Lobelia Ave., Riverview Pk., Reading
Tuscarora RC Club, Steve Wonsock
153 Park Pl., Mahanoy City 17948
Univac MAC, Joseph Weinstein
141 Shasta Rd., Plymouth Meeting 19462
Valley Forge Signal Seekers, Wm. Patterson
22 E. Glen Circle, Media 19063
Valley RC Model Club, Inc., M. Kandelin
504 Second St., Athens 18810
Weak End Aero Mod., A.J. Latini, Jr.
214 Rodney Rd., Ridley Park 19078
West Shore Flying Soc., C.S. Fries
1114 Charles St., Mechanicsburg 17055
W.H.A.K.S., John A. Sacco, Jr.
48 Wheeler Ave., Pittsburgh 15205
The York Area RC Club, Inc., Kermit Hoke
207 Locust Lane, York 17402
York Line Tamers, Richard Denues
2560 Sunset Lane, York 17404

RHODE ISLAND

Aquidneck RC Flyers, John T. Kroenert
349 New Meadow Rd., Barrington 02806
Rhode Island Aeromodelers, Bernard Collins
11 Taft St., Cranston 02905
Rhody Aero Guidance Soc., Louis Peters
125 Summit St., Central Falls 02863

SOUTH CAROLINA

Camden Model Airplane Club, Robert Moon
1721 Woodside Drive, Camden 29020
Carolina U-Liners, L.J. McKinney
104 Sunrise Drive, Mauldin 29662
Charleston RC Society, Ed Roberts
794 Piccadilly Dr., Charleston 29407
Dixie RC Flyers, Carl W. Cox
11 Clemson Drive, Aiken 29801
Gooney Birds, Edward H. Schwab, Jr.
Quinby Circle S., Florence 29501
Greenwood Radio Aircraft, James C. Owens
P.O. Box 354, Greenwood 29646
Lexington Aircraft RC Soc., J. Schafpf, Jr.
820 Fontana Dr., West Columbia 29169
Piedmont Flyers Assn., Wm. R. Dickerson
210 E. Faris Rd., Greenville 29640
Sky Knights, Ralph K. Dobson
Box 66, Spartanburg 29301
Sumter Model Airplane Club, Chas. Johnson
Rt. 1, Box 57X, Sumter 29150
Western Carolina RC, Kirby McKinney
7 Windemere Dr., Greenville 29607

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Official Sanctioned Contests of the Academy of Model Aeronautics

March 4—5——NEW PORT RICHEY, FLA. (AA) Chasco CL Championships. Site: Recreation Center. J. Kloth CD, 3932 Yardley Ave., N., St. Petersburg, Fla. 33713

March 5——LOS ANGELES, CALIF. (A) CL Racing Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801

MARCH 12——MESA, ARIZ. (AA) Corsairs 3rd Annual Invitational CL Meet. Site: Mesa Community College. M. Sledge CD, 1755 W. Auburn, Mesa, Ariz. 85201.

APRIL 8—9——NEW ORLEANS, LA. (A) 1st Annual New Orleans Spring Fiesta RC Scale Invitational Meet. Site: Crescent City RC Club Flying Field. A Wiltz CD, 3231 47th St., Metaire, La. 70001

APRIL 9——LOS ANGELES, CALIF. (A) CL Racing Series. Site: Sepulveda Basin. J. Plaunt CD 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801

APRIL 15—16——MONROE, N.C. (AA) MR/CC RC Air Races I. Site: Monroe RC Club. V. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe Radio Control Club.

APRIL 16——PHOENIX, ARIZ. (AA) Spring FF Contest for Cat. I. Site: 35th Ave. & Pinnacle Peak. W. Morris CD, 7422 E. McKinley St., Scottsdale, Ariz. 85257.

APRIL 22—23——CLOVIS, N. MEX. Clovis M.A.D.S. RC Fly-A-Lot. Site: Clovis MADS Field. C. Meyer CD, 1508 W. Chester, Clovis, N. Mex. 88101. Sponsor: Clovis Model Airplane Drivers Society.

MAY 6—7——HUNTSVILLE, ALA. (AA) 12th Annual Rocket City RC Meet. Site: Huntsville Heliport. C. Scholefield CD, 2709 Briarwood Dr., Huntsville, Ala. 35801.

MAY 7——LOS ANGELES, CALIF. (A) CL Racing Series. Site: Sepulveda Basin. J. Plaunt CD, 909 S. 2nd St., Apt. I, Alhambra, Calif. 91801.

MAY 7——COUNCIL BLUFFS, IOWA (AA) Midwestern CL Spring Warm-up. Site: Iowa School for the Deaf. H. Hough CD, 924 Avenue I, Council Bluffs, Iowa 51501. Sponsor: Council Bluffs Balsa Busters.

MAY 14——HOUSTON, TEX. Manned Spacecraft Center RC Fun Fly. Site: NASA/MSC. C. Scully CD, 5271 Memorial Dr., Houston, Tex. 77007. Sponsor: Manned Spacecraft Center RC Club.

MAY 21——TUCSON, ARIZ. (AA) Spring Invitational CL Contest. Site: Rodeo Park. T. Snow CD, 3408 N. 2nd Ave., Tucson, Ariz. 85719. Sponsor: Cholla Choppers M.A.C.

MAY 21——BALTIMORE, MD. (AA) Flite Streaks 6th Annual CL Combat Contest. Site: Skyview Model Park. L. Lauer CD, 831 Lannerton Rd., Baltimore, Md. 21220. Sponsor: Flite Streaks.

MAY 27—28——SCHENECTADY, N.Y. (AA) 3rd Annual Empire State RC Championships. Site: Schenectady County Airport. A. Sattler CD, 29 Waldorf Pl., Schenectady, N.Y. 12307. Sponsor: Thundervolts RC Club, Inc.

MAY 27—28——MONROE, N.C. (AA) MC/CC RC Air Races II. Site: Monroe RC Club. V. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210. Sponsor: Monroe Radio Control Club.

JUNE 3—4——NASHVILLE. TENN. (AAA) 9th Annual Mid-South RC Championships. Site: Percy Warner Park. B. Reuther CD, 6602 Highway 100, Nashville, Tenn. 37205.

JUNE 3—4——BATON ROUGE, LA (AA) "Cajun Classic" Baton Rouge 11th Annual RC Meet. Site: Kleinpeter Field on Pecue Lane. H. Roberts CD, 9243 Hampton Way, Baton Rouge, La. 70814.

1972 NATIONAL CONTEST. Glenview N.A.S. has tentatively approved the dates of July 24-30. Final approval is expected momentarily.

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

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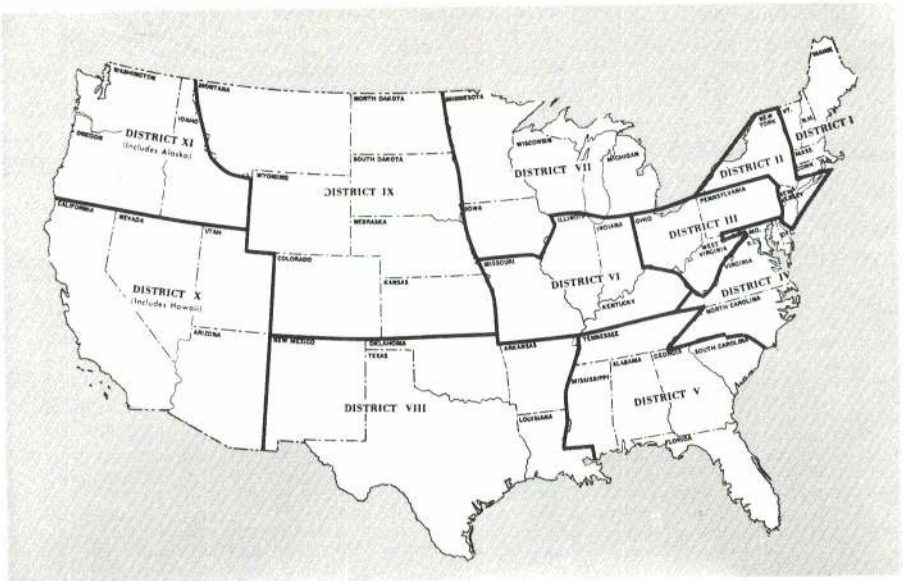

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