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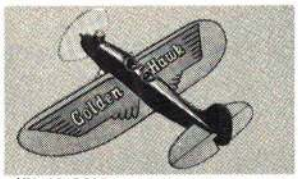

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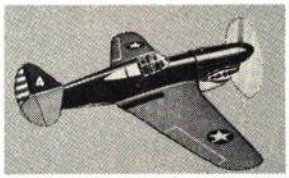

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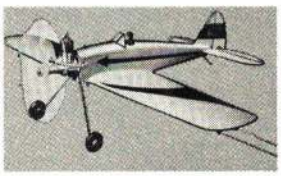

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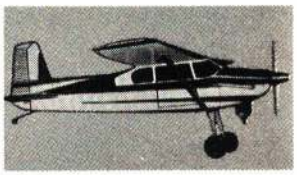

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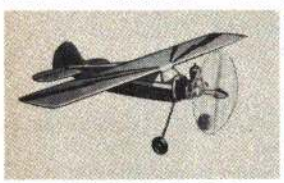

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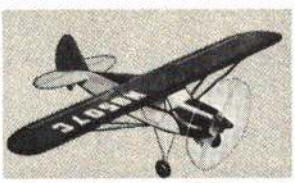

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AMERICAN aircraft modeler

COVER PHOTO: Bob Buenzly's brightly MonoKoted Nesmith Cougar control line scale model (page 25) is held by his mechanic and fiancee, Janie Bergenback. Shiny finish is typical of many homebuilt aircraft. Transparency by Charles Cortright.

WILLIAM J. WINTER — PUBLISHER **EDWARD C. SWEENEY, JR.—EDITOR**
Kathryn Conover, Editorial Assistant **Eleanor Swavely, Editorial Assistant**

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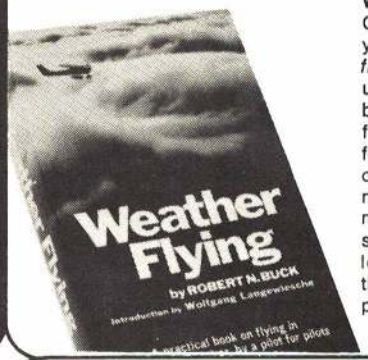

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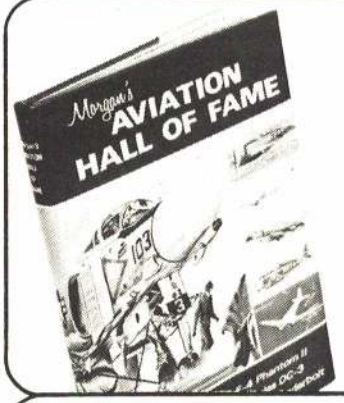

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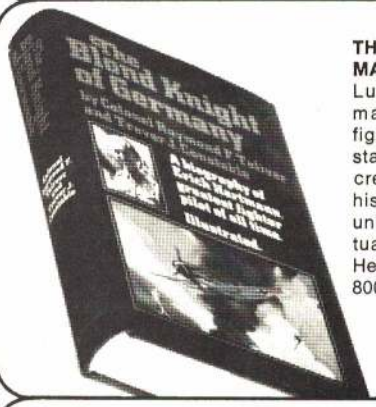

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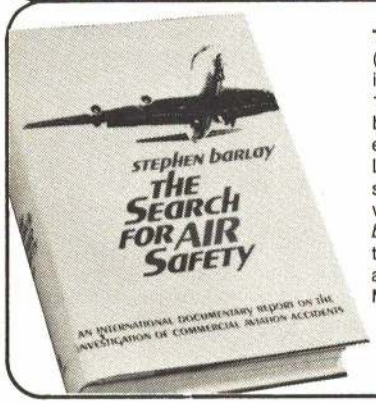

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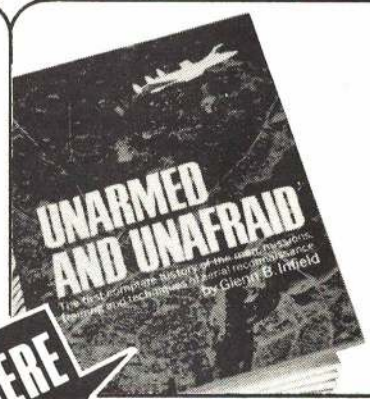

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Editorial

Straight...and Level

The aeromodeling world is a lot more than just models and flying.

NEW YEAR'S DAY as this is written, is a good time to catch up with some of the more pleasant things about this hobby. So we talk of people, men who have made unsung contributions to this model world.

By summer, more famous modelers will be nominated for the Hall of Fame. While past selections managed to include a few bigger-than-life figures of the past, there were, as we're all aware, many fantastic people, who dwarfed by their achievements most of the things that pass these days for accomplishment. It is fitting that one of these mystical figures from the past should be honored in each year's Hall of Fame selection. Typical of their day, these men were skilled craftsmen, mechanically sophisticated jack-of-all-trades personalities, who often mixed full-scale and modeling. None was more typical–if genuine greatness can be called merely typical–than William T. Thomas who died in July of 1966.

Bill Thomas Sr., who shared an avid modeling career with his son Bill Jr., is best remembered for the Thomas Brothers Airplane Co., of Ithaca, N. Y., prior to World War I, and then for his association, beginning during that War, with the Morse Chain Company, to form the Thomas-Morse Company. Between 1910 and 1922, the various Thomas companies produced 22 different aircraft. Thomas Morse, best known for the stubby MB3 produced in quantity by Boeing before their own fighters, was sold to Consolidated Aircraft in 1922. Famous in its own right under Rueben Fleet (note that last name), Consolidated, located in Buffalo for a long time, went to the Coast, where it eventually became General Dynamics and made Convair a mid-century giant.

An active modeler since 1937–and he probably built models from the very beginning–Bill and his son built what was perhaps the first operable Wankel engine in this country. Under the fascinating headline, "Flapper's Flight Flabbergasts Fabricators" a Florida paper some years ago described a 1 1/2 mile flight of a gas-powered ornithopter with a nine-foot wing span–and the best we have done otherwise this far are those little rubber-powered novelties. The two Thomas's released the ornithopter from the Ormond Beach Airport on its first test flight and off it went, on a high beeline across the sky. It looked just like a pelican, said Floridan Bill Thomas. The Thomas's did fine in competition free flight, too–the "simple" stuff.

Born in Rosario, Argentina, and a civil- and mechanical-engineering grad from London's Central Technical College in 1908, Bill flew his first airplane with a 22-hp engine in 1909. With his brother Oliver, he then founded the Thomas School of Aviation in Ithaca–the first chartered by the New York State Board of Regents. From 1910 to 1922 his aircraft set many records, including an endurance record in 1912, and broke Lincoln Beachey's altitude record. An astronomer, as is son Bill, he was active as an amateur in the Daytona Beach Stargazers Club, which met twice a month in his home. He was one of a group who, in World War II, helped meet a shortage of optical prisms which he made in his home workshop. He was a founder of the Aero Club of Great Britain and Ireland in 1908, an Early Bird and, among other things, a former district vice-president of our own Academy of Model Aeronautics. To the Nominating Committee for the Modeling Hall of Fame, Bill Thomas, Sr., should need no introduction.

THE HOBBY SHOP that Went to Church should be one of this year's warmest stories. For us, it began in 1953 when Rich H. Palmer told us about his ambitious plans to open on Route 46, Parsippany, N. J., an unusual hobby shop with adjacent flying circles and even a lake for model speed boats. Thousands of weekend drivers, who did doubletakes as they flashed by, stopped and were introduced to modeling. New highways and a 200-room Holiday Motel crowded him out. Last spring, Rich announced the building of a 6600-sq. ft. two-story hobby shop for trains, planes, boats, rockets, cars, plastics, and packaged craft items.

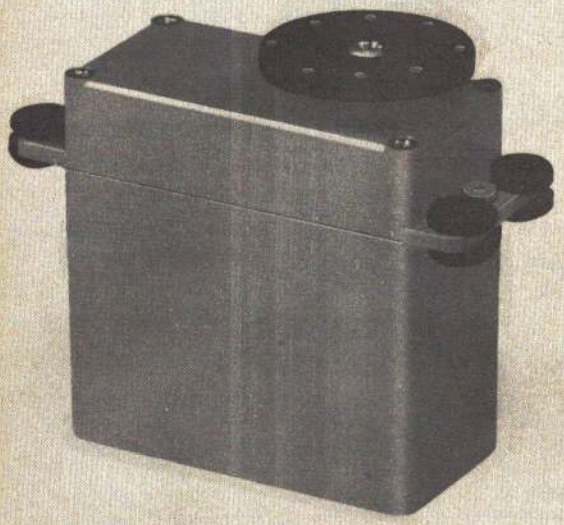
What is it they say about the best laid plans? As Rich puts it, "the roof fell in."

Red tape. He got around the stubborn town fathers with a stipulation that he clear it with the state because of being near a river. The state took three months to clear Rich of a flood control zone. By August last year, the money market tightened and the mortgage money people backed out. Time had run out, and Rich had to find an existing building.

You've guessed it. Rich found an unused church, built in 1851. On the front he hung a sign, "Toonerville Tower." A Model Museum will be on the lower level–oh, yes, the bell still rings. One wing will be modernized into a cinderblock building of 1800 sq. ft. For a modern note, Rich's country-church operation will be 60% computerized. Grand Opening was targeted for March 1. By the time you read this,

Continued on page 66

NEW!



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A standoff

This is an open letter in reply to Marc Sexton (You Said It, Jan. **AAM**). I must agree, Marc, that many experts do find it somewhat of a hassle to find the time to help beginners, old and young alike. However, most will welcome this hassle.

The real problem lies in a communication gap. While you are waiting for someone to ask if he can assist you, the expert is also waiting for you to ask for help. Kind of a standoff.

In many instances, this kind of problem is soluble—join a local modeling club. As president of the Barnstormers, a control line club in Southern California, I speak for the group in saying we would welcome you and those with an interest like yours.

This is not to say that before you will get help you must join a club, but it is invaluable in closing the gap between novice and expert. You see, Marc, in order for a club to function it needs people like you. The next time you have a question, ask a local club member, an expert, or someone like yourself. But please, please ask!

Bill Noyes, Valinda, Calif.

Scale addicts, unite!

AAM in the current format has become my very favorite, and here's why. Some grown men are compulsive model builders for the sheer satisfaction of the building. Not particularly interested in contests, these; but most magazines are 99 44/100% contest-oriented. This kind of coverage offers pitifully little to people not interested (except academically) in RC or super performance of any kind.

Our breed builds about 95% scale, much of it non-flying. My greatest delight is to produce a little plane that looks a lot like the real thing (I still make 1/48th solids), but I don't care for the installation of working gadgets that contribute more to frailty than interest, like cockpit working controls or opening wing panels. However, we could not countenance a model without separate ailerons or external horns and cables.

I have started on a project of the 1/16th group, now in various stages of completion: F11C-2; R. Turner's No. 57; Fokker DR.1 and D.VII; Spitfire Vb; two Nieuport V strutters; Hawker Fury II; Piper PA 12. These are soon to be followed by Supermarine S-5, R3C-2, Sopwith Snipe, and so on and on.

There must be many addicts of the accurate, but not quite museum quality, airplane model. I would enjoy an exchange of info and drawings with readers who have similar interests.

Please keep up the scale drawing and photo features. **AAM** is the only mag where they aren't all but crowded out.

Robert Wilde, 18 Slope St. Nanticoke, Pa.

Comments on static scale produced a surprising reader response. Several letters on the subject appear in this department. It is suggested that enthusiasts make their case direct to AMA. —Publisher.

Sailplane search

I'm a 15-year-old RC sailplane buff. Last week I made my first successful RC glider flight. I made a homebuilt Kestrel from **AAM** plans and filled it with a Testors Simpulse I.

The Kestrel glides well and I like its slow speed characteristics; but I'm looking for a higher performance ship for my single channel, pulse-proportional set. The best I've found is Sterling's Schweizer 1-34 kit, but the $24 goes hard on the pocketbook.

Could you or your readers recommend another sailplane?

Peter Kistler, 205 Main St. Catawissa, Pa.

Likes the Thor

In reference to the Thor 29—all those comments are really too much to bear! As an owner of five Thors in running order, I thought I'd better do something before mine stop running too. They can't withstand much, you know.

Why they pop, but don't run, is a tricky reason associated with several definite factors. (1) The engine may be so worn that it has no compression. (2) If it's new or like new, look to see if a $2.95 bargain-kit engine-hunter put the piston in with the baffle so it closes up the exhaust. That won't help. (3) Look to see if the needle valve really works. One Thor needs six turns open to let fuel in, another only two and a half. Another won't close down airtight, so it runs rich and slow and won't rev up. (4) Does the rear gasket let air in or is it a proper seal with orange shellac? (5) Put the timer a mite to the left of twelve o'clock and make sure the fuel comes into the crankcase. A little drop on the piston as a prime won't make it run. (6) Try a 11- or 12-in. prop (wood preferred), and add a bit of Gulf zinc diophosphate oil additive to 70 oil, using low-grade aviation or Amoco gas.

Honest, fellas, if the Wilco coil isn't shorting out and the ignition checks out ok, it will run, if it isn't worn out. The best version was the plain aluminum, which hones in with proper lubrication and short runs. The gray, or black, version was inferior; it ran slower because of poor surfaces. The piston scratched up easily and only extremely good care can keep it operative.

I have run both versions and currently use them in oldtimer free flight. No trouble at all—just don't expect any old needle valve, spray bar combination to run well. If you have spares, you have to match them up properly. I'd be glad to assist Thor owners currently defeated by the challenge. Would also appreciate hearing from anyone with Baby Miss Behaven plans. Please let me know, so I can rebuild my first UC-Thor-power, what else?

David Axler, 10433 134th St., Edmonton, Alberta, Canada

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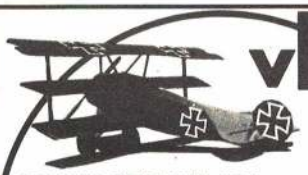
vk



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Modelers' exchange

I am a Turkish young man, 20 years old, and am interested in aeronautics. My father is an officer, and my brother was a pilot in the Turkish Air Force. I am a parachutist and have eight springs. I flew an aeroplane alone for 35 hours, and am to be a pilot next year.

There are many United States Air Force pictures and model planes in my collection. I want to buy little plastic models from the U.S. I would also like to exchange information or models with other readers.

Emin Findikli, Kurtulus Samur Sokak, 16/13 Ankara, Turkey

Beat the drums for scale

We all agree that public understanding and acceptance of our hobby is paramount. We also agree that the Nats scale event attracts the most spectator interest. My only criticism of the 1970 RC scale event, which I feel was the best ever, was the lack of a master of ceremonies during the flying.

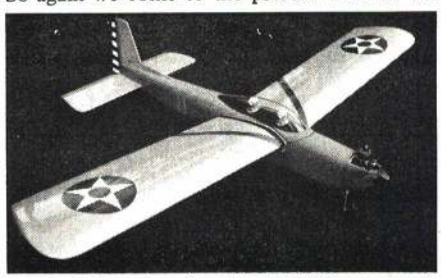
My wife, out in the spectator area, heard several conversations and erroneous conclusions regarding the different models in the event. Why don't we take advantage of a perfect opportunity to enlighten the public? Each contestant should furnish a page or two of interesting facts about the proto ship and his model.

Thus informed, the "silver-tongued" MC could present interesting and intelligent banter to the public. I'm sure all scale events would be greatly enhanced by such an addition.

Dick Graham, Ottumwa, Iowa

Design vs pilot skills

The editorial in the January issure inspires me to do two things: one is to commiserate on the disappearance of the lost art of model trimming for flight, which most advocates of RC, as you say, no longer need since the airplanes are designed to fly right off the workbench. My second reaction is to take a somewhat different viewpoint and say, "Maybe that's not bad, really." The sport of flying full-scale aircraft does not concern itself too much with the aircraft design either. So again we come to the present state of the



art in RC, wherein pilot skill is the main objective of many, perhaps most, of the enthusiasts.

But there still exists a small hard-core group who find flying a secondary thrill. For myself, the minute a design is working entirely to my satisfaction I become bored with it and begin thinking about something new. The only exception is the field of soaring, where the unseen air currents make even the most perfectly-designed airplane subject to the whims of nature.

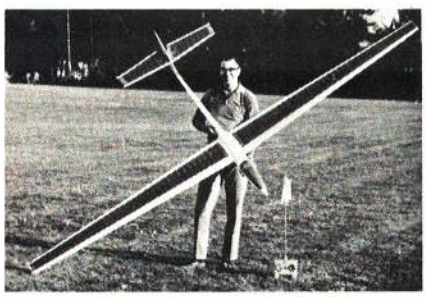
As for the power models, there is always the challenge for a designer to meet a specification. For example, you mentioned the interrelationship of dihedral and fin area.

Continued on page 90

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

"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 underside of one panel.

Harley E. Michaelis
Walla Walla, Wash.

In these days of fanciful advertising it's a real pleasure to run into a product that lives up to everything claimed for it.

Daniel Rossman
Wynnewood, Pa.

I have not "silked" a model since Monokote became available. First Monokote job was regular silver 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.

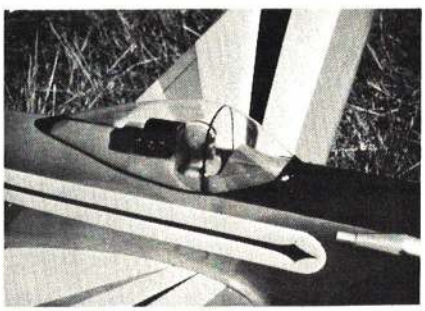
Brian McAvoy
Greenock, Pa.

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

Dan Rhoads
Newington, Conn.

Being a little unhappy with my memories of doping and doping and doping silk or silkspan, I thought I'd try your product, SUPER MONOKOTE. Well, fellas, I believe! Never before has any product done so much for me, at so little cost. Everything you say about it is true.

Ralph Joblin
Philadelphia, Pa.



The Taurus was covered and trimmed with Super Monokote. I find it extremely versatile as a trim material because it doesn't stick until I want it to. It can be positioned precisely to produce the most intricate designs.

Gene Rubel
Torrance, Calif.

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

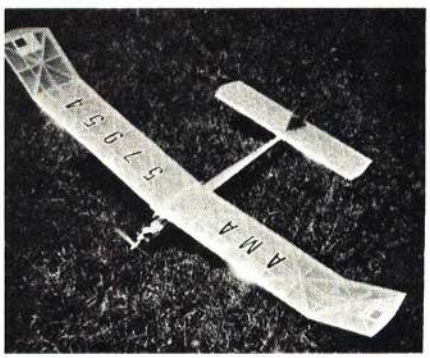
Dr. Walter Good
Bethesda, Md.

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.



I repaired the damage and recovered with a fresh section of transparent Super Monokote. Only a trained eye would ever spot the repair. The good old days of steam it and wait, then steam it and wait again to make adjustments are gone forever if Super Monokote 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!

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Santich's Enya-powered Chipmunk took 2nd in scale. Based on Stafford kit. 6½ lb.

On the Scene

U.S. Air Force Championships

Air Force teams competed in USAF Worldwide Championships. Winners go to AMA Nats.

JOHN BLUM

TOP MODEL AVIATION enthusiasts came from all over the world for the 20th U.S. Air Force Worldwide Championships. Thirty-four airmen who had qualified for a shot at the finals were sent to Scott Field, near Belleville, Ill., to complete, not only for Air Force honors, but also for a place on the team that will represent the Air Force at the Glenview Nationals.

Qualifiers for this meet competed in elimination contests within their own Commands. Transportation and arrangements to transport the contestants and equipment to the Finals and return were made out of funds obtained through recreational activities.

Air Force Team members are chosen on the basis of points, requiring contestants to compete in events usually outside their normal modeling element. Qualifying for the Team are: Capt. Bob Adair, Capt. Keith Trostle, Capt. Hoyt Hawkins, Sgt. Bert Dugan, and Maj. Philip Bayly. Assisting at the Nats will be the next five qualifiers: Capt. Dick Stiles, Sgt. Larry Miller, Edgar Corson, Maj. Frank Mock and Sgt. Robert Cooley. RC Specialist will be Sgt. Dan Santich. Air Force awards went to Capt. Keith Trostle as high point winner and to Pacific Air Force as high point Command.

The week's activities were celebrated with a banquet on Sunday evening. Base Commander Col. Kenneth Clark and MAC Commander Gen. Catton gave welcoming addresses. In addition to awards, special recognition was given to CD Eugene Comontofsky, retired AF officer, and to the local modelers who, through coordination with the Greater St. Louis Modeling Assoc., worked as judges and officials.

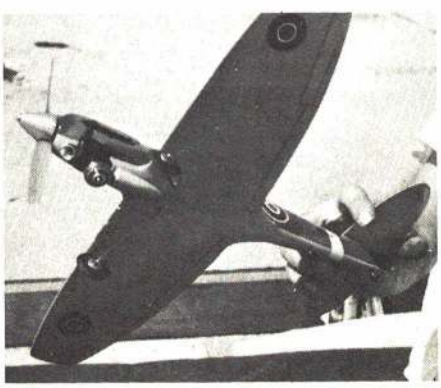
Project Officer John Gay reports that this is the first Championships at Scott Field and rumor has it the 1971 Championships may also be held there.

Capt. Hawkins adjusts needle on ST 15 FAI speed model. Uses carved 6-7½ prop.

Fox 35 powers Sgt. Whiddon's Detroiter to second in stunt with 403.5 points. 38 oz.

Capts. Koger and Walker entered original design Pattern ships. Placed 1st and 2nd.

FF scale Fairchild 24 by Sgt. Dugan uses Cox 020. Always a scale favorite.



Capt. Trostle likes realistic ½A Proto models. Spitfire uses lefthand shaft TD.

ST-powered Voodoo placed 3rd in Combat. Sgt. Cooley uses chickenstick to start it.

From TF kit, Sgt. Rich built RC scale-winning SE-5. Power is Enya 60.

Sgt. Ford's biggest is the C-5A Galaxy. The 28 wheels can be retracted too.

CARL GOLDBERG

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

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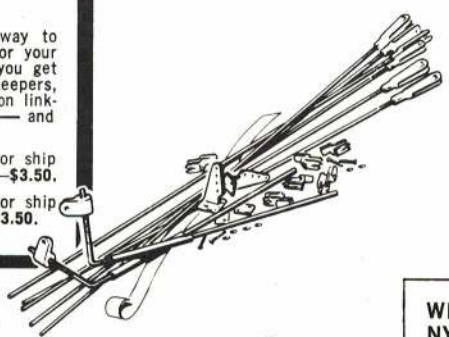

CONTROL HORNS

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.**

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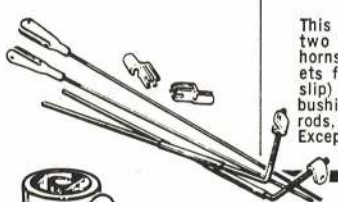
This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft. — **50¢**



STRIP AILERON LINKAGE

This complete set has two threaded aileron horns; two nylon brackets for fine, safe (can't slip) adjustment; brass bushings; Snap-Links and rods, and Snap'R Keepers. Exceptional value—**$1.50**

NYLON BEARING

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

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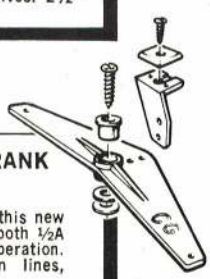
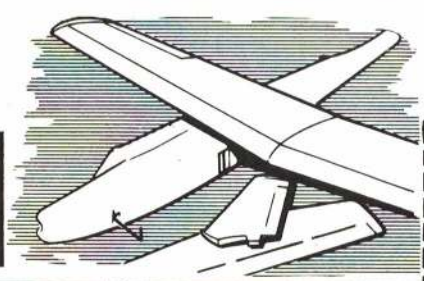


½A BELLCRANK and HORN

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



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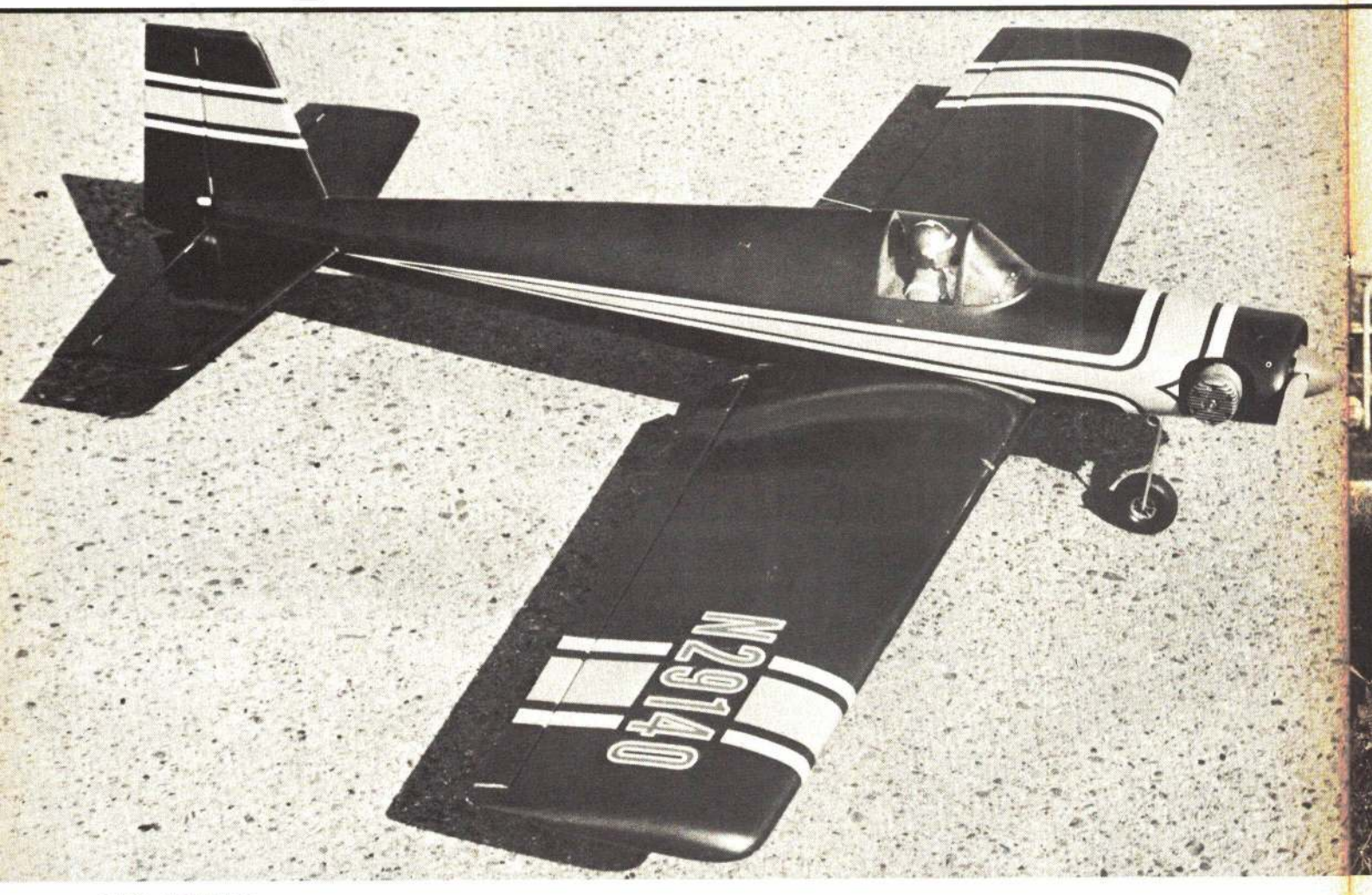
Grouper

Its unique nose named it, but author's proud creation uses stock ready-to-fly wing.



BUD PHILLIPS

THE GROUPER WAS conceived when I grew tired of today's high performance, look-alike, slab-sided super stunt models. I wanted to design, build and fly a model airplane which looked different. This concept necessitated a round fuselage. The engine had to be hidden or at least made less obvious. The ship had to look like a full-sized plane. Thus, the Grouper was created.

I was not sure how the ship would look, but under these conditions it was destined to be different. The front section is a horizontal ellipse, almost large enough to conceal a side-mounted engine, and is egg-shaped aft of the canopy. The veteran Lanier foam wing was selected.

This combination had to be successful. A side-mounted engine is a good compromise between concealment and ease of starting. The round fuselage with the turtle-deck provides the necessary realism and aerodynamic cleanness. The Lanier wing would permit me to get the plane in the air quickly.

Construction began on the fuselage, but spring weather diverted me from the workbench to flying. Then one bright and blustery day, my Lanier Thunderball landed hard and shattered its nose gear mount. After 150 or more flights accumulated prior to this damage, the fuselage was ready to be retired. But what to do with the wing? Mate it to that dusty, partially completed Grouper fuselage!

Immediately a clash of proportions was apparent. The wingspan was too great, but the hacksaw solved that. The span was reduced to five feet, including straight-back wingtips. A model this size is convenient and still retains the large model flying characteristics.

A somewhat similar approach was used to name the Grouper. Its most noticeable feature is the wide oval nose. Stretch the imagination a bit and it looks like a big mouth. My wife said it reminded her of a fish. Visions of a large, slow-moving, big-mouthed rock bass appeared. In true aerodynamic thinking, the appropriate hydronautical name of Grouper was chosen. Planes have been named after various birds, objects, places and mythological creatures, so why not a fish?

Construction

The fuselage is unconventional in shape and design. It is a monocoque fuselage with a high strength to weight ratio. The skin is supported by formers built upon a horizontal ¼" thick balsa crutch. Construction requires little more work than for a wing —which could set back model aviation several decades! No removable cowl or tank compartment hatch are needed. The side-mounted engine throws the glop down and away and keeps the airplane cleaner.

Cut the crutch from ¼" medium hard balsa either from one wide sheet (as I did) or from two sheets. The right forward section of the crutch will be cut off later to allow clearance for the engine. Gather the necessary wood for the formers and cut them out as shown.

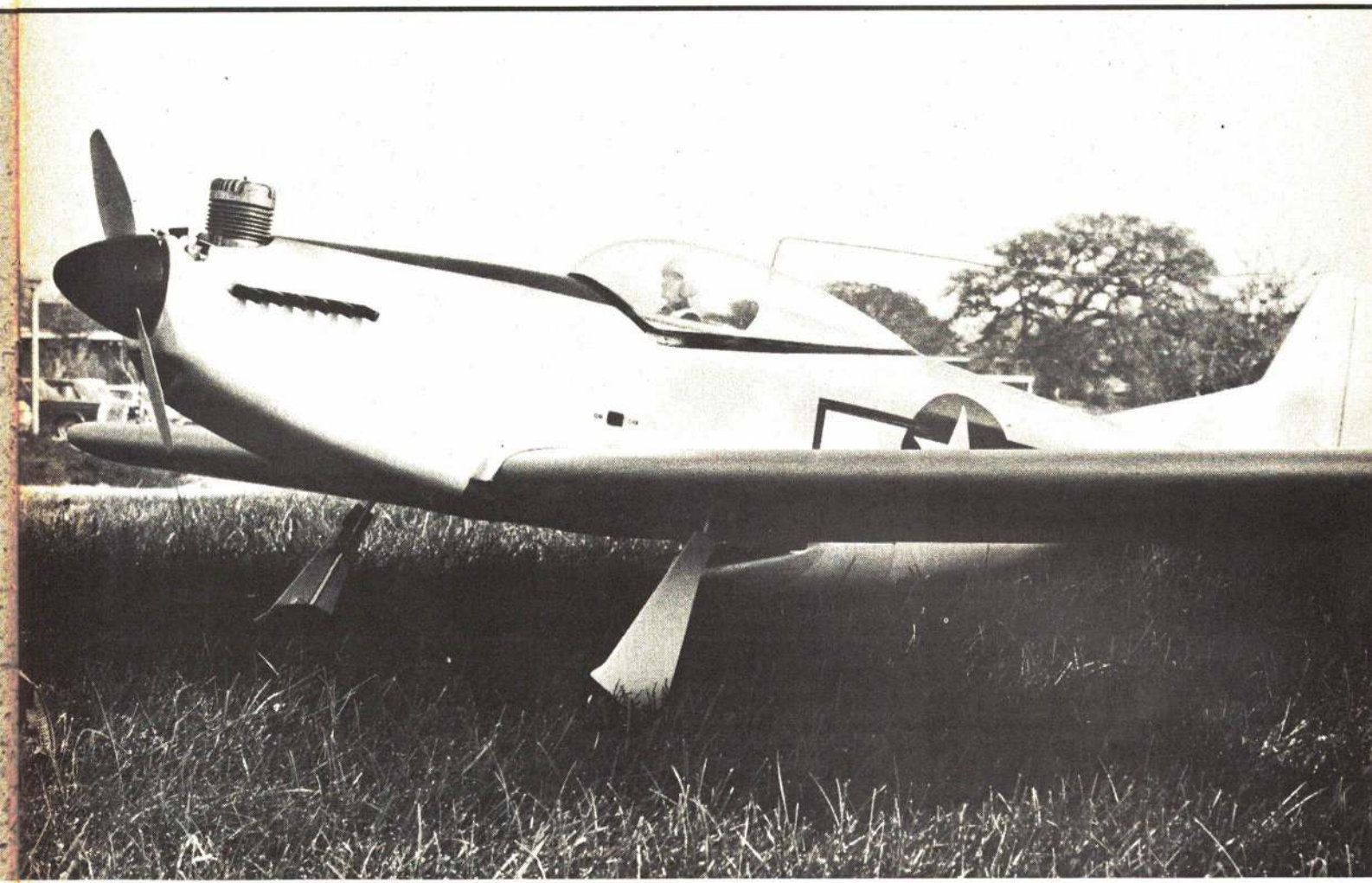
My method for cutting out balsa formers, ribs, wing saddles, etc., is to glue (rubber cement is great) the outline of the piece to stiff cardboard and cut that out. Then put a loop or two of masking tape with the sticky side out on the back of the cardboard template, which is then placed on the piece of wood to be cut. The loop of tape holds the template to the wood as you cut around it.

When the parts have been cut, start assembling the fuselage. Spread the forward section of the crutch to allow formers F3 and F2 to be glued in place. Then add F1. The remaining

(Continued on page 16)

Mustang

Unmistakably a P-51, this stretched-out semi-scale performs well with adequate power. Ready-to-fly wing works fine.



DICK CARMAN

OH NO, not another P-51! But tell me —at that last air show when you saw that sleek Mustang profile poised for flight, didn't you check to see when the flying demonstration would start? And later—that's a V-12 firing off now. Look, the tail is up. More speed. It's off! A slow roll on takeoff—those loops and four point rolls are so smooth, and now a victory roll. It must be getting ready to come in, those long main gears stretching for touchdown.

Weren't you helping fly that bird? I was. I always wanted to build that airplane and, when I did, I wanted it to fly well, as well as look scale. Plenty of P-51 kits were available, but I decided to build an almost scale Mustang using the Lanier wing. It is one of the best pattern airfoils around, with its tapered, square-tip look. When lightly sanded with #400 wet paper just enough to break the gloss and given two light coats of Hobbypoxy silver, the first Mustang wing took shape.

I've built three of these airplanes. Each came in at a different weight and each had its individual flying characteristics. The first ship used an old Lanier Bronco horizontal stab covered with 1/16" sheet. It was so tail heavy that the airplane required a ½ lb. lead brick in the nose to balance. Dry weight was pushing 7¾ lb. but, surprisingly, only the vertical maneuvers indicated it was heavy. In silver paint and military markings, it was a sweet-flying airplane. The Lanier wing didn't seem to be bothered by the extra weight. The second model used a home-cut wing, same airfoil and span. It weighed 6½ lb., no more foam stabs!

The model I now fly has a wider, deeper fuselage and a flat, built-up horizontal stab. No difference in takeoff or flying qualities between a stab with airfoil or this flat stab are evident. The flat one makes it easier to get the incidence correct. A 66-in. wingspan was used on this model, which weighs 7 lb. dry. The Lanier wing does well up to about 7 lb.; at 7¾ lb., the landings are a bit warm but not unreasonable. The 66-in. span allows the flier to choose his landing speed, and the speed through maneuvers looks more scale.

Construction

Fuselage construction for this airplane is the most time-consuming step, so this area was simplified but without losing scale appearance. Familiar slab side and plywood doubler techniques are used, along with ¼" sheet for the cowl and radiator. Cut both sides from ⅛ x 4 x 48" medium balsa. Contact glue the 1/16" plywood doubler from the nose to just beyond bulkhead F4. Since a 4" width is not quite wide enough for the full fuselage depth, two pieces at the leading and trailing edge of the wing cutout must be added. Glue ⅛ x ¼" strips along the top and bottom edge of the rear section and reinforce the sides with a few diagonal pieces. Add a 3/32" sheet balsa doubler to the last 8" of tail section.

Cut all bulkheads: F1 and F2 out of ¼" plywood; F3 through F7 from 3/32" or ⅛" balsa; C1, C2, R1, and R2 from 3/16" or ¼" balsa. Pre-drill F1 for the radial mount to be used and F2 for the wing dowels. Cut one ⅛ x ¼" strip to the same width as F5, F6, and F7; and a larger ¼" block the same width as F4. Cut off a ¼ x ⅜" tail post, F4, and its ¼" piece. Glue F1 into its location, and hold in place with masking tape. While the glue is still wet, be sure everything is square and true. Finish by gluing F5, F6 and F7 with bottom cross strips at the location indicated. Hold with masking

(Continued on page 17)

Grouper

formers are glued in place, top and bottom. The top and bottom ¼" stringers can be installed in the aft section to give the formers support.

While the fuselage is drying, start building the fin and stabilizer framework over the plans, which must be separated by waxed paper or plastic wrap. The framework is covered with 1/16" sheet balsa, not paper! Build on a flat surface. After the frames are dry, glue the 1/16" covering to both sides and pin flat. Sand and shape the fin and stab when dry. Glue the fin to the stab at right angles (they look better that way) and set aside to dry.

Return to the fuselage and work on the nose section. Box in the area around the tank compartment with ⅛" and ¼" balsa. The ¼" balsa extends to the outer edge of formers **F2, F3,** and F4. It will be sanded later to support the skin in that area. Glue the ¼" stringers on the top and bottom in the nose section. Taper the forward portion of these stringers to allow clearance for the engine mounting plate.

Permanently mount the lower nose gear bearing mount in place. Cut away part of the lower ¼" stringer to provide clearance. Lock the screws in the blind nuts with epoxy. They will be difficult to tighten once the fuselage is sheeted. Locate the upper nose gear mount.

Glue the fin-stab assembly to the crutch, lining it up with the centerline of the fuselage. Now, glue the upper side stringers in place. Taper their aft ends to blend smoothly with the fin. While gluing these stringers, do not induce a twist in the fuselage. Glue the lower aft stringers in place.

Cut out two wing saddles from ¼" balsa and glue in place. Add the ¼" balsa reinforcements between F3 and F4. Make a cockpit floor from ⅛" balsa and blue in place. Add scrap ¼" balsa to build out the wing saddle surface. Sand to the curvature of the fuselage.

Now cover the fuselage with medium grade 3/32" sheet balsa (plank, if you prefer). I cut the balsa sheets so all joints would butt over the stringers, which gives some added support to the butt glue joint when sanding. The fuselage should be supported on a flat surface and the top sheeted first. This will ensure a true fuselage. Once the top is sheeted, no further twist can be built in. When dry, remove and sheet the bottom.

Add the ½" thick balsa cowl ring to F1 and round when dry. Epoxy the wing holddown block in place.

After the fuselage is completely covered, it is sanded, doped, and silked. Cut out an opening for the engine, large enough for it to pass through. Cut the rudder and elevators from ⅜" sheet. Sand to shape, silk, and hinge by your favorite method.

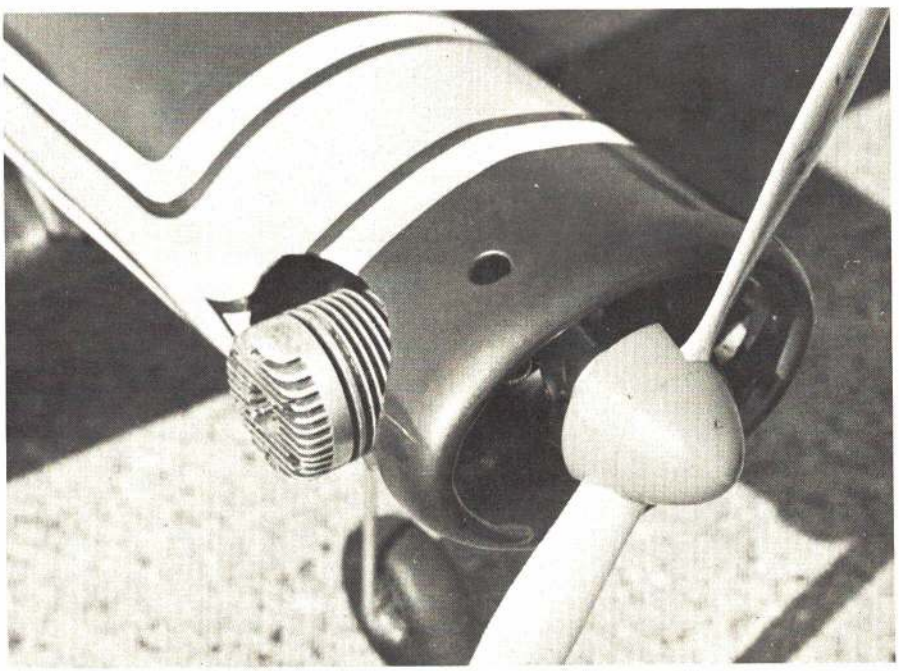
Decide how to finish the cockpit area. I covered the interior with stick-on red velvet plastic. A black readrest adds to appearance. Cover the instrument panel with stick-on walnut plastic and add Tatone instruments. A two-in. scale pilot flies the ship.

Recess the sheeting around the cockpit area for the acetate sheet disguised as a canopy. Make these recesses about ⅛ in. wide to provide adequate gluing

(Continued on page 86)

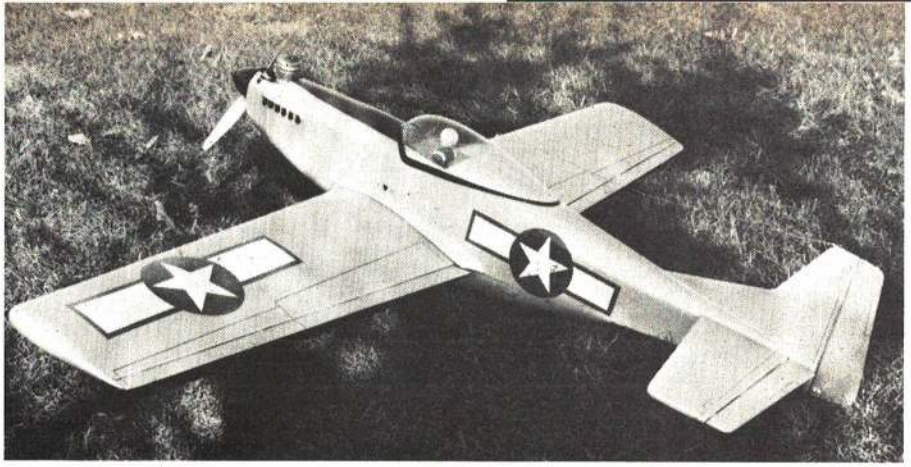
This Grouper's bare Lanier wing was balsa-covered for appearance, is much heavier.

Cockpit details always attract attention and make a non-scale model look real. Interesting here is the use of a plywood canopy for handling strength.

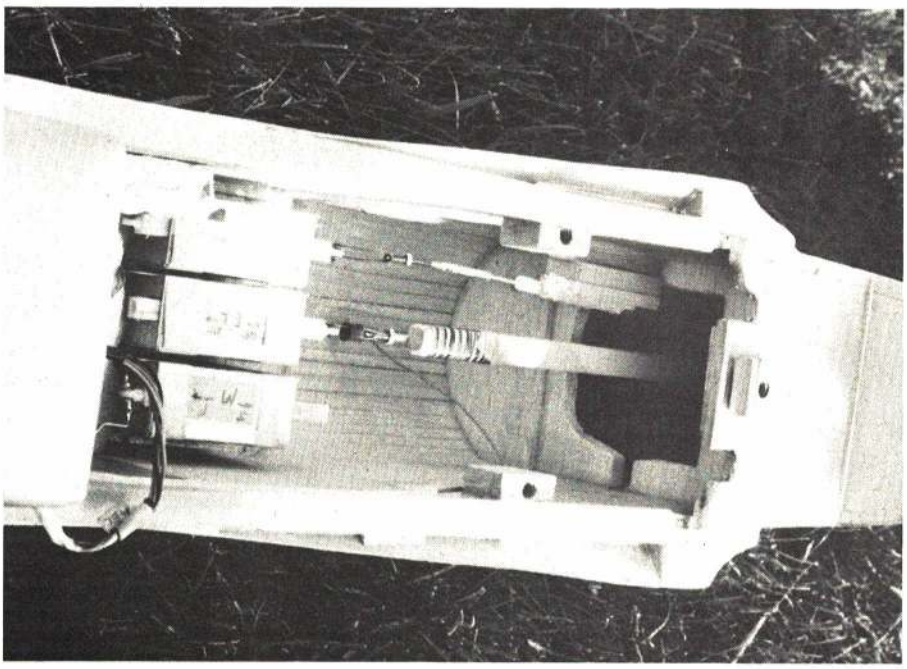


The Grouper nose provides ample air inlet and place for battery on the left side. In flight, the engine is hidden. Mufflers are located unobtrusively below nose.

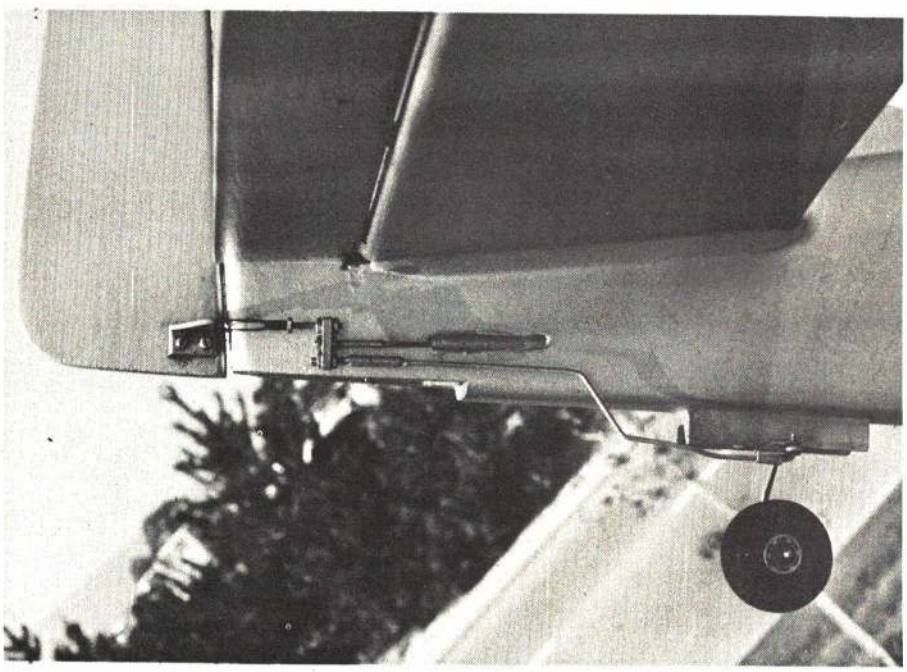
Mustang



The Mustang is quite distinctive. Airscoop, ink lines, and tail quickly identify aircraft.



Lots of room inside for an old PCS. Note mounting of plywood wing fillet for appearance only. Wing mounting screw blocks and belly scoop attach block also are shown.



Semi-remote tail wheel steering is clever. Phenolic or ply coupler from servo pushrod to rudder and wheel is held to threaded pushrods with nuts on each side.

tape until dry. Bulkheads are placed into the fuselage to a depth indicated by a dotted line on the plans.

Plank the bottom rear with 3/16" or ¼" soft balsa. Cross-grain the first 6 or 8" to prevent splitting. Bevel F3 and glue into position by using a straightedge from F7 forward to achieve the correct angle. Turtleback is made by trimming ⅛ x ¼ x 22" strips to a taper of ¼" at F3 to ⅛" at F7. These are cut at an angle so that they will fit with a minimum gap as the rear deck is formed. Allow these strips to go beyond F7 to form a part of the vertical stab fillet.

Start at top center and glue, pin, and glue, until finished. The structure ends up strong but light. Finish by gluing F1, F2, C1, and C2 in place. Engine and mount must be selected now in order to position F1 at the proper location. I put in a little right thrust and downthrust here. Use 3/32" plywood strips on both sides of F1 and at key slot for F2. Use epoxy at these two bulkheads. Glue in R1 and R2.

To avoid knocking off R1 and R2, start planking the radiator first. Cut and piece the sections for the radiator out of ¼" soft to medium balsa. Build and glue as one complete unit, remembering that it will be separated later at R1. Building it as a one-piece structure makes it easier to shape and sand. Separate the front section to finish the detail work, such as holddown screw, dowel, etc. The cowl, which also uses ¼" sheet, goes fast. Rough cut the bottom nose block and extend it under the wing cutout as shown. This enhances the profile appearance.

A ½" thick block is glued to the nose and reinforced on the inside with triangle strips. Use a 2¾" spinner mounted on the engine, and in the plane, to determine where and how to shape the nose. A 6-in. block plane is a great help for shaping nose, cowl, radiator, and rear section. The more excess removed now means less sanding later. Close attention to the photographs or to a set of 3-views helps in shaping the bottom nose section.

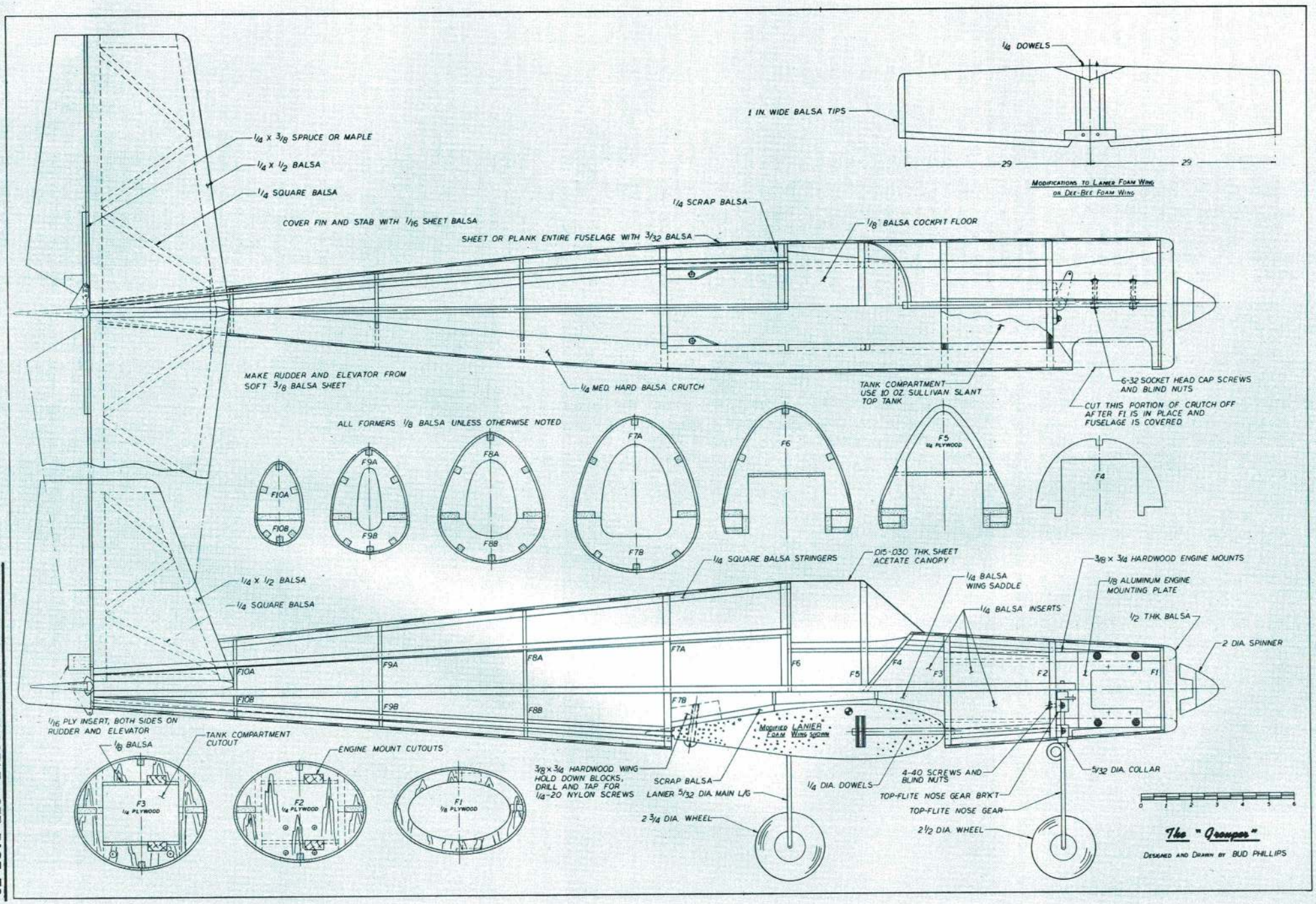
Wing fairings are made from balsa and 1/32" plywood. With the wing in the cradle and wax paper between, glue the forward balsa piece and plywood fairing in place; hold with masking tape. When dry, remove the wing and glue ½" long triangle pieces under the 1/32" fairing to reinforce it. Put the wing back in cradle and glue the rear balsa fairing block in place.

Exhaust stacks are made from 5/16" diameter dowels, ⅝" long and sanded to a 45-degree angle; equally spaced and glued at a down and rearward angle onto a ⅜ x 4" piece of 1/32" ply. When gluing to the fuselage, also butt-glue a 1/16 x 3/16" strip along the top of the stacks at the fuselage.

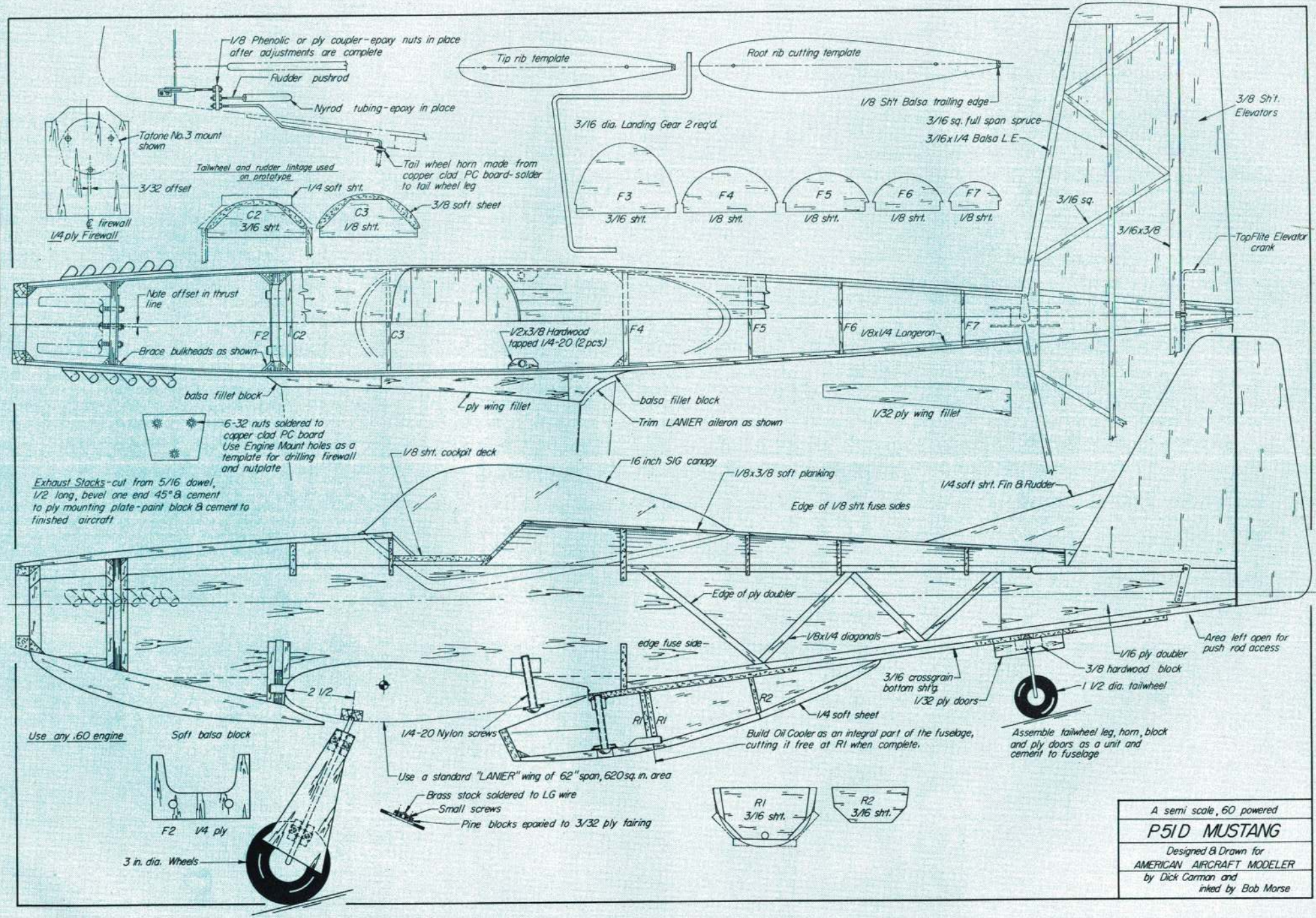
The tail wheel assembly uses 3/32" wire into a ⅜ x ¾" hardwood block with doors made of 1/32" ply. Copper-clad printed circuit board material is used for the control horn and is soldered to the tail wheel wire. The linkage hole should be located ¾" from center. Position the assembly to be directly under the leading edge of the horizontal stab.

Build the horizontal stab framework, using 3/16" stock, including tips. The

(Continued on page 67)


1/4 DOWELS
1 IN. WIDE BALSA TIPS
29
29
MODIFICATIONS TO LANIER FOAM WING OR DEE-BEE FOAM WING
1/4 X 3/8 SPRUCE OR MAPLE
1/4 X 1/2 BALSA
1/4 SQUARE BALSA
COVER FIN AND STAB WITH 1/16 SHEET BALSA
SHEET OR PLANK ENTIRE FUSELAGE WITH 3/32 BALSA
1/4 SCRAP BALSA
1/8 BALSA COCKPIT FLOOR
MAKE RUDDER AND ELEVATOR FROM SOFT 3/8 BALSA SHEET
1/4 MED. HARD BALSA CRUTCH
TANK COMPARTMENT USE 10 OZ. SULLIVAN SLANT TOP TANK
6-32 SOCKET HEAD CAP SCREWS AND BLIND NUTS
CUT THIS PORTION OF CRUTCH OFF AFTER F1 IS IN PLACE AND FUSELAGE IS COVERED
ALL FORMERS 1/8 BALSA UNLESS OTHERWISE NOTED
F10A
F10B
F9A
F9B
F8A
F8B
F7A
F7B
F6
F5
1/4 PLYWOOD
F4
1/4 X 1/2 BALSA
1/4 SQUARE BALSA
1/4 SQUARE BALSA STRINGERS
.015-.030 THK. SHEET ACETATE CANOPY
3/16 X 3/4 HARDWOOD ENGINE MOUNTS
1/8 ALUMINUM ENGINE MOUNTING PLATE
1/4 BALSA WING SADDLE
1/4 BALSA INSERTS
1/2 THK. BALSA
2 DIA. SPINNER
F3
F2
F1
1/16 PLY INSERT, BOTH SIDES ON RUDDER AND ELEVATOR
1/8 BALSA
TANK COMPARTMENT CUTOUT
ENGINE MOUNT CUTOUTS
1/4 PLYWOOD
1/8 PLYWOOD
MODIFIED LANIER FOAM WING SHOWN
3/8 X 3/4 HARDWOOD WING HOLD DOWN BLOCKS, DRILL AND TAP FOR 1/4-20 NYLON SCREWS
SCRAP BALSA
LANIER 5/32 DIA. MAIN L/G
2 3/4 DIA. WHEEL
1/4 DIA. DOWELS
4-40 SCREWS AND BLIND NUTS
TOP-FLITE NOSE GEAR BRKT
TOP-FLITE NOSE GEAR
2 1/2 DIA. WHEEL
5/32 DIA. COLLAR
0 1 2 3 4 5 6
The "Grouper"
DESIGNED AND DRAWN BY BUD PHILLIPS

FULL SIZE PLANS AVAILABLE — SEE PAGE 70

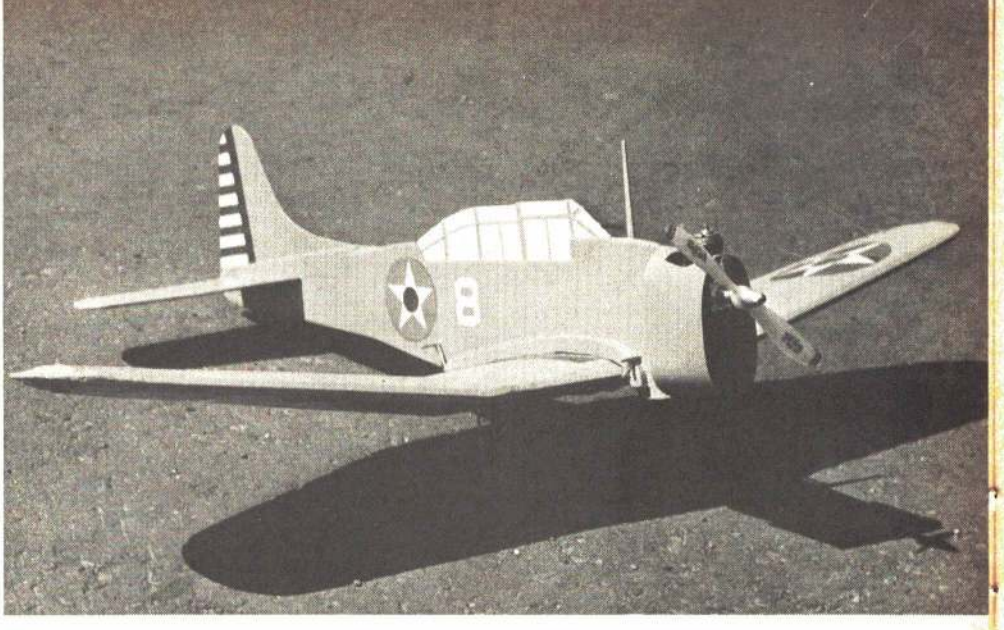


A semi scale, .60 powered

P51D MUSTANG

Designed & Drawn for AMERICAN AIRCRAFT MODELER by Dick Carman and inked by Bob Morse

The 020 Pee Wee looks strange inside the cardboard-simulated radial engine cowl.



SBD DAUNTLESS

Generous tail area and ample dihedral make this great dive-bomber suitable for free flight. The first model flew out of sight.

PAUL SCHAAF, JR.

"HEY, DAD, how is it going to fly? I don't see any wires on the wing." I sat stunned. Had I neglected something important in my son's education?

After reviewing the planes we had built recently, I understood the reason for his question. We had been knee-deep in control line, but this was our first free flight model, and a word of explanation was needed.

"A free flight is a plane with properly proportioned flying surfaces and a somewhat smaller engine. Once launched, it is entirely on its own, but engine running time must be restricted since, if the model flies too well, all that will be left after the first flight is happy memories."

Some tips which should permit free flight ownership to last quite some time follow. The model is a liberal copy of one of the famous Navy Carrier planes of WW II, the Douglas SBD-4 Dauntless.

Fuselage: The fuselage is constructed of hard ¼" balsa sheet and is slotted ⅛" at the back to provide a groove for the one-piece stabilizer. Then the wing mount is cut out and a ¼" balsa frame mounted around the cutout. This will provide a better and more secure platform for the wing. Titebond cement, which is strong and handles easily, is used for all joints.

The canopy, made of 1/16" balsa sheet, is cut and fitted as illustrated. Canopy frames are made of painted drafting tape cut to the given size, but they are not mounted until the plane is painted.

The firewall is ⅛" plywood angled to the right approximately 1/32". Backing it up are filler pieces made from ⅜" balsa sheet. The cowling is cut from thin cardboard which, when doped and painted, looks fine and is not as fragile as thin balsa. It will bend but not break. The tailwheel is cut from 1/16" sheet plywood. Wing rubber hold-down pegs are added to the fuselage where indicated.

Rudder: Use hard 1/16" balsa sheet for the rudder. Its rear is a separate piece which is mounted with fine wire to the front piece, thus permitting trim adjustment as required.

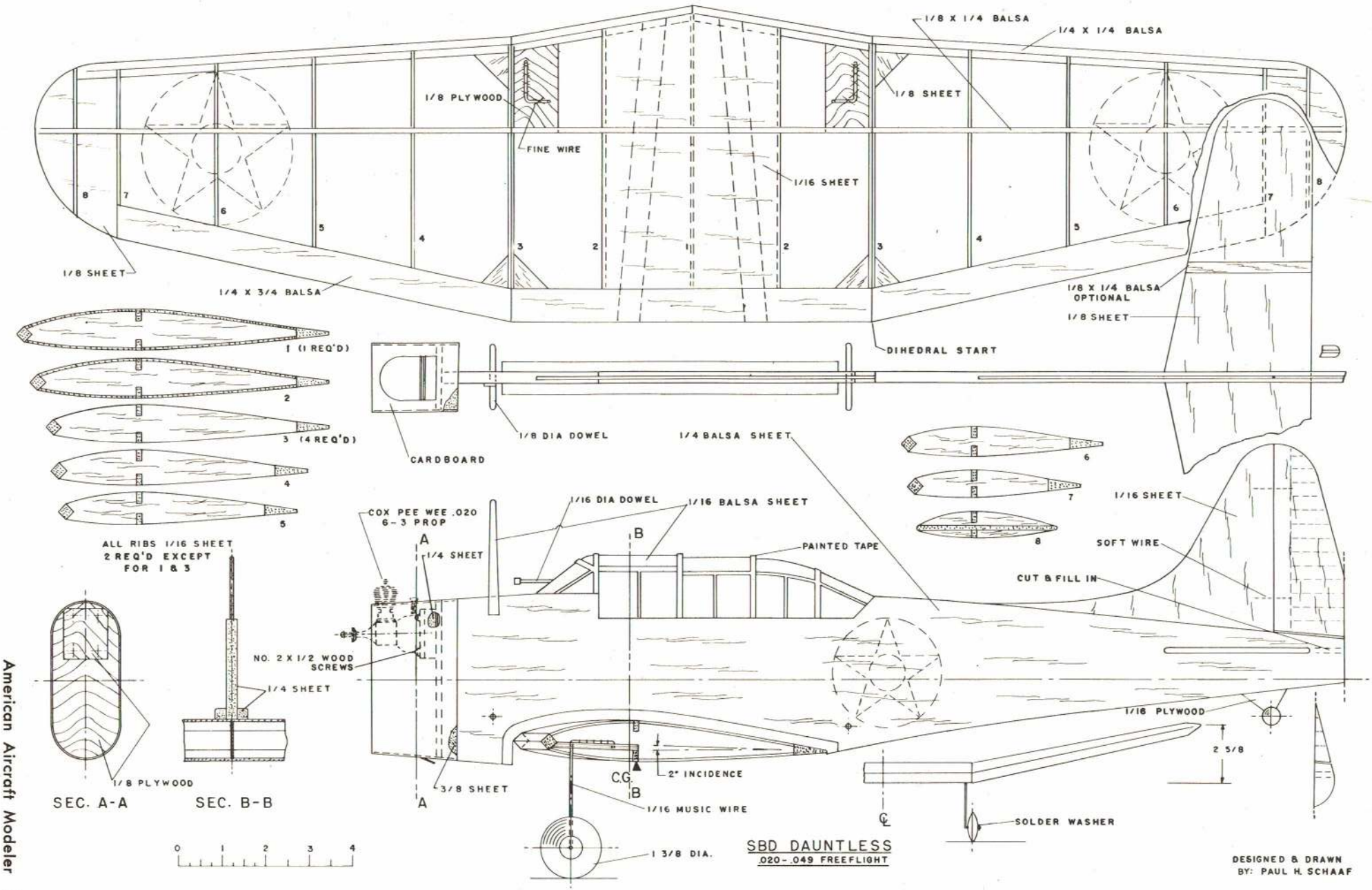
Stabilizer: The stabilizer is cut from ⅛" balsa sheet. I made mine in three sections, with a crossgrained ¼" wide balsa strip inserted between the inner and outer panels to hold warpage to a minimum. This construction method is optional but recommended. After the stabilizer is glued into its slot in the fuselage, fill the gap behind it with scrap.

Wing: The ribs are cut from 1/16" balsa sheet and the leading edge is ¼" sq. hard balsa. The model has two ⅛" x ¼" center spars and the trailing edge is ¼" x ¾" tapered balsa. To provide a good secure mounting to the fuselage, the center area only has a 1/16" balsa skin.

The wing is made in three sections, inner and two outer halves. The first rib on the outer panels must be angled in assembly to provide the proper dihedral, and gussets are added to strengthen this area. Wing tips, made from ⅛" balsa sheet, have smaller upper and lower ribs to permit a good blending of the wing covering at the tips. My

(Continued on page 83)

Classic color scheme lines, rather than perfect scale shapes, define the model's origins. With luck, the Dauntless will take off unassisted. Its graceful climb is slow and steady.

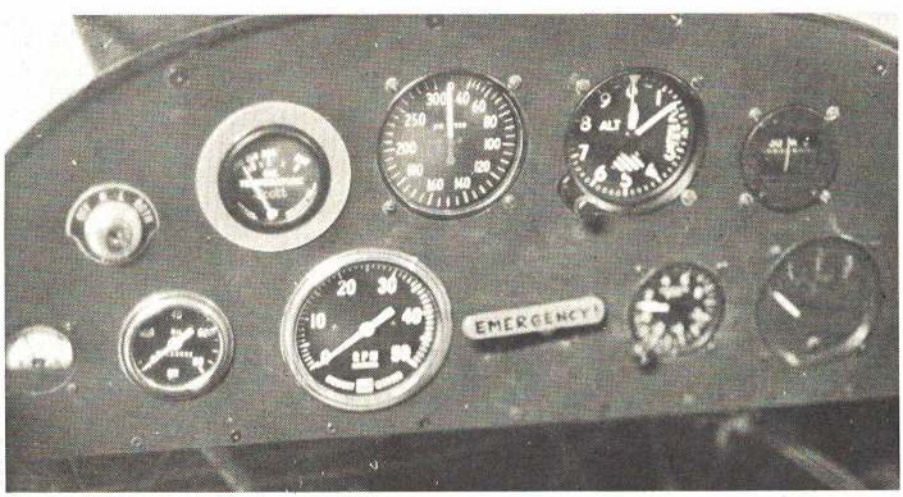


FULL SIZE PLANS AVAILABLE—SEE PAGE 70

Owl Racer

DON BERLINER

Unique because of new ideas, the Pogo proved it has winning potential in its first two races. Smooth lines make it suitable for any model project.



Only engine performance information really matters in any racer. Pogo is not flown cross-country to the meets, so minimum instruments are used.

THE OWL is a pussycat. And a tiger. And a 'possum.

A pussycat, because Bud Pedigo, first pilot to race this new Formula One, says he'd turn a student loose in it.

A tiger, because it blasted around the three-mile oval at St. Louis at 209 mph its first time out.

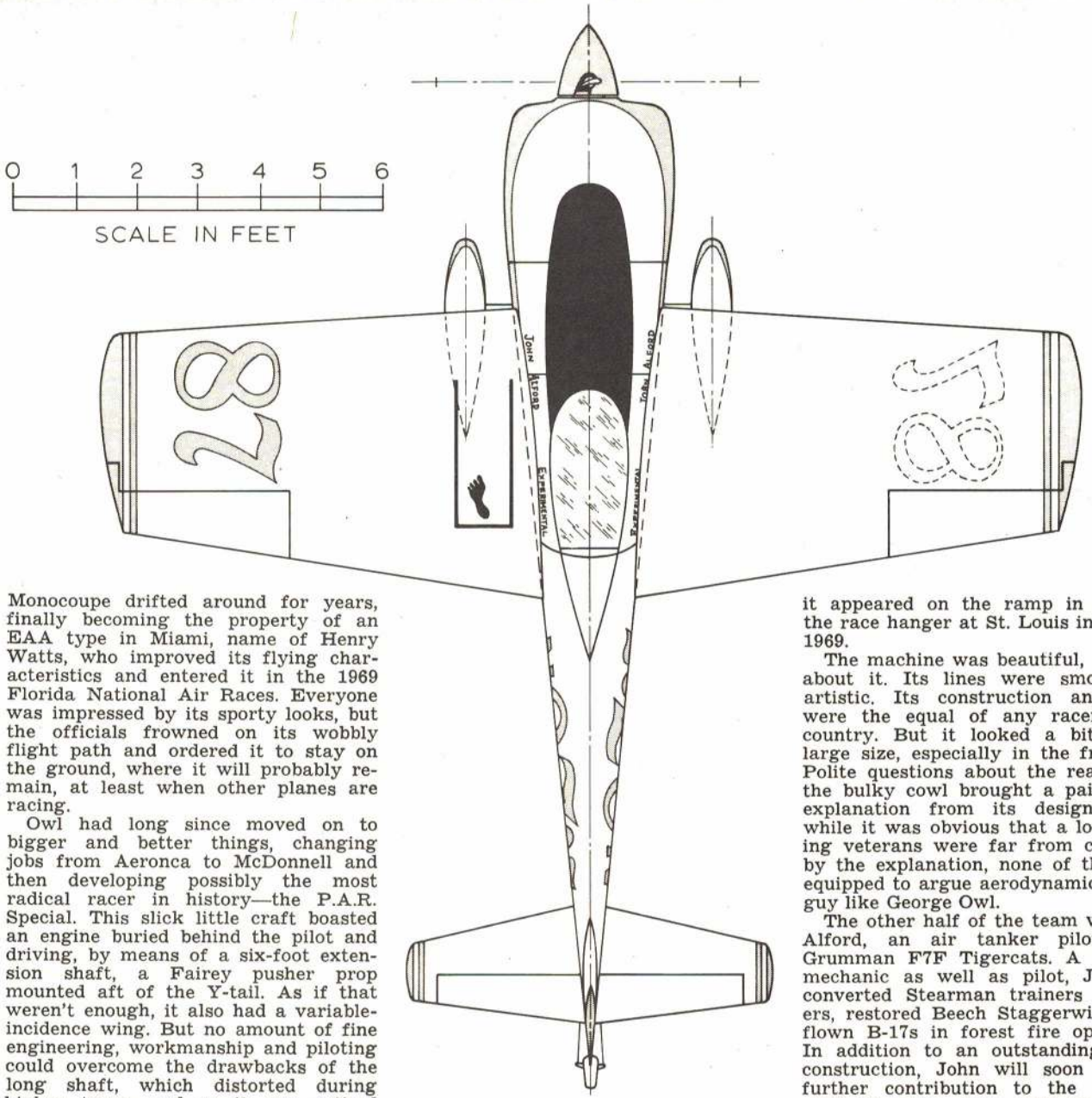
A 'possum, because it's now named Pogo, who is one of the better-known 'possums of the Okeefenokee Swamp.

And the Owl Racer because it was designed by George Owl, who has been involved in the brains-and-slide-rule part of airplanes ranging all the way from Midget Monocoupe to X-15.

Engineers, as a general rule, don't make very good raceplane designers, for they tend to build airplanes that are too big and too heavy. But an engineer with racing experience is another matter, and that is the exclusive category into which George Owl fits quite snugly.

He got into the raceplane racket in 1947, when the Goodyear Racers flashed onto the scene and it seemed as though just about everybody was starting to build one—or at least was talking about building one. George was no exception, but his airplane was. It was the one and only high-wing ever proposed for the 190 cu. in. class. He built it for Woody Edmundson, then a rather successful pilot of racing P-51's and aerobatic Monocoupes, and now a very successful, charter flying operator.

The racer was called the Midget Monocoupe, and looked like one, with a Monocoupe's classic tapered wing atop a very small fuselage. It was ready in 1948, but Woody found it entirely too hot to handle, so it never got to Cleveland, although Woody and his other airplanes did. The Midget



Monocoupe drifted around for years, finally becoming the property of an EAA type in Miami, name of Henry Watts, who improved its flying characteristics and entered it in the 1969 Florida National Air Races. Everyone was impressed by its sporty looks, but the officials frowned on its wobbly flight path and ordered it to stay on the ground, where it will probably remain, at least when other planes are racing.

Owl had long since moved on to bigger and better things, changing jobs from Aeronca to McDonnell and then developing possibly the most radical racer in history—the P.A.R. Special. This slick little craft boasted an engine buried behind the pilot and driving, by means of a six-foot extension shaft, a Fairey pusher prop mounted aft of the Y-tail. As if that weren't enough, it also had a variable-incidence wing. But no amount of fine engineering, workmanship and piloting could overcome the drawbacks of the long shaft, which distorted during high-g turns, and so it was retired after achieving a best performance of 181 mph at Chattanooga in 1952.

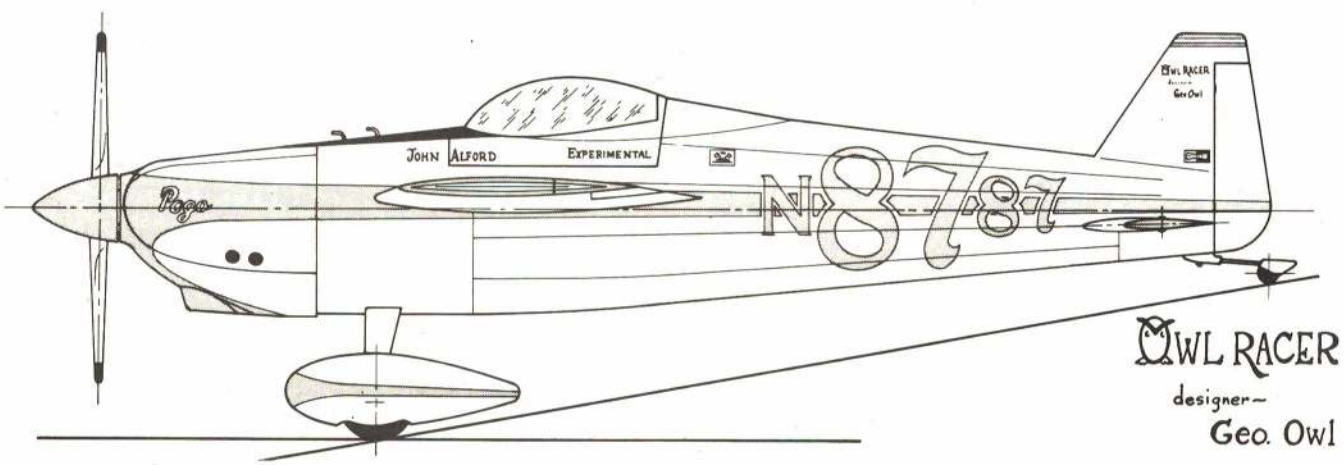
His radical ideas having brought no success, George Owl vanished from the racing scene and busied himself at North American Aviation, designing such run-of-the-mill flying machines as the B-70 and X15, neither of which made so much as a ripple in the air racing pond, although they reportedly were fairly fast.

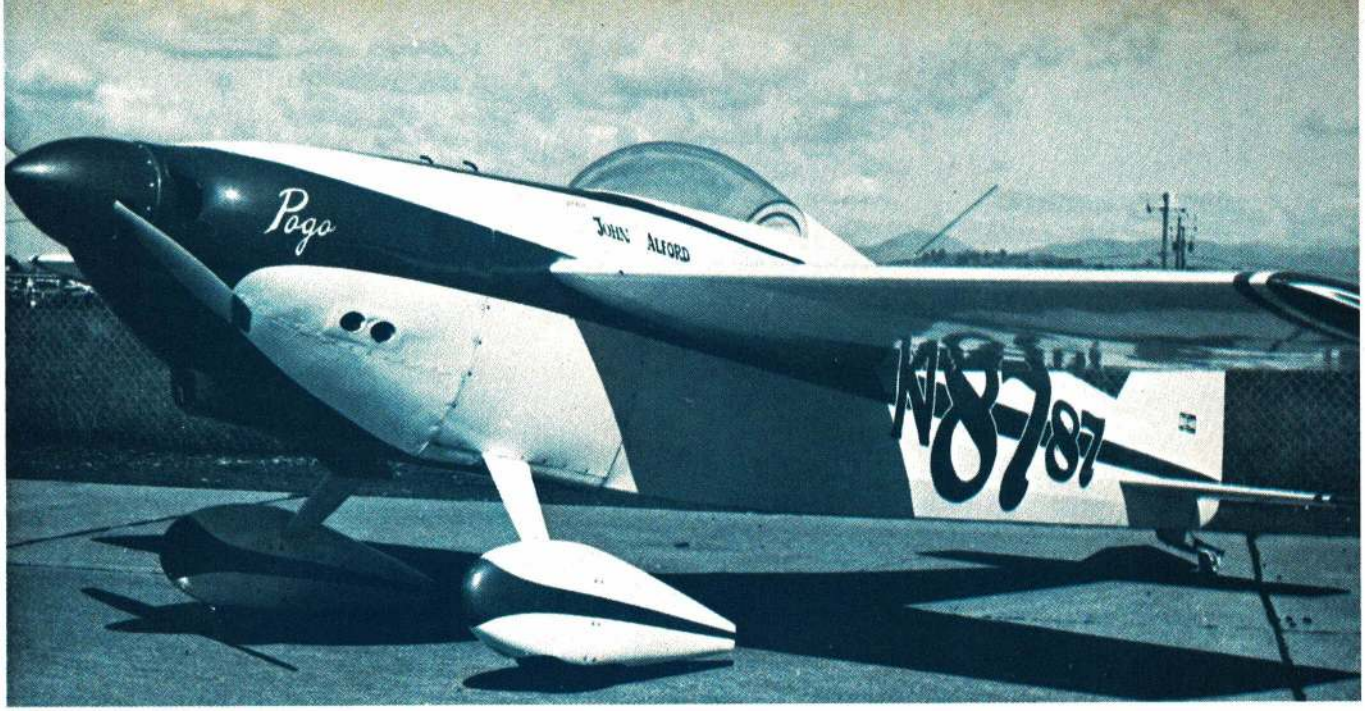
Shortly after air racing returned in 1964, so did George Owl, this time well armed with ideas, vastly more experience, and an expert builder named John Alford. Together, they developed the Owl Racer. Hardly anyone knew of its existence until, as if by magic, it appeared on the ramp in front of the race hanger at St. Louis in August, 1969.

The machine was beautiful, no doubt about it. Its lines were smooth and artistic. Its construction and finish were the equal of any racer in the country. But it looked a bit on the large size, especially in the front end. Polite questions about the reasons for the bulky cowl brought a painstaking explanation from its designer. And while it was obvious that a lot of racing veterans were far from convinced by the explanation, none of them was equipped to argue aerodynamics with a guy like George Owl.

The other half of the team was John Alford, an air tanker pilot flying Grumman F7F Tigercats. A qualified mechanic as well as pilot, John had converted Stearman trainers to dusters, restored Beech Staggerwings, and flown B-17s in forest fire operations. In addition to an outstanding job of construction, John will soon make a further contribution to the story of #87. His wife, Joan, will be its pilot for 1971, and thus the first woman to compete in Formula One.

A lot of brand new racers are exceedingly fast on the drawing board, in the workshop and at the home field. And a lot of pretty bubbles are burst in that first spin around a race course, when the unbiased stopwatch converts dreams into reality. But this time





Designer theorized that less wetted area and fewer cowl intersections offer less drag than the typical tight-fitting cheek cowl. This is the easiest racer to model for RC pylon.

there was nothing for the Owl crew to apologize for, as pilot Bud Pedigo clocked 208.90 mph, good for sixth place in an amazingly fast field of 13 racers. Four years of careful planning and hard work began to pay off.

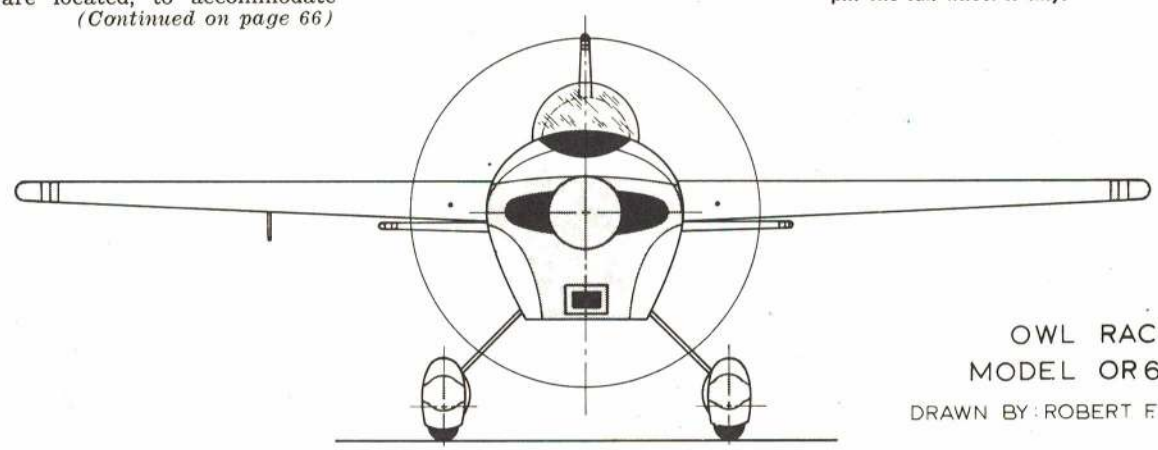
The Owl Racer didn't become the Cinderella plane of the year by beating Rivets. In fact, it didn't even make the Finals in its first try, being plagued by poor takeoff acceleration. Still, it topped 200 mph in the Consolation Race and put everyone on notice that more would be heard. A few weeks later, at Reno, Pedigo earned over $1000 by flying #87 into fifth place in the Formula One Championship Race at almost 204 mph.

Such performance for a completely new design, while not unheard of, is certainly rare. How did Owl and Alford do it? By careful detail work, by precise alignment of every important piece, and by knowing which tried-and-true techniques to use and which to ignore when their own calculations pointed down an untried path.

The main deviation from conventional design in the Owl Racer is its cowl—large, but simple. The Owl cowl, according to George, has less surface area, no sharp intersections, more interior space and a better shape for withstanding pressure. Moreover, it has a blunt front where the cooling intakes are located, to accommodate

(Continued on page 66)

Pogo's color scheme is metallic olive green striping and numerals on solid white, with a black antiglare panel in front of the cockpit. The tail wheel is tiny.



OWL RACER
MODEL OR65-2-1
DRAWN BY: ROBERT F. PAULEY

NESMITH COUGAR

ROBERT BUENZLY

Squarish, simple lines make this aircraft an ideal beginner's scale ship. With lots of detail, it is a contest winner.

IT'S A RARE homebuilt aircraft magazine that doesn't include a Nesmith Cougar. With a wingspan of 20 ft. 5 in., the Cougar zips along, powered by an 85-hp air-cooled Continental engine or by a higher-powered 115-hp Lycoming engine. With an empty weight of 624 lb., this ship can cruise at 166 mph; its maximum speed is around 182 mph. Service ceiling is 13,000 ft. and the takeoff run is 310 ft. (solo).

Cougars have been built with fiberglass wings or wheel pants, with various cowling styles, and a few without the rear side windows. One Cougar even had folding wings for storage and towing by an auto. Any of these features may be incorporated in the model.

My Cougar was built in Spring of 1969, when I decided to attend the Nationals at Willow Grove, Penna. With only seven weeks of building time, I wanted a ship with simple, yet unusual lines, and the Cougar satisfied these requirements. The ship's maiden flight at the Nats was rather precarious because the windshield blew off, but the Cougar has placed in every air meet since the Nats, including the Eastern States Championships held at Johnsville Naval Air Station. It really doesn't take a huge, multi-engine scale ship to bring the hardware home, as was quite evident at the 1969 Nats. The building of smaller, single-engined scale ships is on the increase.

Construction

The amount of detailing is left to the builder's discretion. Throttle control, operating landing lights, navigation lights, an operating door, complete interior and workable controls from the control stick are a few of the point-gathering features that may be incorporated in the Cougar.

Construction by the usual stick and tissue method is not difficult. The fuselage is a simple box affair. Its sides are made from ¼" sq. medium hard balsa, except for the four upright pieces in the cabin area which extend into the plywood wing center section C1. These four pieces are of ¼" sq. hardwood.

Build one side directly on the plans. When dry, build the other side on top of the first side to make them identical. A sheet of wax paper should be laid on the first side after it is dry and before starting the second side. This prevents the two sides from being accidentally glued together. Use pins to hold the second side down while gluing and assembling.

When the second side is finished, remove both assemblies from the plans and separate, being careful not to break any of the glued joints. Drill three holes for the leadout control line wire grommets at the top of the cabin on the left fuselage side. Glue the 3/32" plywood nose pieces so that they are on the inside when the fuselage sides are held upright. Join the sides together at the rear and add the ¼" sq. crossmembers on the nose.

Finish the fuselage framework by adding all the crosspieces, except the two directly below the engine compartment. Take the carved balsa tail piece and glue the tail wheel landing gear wire to it. Use gauze to strengthen this area if necessary. Next, glue the tail piece, with the tail wheel wire, to the end of the fuselage sides. Add the nose pieces and ¼" plywood stabilizer mount, S1. Use a triangle to keep the sides a true 90 degrees from the crossmembers. It is quite easy to make a lop-sided fuselage.

Slide fuselage plywood formers F1 and F2 onto the motor mounts which have been drilled for the engine. I would recommend a 35 displacement engine for flying in windy weather or off grass. For flying off macadam or concrete, a 19 should handle the ship with ease, providing construction is kept light, and no flying is done in wind. My ship, with a Max O.S. 35, is quite stable in a moderate wind.

Mount the landing gear, using J bolts. When the engine mounts and the landing gear are lined up, solder the two landing gear pieces. Use either 3/32" or ⅛" dia. music wire for the landing gear. For a 35 engine, use ⅛" dia. wire.

Glue the two fuel tank mounts to the engine mounts after positioning the plywood formers to accommodate the engine and fuel tank. Secure the plywood formers F1 and F2 with ample amounts of cement. Glue the fuel tank to the tank mounts. Use fine wire, if necessary, but be sure the fuel tank is mounted securely. I used a wedge-shaped fuel tank, but a rectangular tank will do. Be sure the landing gear J bolts do not interfere with the tank. If they do, make the hardwood tank mounts thicker in height in order to drop the fuel tank to clear the J bolts.

Allow the fuselage to dry thoroughly for several days before any rigorous handling.

Carving the leading edge from ⅝" balsa is the most difficult task in the construction. Pin the ¼" trailing edge, the leading edge, and W1 and W2 to the plane. Then glue the 1/16 x ⅛" bottom cap-stripping in place. Notch the ¼" sq. hard balsa spar to accept W2 and glue in place. When dry, glue in the wing ribs. Next add the top cap strips. Cap-stripping may require a little more time than usual, but it pays off when the ship is covered. Add two wing strut mounts and set the wing aside to dry.

Stabilizer and tail are made from ⅜" balsa or two 3/16" sheets glued together. Sand to the airfoil shown on the plans. Use elevator hinges of your choice and then attach the control horn.

When the fuselage is dry, sand the outside edges of the four longerons round to resemble tubing when the covering is applied.

Glue the stabilizer to the rear of the fuselage as shown and, when dry, drill two ⅛" dia. holes through the stabilizer and S1. Then drill two ⅛" holes in the bottom of the tail. Mount the tail to the stabilizer, using ⅛" dowel, and glue securely. This makes quite a sturdy tail section.

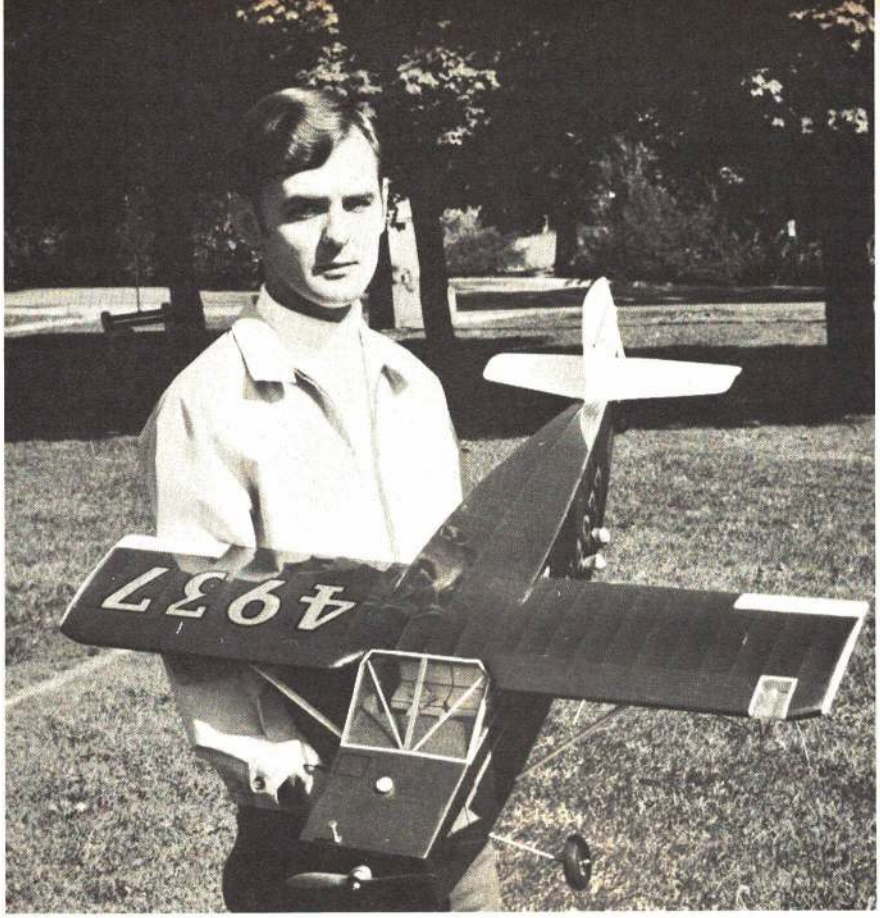
The fuselage side fairings and bottom fairings are added at this time.

Cut down a Roberts three-line bellcrank and bolt to the bottom of plywood W2 on the wing. Bolt the engine in place and wrap it in aluminum foil until the ship is completed.

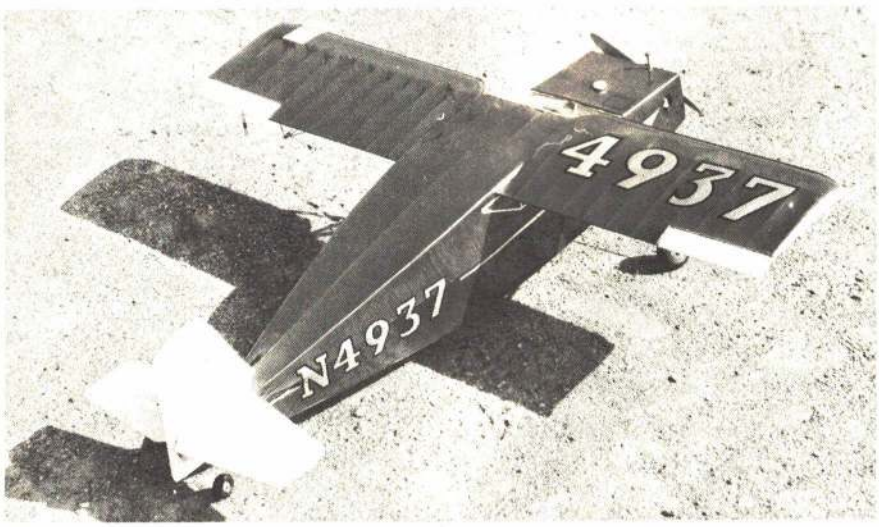
The real Cougar has only a one-inch dihedral. This may be eliminated on the model and it still will be an excellent flyer. I used a ¼-in. dihedral on each wing panel. Glue the plywood leadout guide in place.

Lay the wing on top of the fuselage and allow the ¼" sq. hardwood uprights of the fuselage to come through the corresponding cutouts on the center wing section W1 and W2. Do not glue as yet, but pin the wing in place and cut and bend the necessary pushrods and throttle linkage to shape. When

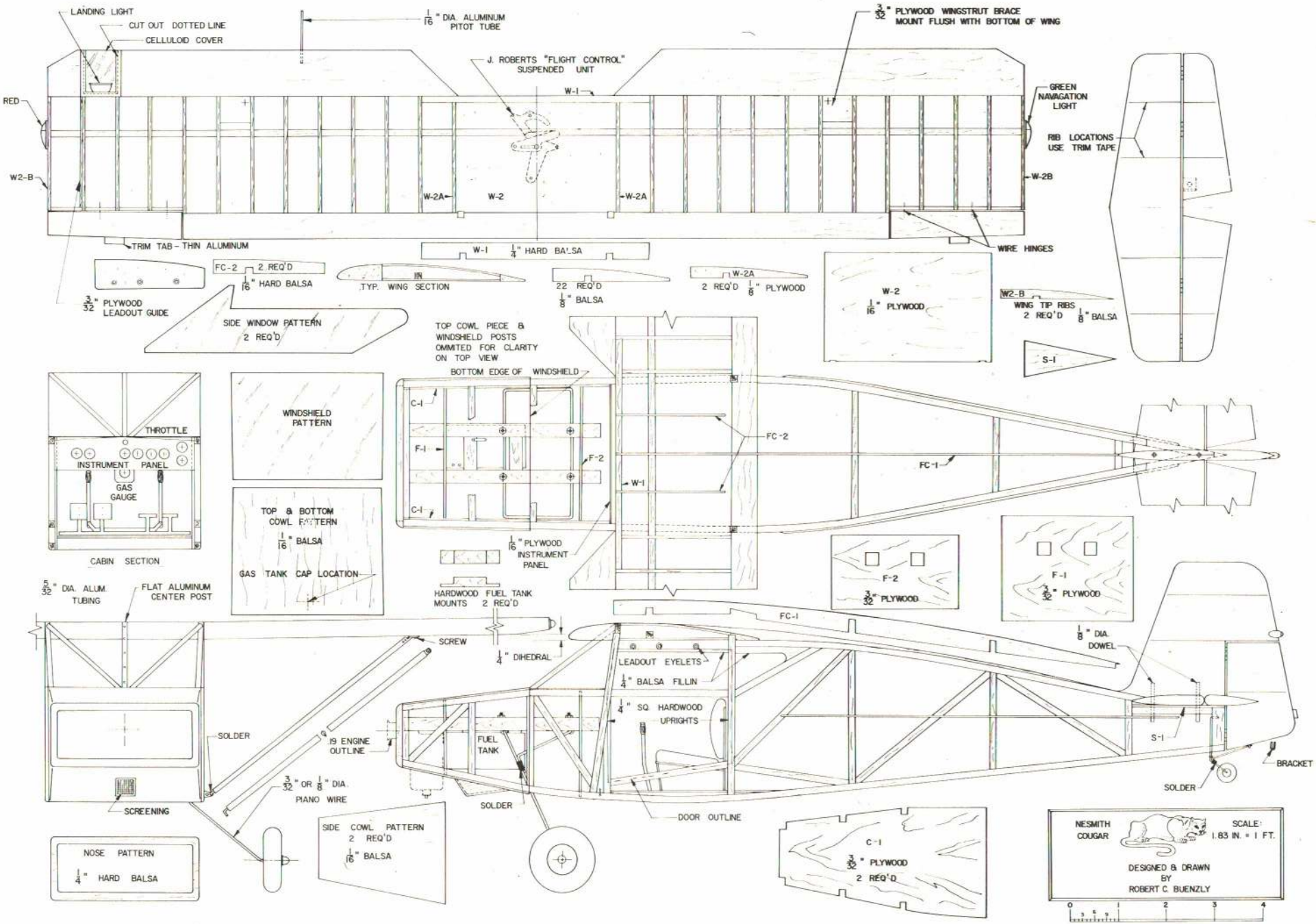
(Continued on page 84)

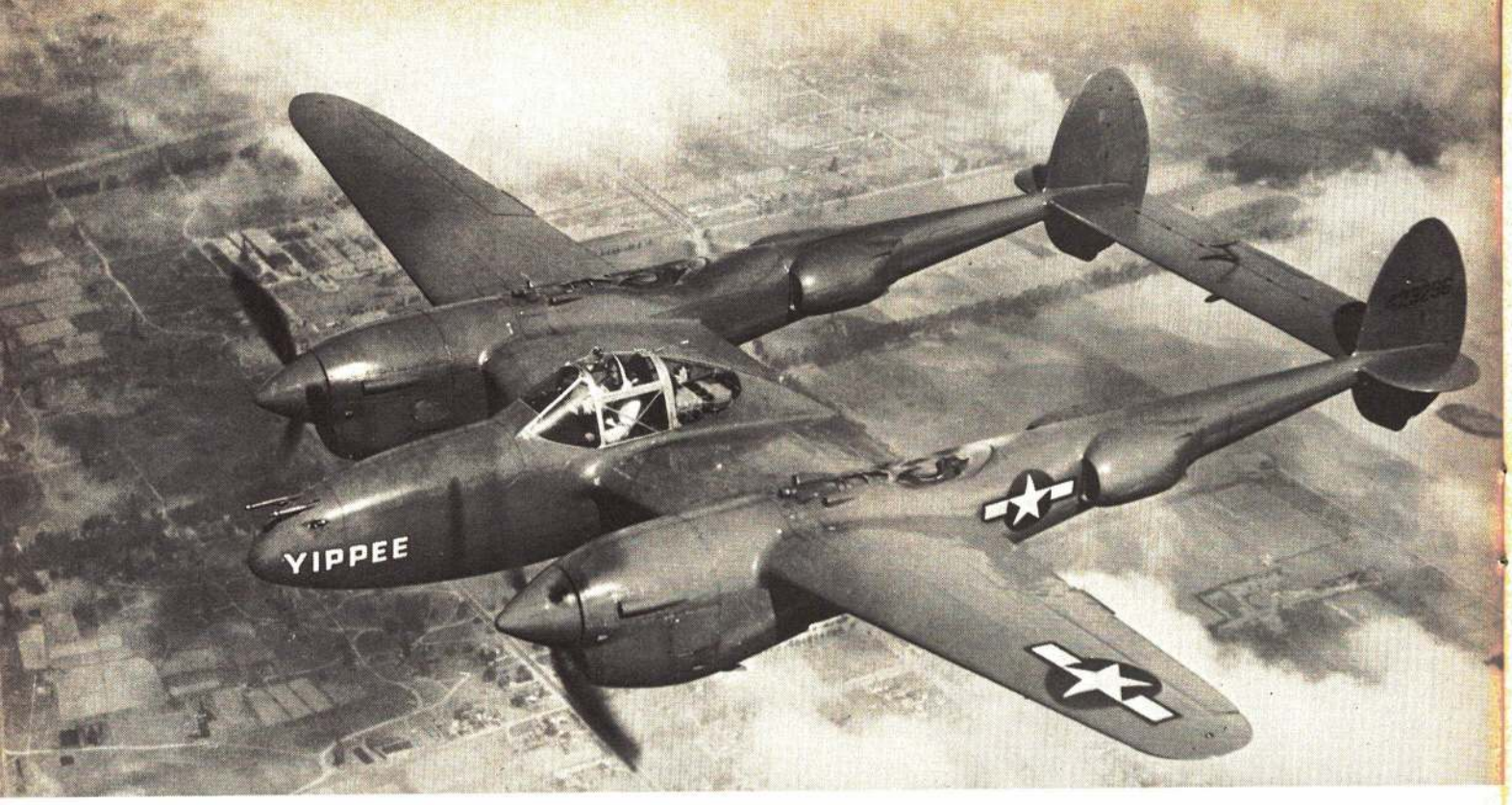


Author holding his finely-detailed Cougar. The high gloss finish with MonoKote is suitable for homebuilt designs; some real planes are this glossy. Photos by Tom Alericia.



The Cougar is something of a fast-flying box. Its angular design detracts only mildly from performance but aids greatly in construction. Many full-size planes are built and flown.


LANDING LIGHT
CUT OUT DOTTED LINE
CELLULOID COVER
1/16" DIA. ALUMINUM PITOT TUBE
3/32" PLYWOOD WINGSTRUT BRACE MOUNT FLUSH WITH BOTTOM OF WING
J. ROBERTS "FLIGHT CONTROL" SUSPENDED UNIT
W-1
RED
GREEN NAVAGATION LIGHT
RIB LOCATIONS USE TRIM TAPE
W2-B
W-2A
W-2
W-2A
W-2B
TRIM TAB - THIN ALUMINUM
WIRE HINGES
W-1 1/4" HARD BALSA
FC-2 2 REQ'D 1/16" HARD BALSA
TYP. WING SECTION
22 REQ'D 1/8" BALSA
W-2A 2 REQ'D 1/8" PLYWOOD
W-2 1/16" PLYWOOD
W2-B WING TIP RIBS 2 REQ'D 1/8" BALSA
3/32" PLYWOOD LEADOUT GUIDE
SIDE WINDOW PATTERN 2 REQ'D
S-1
TOP COWL PIECE & WINDSHIELD POSTS OMMITED FOR CLARITY ON TOP VIEW
BOTTOM EDGE OF WINDSHIELD
THROTTLE
INSTRUMENT PANEL
GAS GAUGE
CABIN SECTION
WINDSHIELD PATTERN
C-1
F-1
F-2
W-1
FC-2
FC-1
TOP & BOTTOM COWL PATTERN 1/16" BALSA
GAS TANK CAP LOCATION
1/16" PLYWOOD INSTRUMENT PANEL
F-2 3/32" PLYWOOD
F-1 3/32" PLYWOOD
5/32" DIA. ALUM. TUBING
FLAT ALUMINUM CENTER POST
HARDWOOD FUEL TANK MOUNTS 2 REQ'D
FC-1
1/8" DIA. DOWEL
SCREW
1/4" DIHEDRAL
LEADOUT EYELETS
1/4" BALSA FILLIN
1/4" SQ. HARDWOOD UPRIGHTS
SOLDER
.19 ENGINE OUTLINE
FUEL TANK
S-1
BRACKET
SOLDER
3/32" OR 1/8" DIA. PIANO WIRE
SCREENING
SOLDER
DOOR OUTLINE
NOSE PATTERN 1/4" HARD BALSA
SIDE COWL PATTERN 2 REQ'D 1/16" BALSA
C-1 3/32" PLYWOOD 2 REQ'D
NESMITH COUGAR
SCALE: 1.83 IN. = 1 FT.
DESIGNED & DRAWN BY ROBERT C. BUENZLY



the P-38—best of the twins

Although all of the WW II twin-engined fighters left something to be desired, the Lockheed Lightning did just about everything a military airplane could do.

DON BERLINER

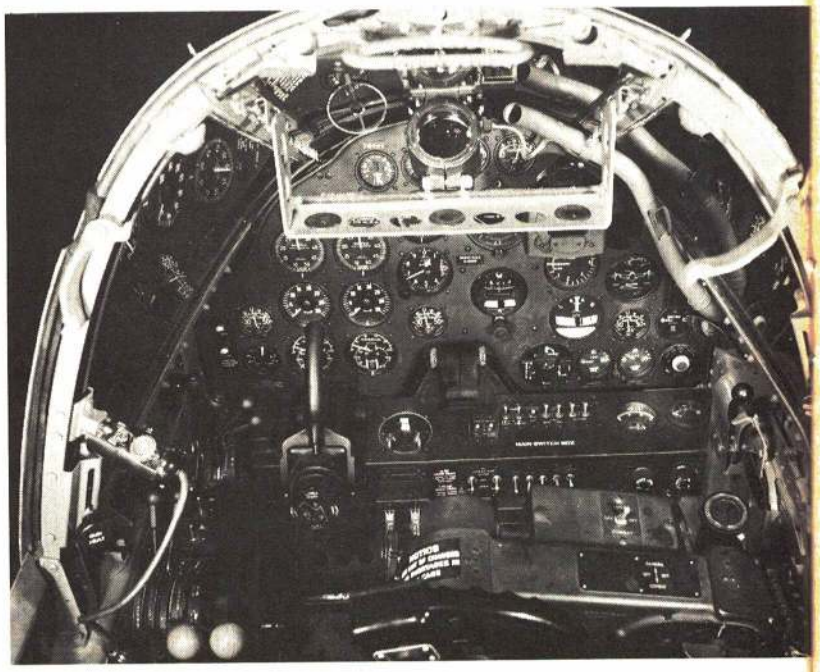
THE TWIN-ENGINED FIGHTER was a phenomenon of World War II. It offered speed, range, versatility, dependability, firepower and a host of other wonderful qualities. But it had one major flaw: it didn't work very well.

The Germans tried it with the Messerschmitt 110, and the RAF Spitfires and Hurricanes quickly covered the English countryside with pieces of them. The British tried it with the Mosquito, which worked, but the Mossy was supposed to have been a light bomber. The Japanese tried it with several impressive machines but were too late.

Of all the enthusiastic efforts, Lockheed's P-38 Lightning probably came the closest to success, although it suffered from some of the same drawbacks as did the others, mainly a lack of maneuverability due to size. With

Biggest advantage of the P-38 was a center pod configuration which allowed concentrated firepower without converging fire.

By World War II, a fighter's cockpit was a far cry from the simple instrumentation of WW I. Almost 10,000 Lightning fighters were built.



SPECIFICATIONS

Dimensions (all models)

Length 37′ 10″ Height 9′ 10″
Wingspan 52′ 0″ Wing area 327.5 sq. ft.

	P-38F	P-38G	P-38L
Empty weight	12,264 lb.	12,200 lb.	12,780 lb.
Maximum weight	19,900 lb.	19,800 lb.	21,600 lb.
PERFORMANCE			
Maximum speed	395 mph	400 mph	414 mph
Maximum range	1750 mi.	1670 mi.	2260 mi.
Climb to 20,000′	8:48	8:30	7:00
Service ceiling	39,000′	39,000′	44,000′

a wingspan of 52 feet and empty weight of more than 14,000 lbs., it dwarfed the Focke-Wulf 190 (span 34½ feet, empty weight 7000 lbs.) and the Zero (span 36 feet, empty weight 4000 lbs.).

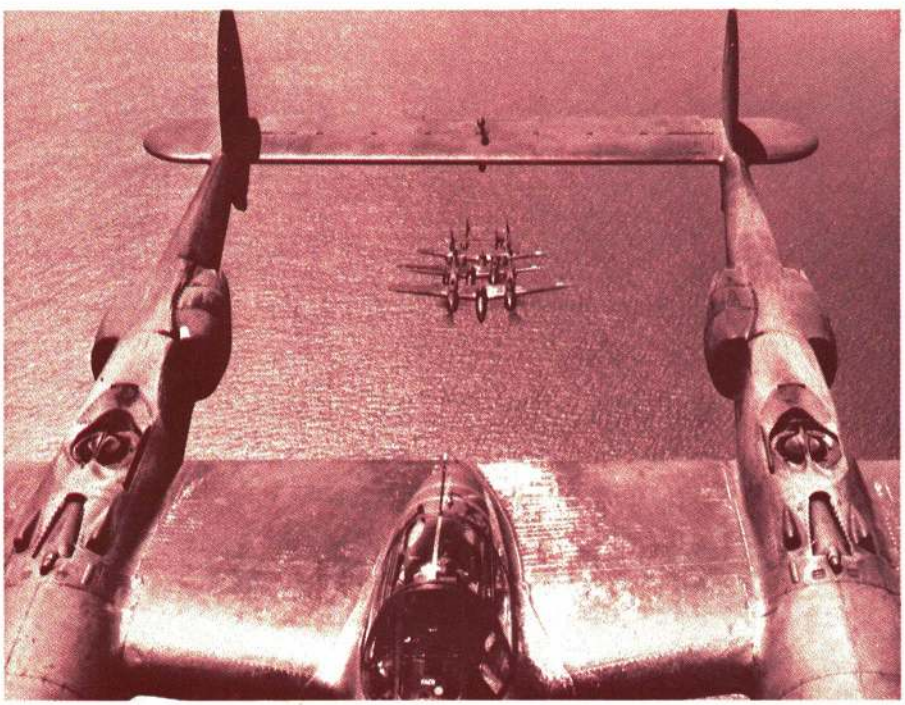
But for all its size, the Lightning did practicaly every job assigned to it with a high degree of effectiveness. To make up for its limited maneuverability, it offered outstanding diving and climbing speed, very heavy concentrated firepower, and the safety of an extra engine. It was the first American aircraft to shoot down an enemy plane after the U.S. entered the war, and it was the first American aircraft to land in Japan after it was all over. Almost 10,000 were built, and they did just about everything that a military airplane can do.

The story began in 1937, when the USAAC announced its interest in a high-altitude interceptor. Convinced that no single available engine would produce the needed power, Lockheed's chief designer Hal Hibbard decided to use two of the brand-new 1000-hp, V-12 Allison V-1710 engines. After considering all sorts of arrangements, the veteran firm picked the twin boom set-up because the center pod would allow a group of guns to be aimed directly ahead instead of with converging streams of fire, and the booms would allow excellent streamlining of the engine nacelles without the need for a bulky and useless rear fuselage.

Construction began in June, 1937, and the extremely radical fighter was rolled out for its first flight in January, 1939, almost three years before the U.S. entered the Second World War. Just two weeks after the first test flight, Lockheed jolted the country with a cross-country dash from California to New York in seven hours, including two stops for fuel. Despite its size and the fact that its test program had hardly begun, the P-38 cruised near 400 mph, at a time when the USAAC's main pursuit plane, the Curtiss P-36 Mohawk, could barely top 300 mph.

Even though the prototype was

(Continued on page 63)



Twin tail booms allowed excellent streamlining of the engines while eliminating a useless rear fuselage. Note the turbosupercharger on the top of each boom.

VERSIONS AND VARIANTS

XP-38—prototype first flown Jan. 27, 1939

YP-38—13 service test-built, 1940-41; first one flown Sept. 16, 1940

XP-38A—1 production model with pressurized cabin, converted in 1941

P-38B—never built

P-38C—never built

P-38D—first production version; 36 built in 1940-41

P-38E—210 built in 1941; P-38D with modified armament

P-38F—first major operational version; 527 built in 1941-42

P-38G—similar to P-38F; 1082 built in 1942

P-38H—increased bomb load; 601 built in 1942-43

P-38J—first version with large chin scoops; 2970 built in 1943

XP-38K—1 P-38J with larger propellers, modified in 1943

P-38L—3923 built in 1943-45; 1887 more cancelled at end of war

RP-38—at least one built with second cockpit on left tail boom

TP-38L—two-place trainer

P-38M—75 P-38L's modified into two-place night fighter

XP-49—experimental high-altitude version with pressure cabin, 1350 hp Continental XIV-1430 engines

F-4—99 P-38E's converted to camera planes in 1942

F-4A—20 P-38F's converted to camera planes in 1942

F-5A—181 P-38G's converted to camera planes in 1942

F-5B—200 P-38G's converted to camera planes in 1943

F-5C—128 P-38H's converted to camera planes in 1943

XF-5D—1 two-seat F-5A

F-5E—705 P-38J's and P-38L's converted to camera planes in 1944

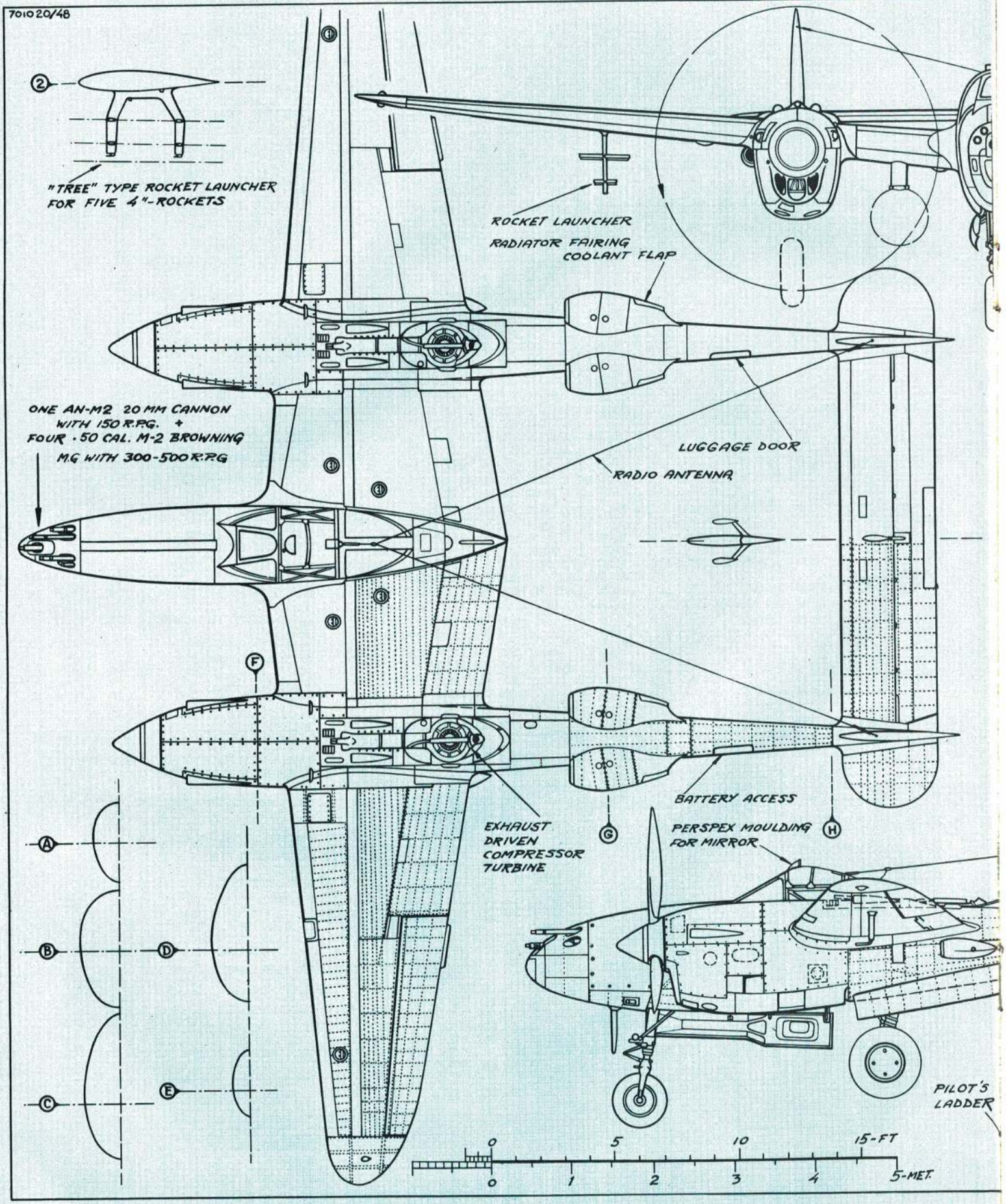
F-5F—P-38J's converted to camera planes in 1944

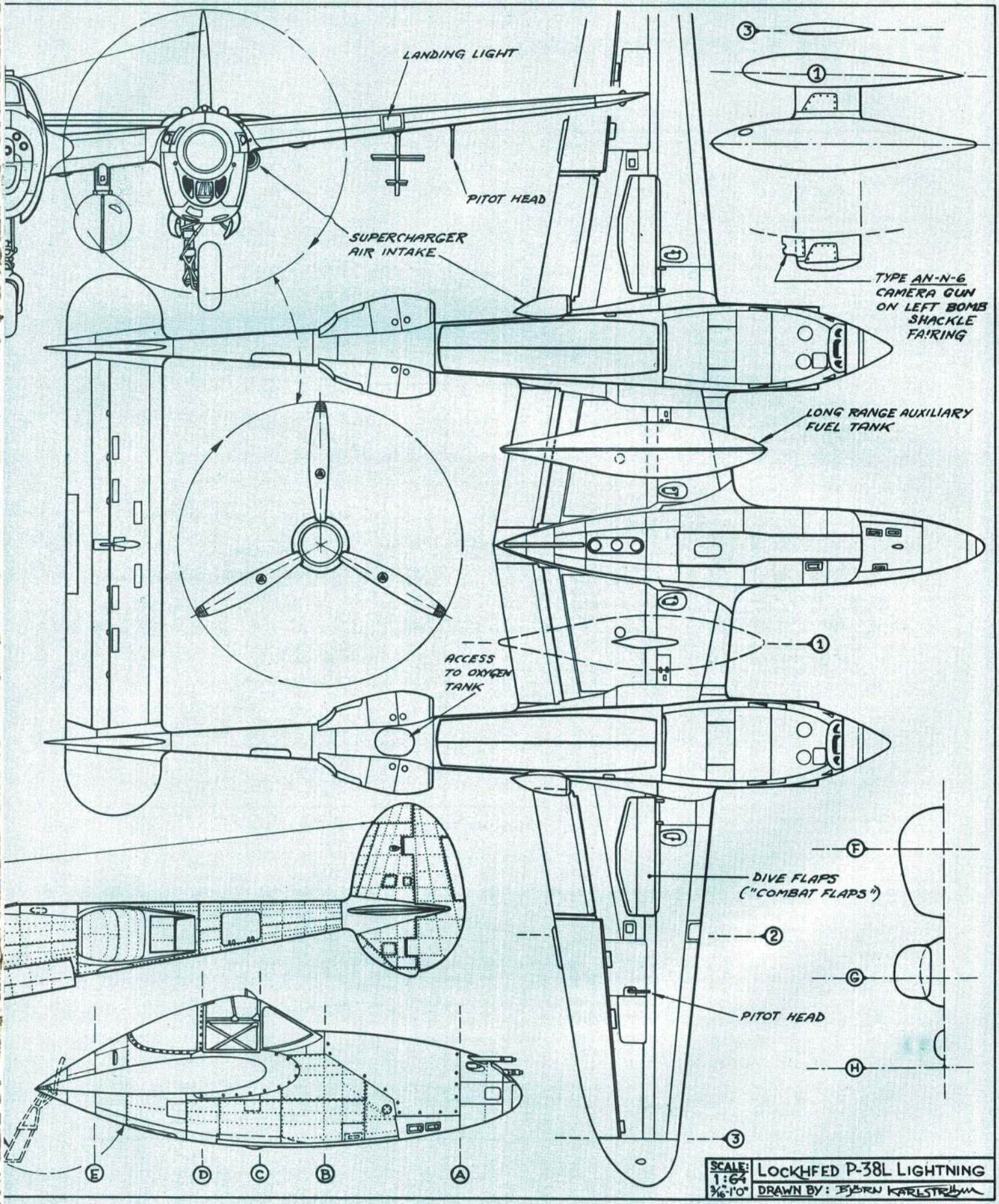
F-5G—P-38L's converted to camera planes in 1945

P-322—Lockheed factory designation for early P-38

Lightning I—143 built for RAF; returned to U.S. for training

Lightning II—524 intended for RAF, but never delivered; similar to P-38G


7010 20/48
"TREE" TYPE ROCKET LAUNCHER FOR FIVE 4"-ROCKETS
ROCKET LAUNCHER
RADIATOR FAIRING
COOLANT FLAP
ONE AN-M2 20 MM CANNON WITH 150 R.P.G. + FOUR · 50 CAL. M-2 BROWNING M.G WITH 300-500 R.P.G
LUGGAGE DOOR
RADIO ANTENNA
BATTERY ACCESS
EXHAUST DRIVEN COMPRESSOR TURBINE
PERSPEX MOULDING FOR MIRROR
PILOT'S LADDER
0 5 10 15-FT
0 1 2 3 4 5-MET.



Pulse Rudder-Only Flying Techniques

BY CHRIS SOENKSEN

INTRODUCTION

Pulse Rudder-Only flying is the logical way to begin gaining skill in radio controlled flight. A novice has only to worry about controlling one surface on the airplane and how this surface affects flight. Problems are not compounded by the application of two, three, or more variables in the beginner's unskilled hands.

After the basic skills are learned, the challenge of rudder-only flying is definitely not fulfilled, and can indeed be advanced to become an even greater challenge; many maneuvers (that would seem impossible at first impression) can be performed by manipulating just the rudder--these include loops, spins, rolls, Immelmans, Split-S's, etc. Limits are imposed only by imagination and skill.

Another consideration is the expense involved. This is usually an important factor to beginners entering a new field with uncertainity and a small budget. Not only is the outlay for pulse rudder-only radio less, but also the airplane and engine can cost considerably less; fuel consumption is lower; and expensive crashes are not as probable as with heavier and more expensive airplanes.

Pulse Rudder combinations, such as the Commander R/O series, offer several other advantages. Because of their configuration, you have great versatility in installation and make it fit better for the exact Center of Gravity you need to achieve; you can effectively protect your receiver by wrapping thoroughly in foam and help avoid damage in those hard landings; because of the extreme light weights offered, you can go to the smaller series of planes such as the Dick's Dream and Citabria, which will fly in very small fields. AND you are not limited in its application. You can go to larger or smaller aircraft with a minimum of expense--the only items required to do this will generally be another battery and actuator. So, Pulse offers you extreme versatility and expandability. Like a well known small car introduced by one of the Detroit big three: It is simple to install, simple to operate, simple to maintain--your actuator has only ONE moving part!

Finally, the most important is the immense enjoyment that can be obtained from simple pulse rudder-only flying. This has brought many "expert" model pilots back to the relaxing but yet challenging field of wagging rudders. It is fun--and fun is the name of the game!

The following suggestions on how to fly pulse rudder-only planes are written in the hope that the reader will succeed in his first attempts to fly radio control. Too many potential flyers are lost because of an excess of expense due to the first aborted flights, a lack of help by experienced people, and a general attitude that absolute control has to be maintained on all of the control surfaces of an airplane at all times in order to fly. Ability is gained only by doing and practicing; reading these suggestions won't make anyone a pilot before he flies, but they should help smooth out some of the hitches in getting the first R/C plane in the air.

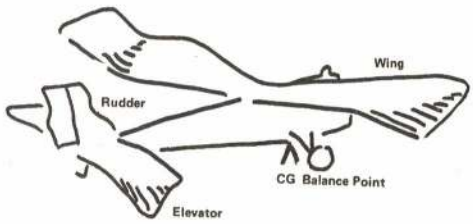
PRE-FLIGHT CHECKS

At Home

I. Check the airplane:

—For Center of Gravity balance and alignment according to the manufacturer's plans.

—For warps in flying surfaces



The center of gravity (CG), or balance point, is marked on your plane plans and instructions. Using your forefingers try to balance the plane by holding underneath the wing near the fuselage (NOT AT THE TIPS). Lift the plane at the wing with the fingers at about the point shown on the plans. (If mark is about one-third back from the leading edge, put fingers at the point one-third back near the fuselage) If the plane is small, you can manage this by yourself--for larger jobs you'll need help.

If the nose dips, you need to have some of the weight back and you can probably shift some of the R/C gear or batteries further back. If the tail tip dips, you are tail heavy and need to move some weight forward. Only as a last resort, should you use lead or solder to help balance, since this will add to your total weight. Your center of gravity (CG) or balance point needs to be at the spot marked on the plans before you attempt any glide.

—Make sure everything is up to snuff; otherwise success can come hard! Look the plane over thoroughly for cracks, breaks, loose nuts, binds in control linkages, and any other weak points.

II. Check your radio:

—For proper transmitter battery voltage (check the instructions--on most 9 volt transmitter dry batteries, this should not drop below 7.2 volts--UNDER LOAD; or with transmitter on and operating).

—For freshly charged receiver batteries

—For adequate ground range (usually 75 to 100 feet with the transmitter antenna collapsed)

—For proper response of the rudder to transmitter command (left follows left, and right follows right)

III. Also make sure you have the following accessories:

—A fresh Glo Plug battery

—An extra Glo Plug

—Tools: Screwdriver, pliers, Glo Plug clip, wrenches, fuel pump or bulb, fast-drying cement, pins, etc.

—Clean wiping rags

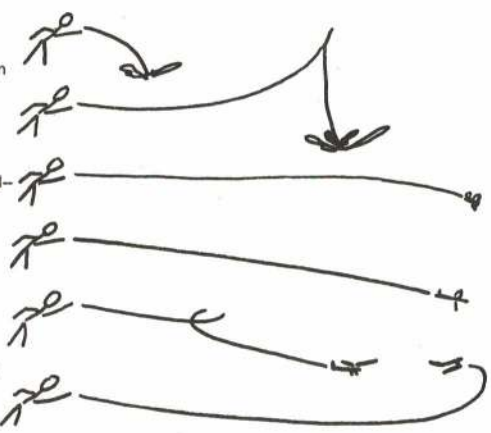
—Box to hold all of the foregoing accessories

At the Flying Field

I. Test Glide the Plane

—Pick a calm day (5 mph or less), turn the transmitter and receiver on and gently launch the plane directly into the wind, aiming at a spot on the ground of about 75 ft. in front of you. Check this diagram for what to do. "D" is what to strive for.

TEST GLIDES: EFFECTS – CAUSES – CURES



A. Very nose heavy or check to see if you put on the wing!! Add weight to tail.

B. Tail heavy or thrown too hard into wind will also cause stall.

C. Slight tail heavy or add shim to elevator panel--generally do not look for a floating glide.

D. GOOD straight fast glide--do all testing with neutral rudder . . .

E. Fast but tricky may indicate wing warp unnoticed before.

F. Some degree of turn–Rudder neutral . . . Elevator not positioned correctly, wing warp or vertical fin not 0° on fuselage-can be trouble.

Reprinted with permission from Paul Runge.

II. Powered First Flights

—Before attempting this, again check the radio ground range.

—Start the engine and turn the radio transmitter and receiver on, checking for proper rudder action.

—Gently launch the plane directly into the wind, just as you did when gliding it.

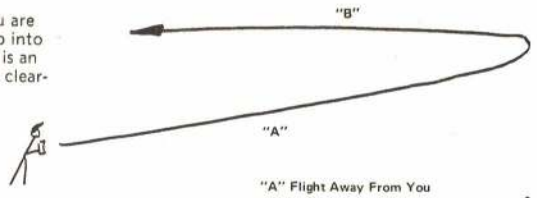
—The plane should start a gentle climb straight out. Allow it to get some altitude and gently turn to the right or left by moving the transmitter stick a SLIGHT bit. Do NOT over-control!!! This is a common beginner's mistake. Do control in small segments while learning. After awhile you will learn to anticipate what the plane is going to do, so that you can be ready to apply proper corrections. Again, do this in gentle increments of control, never full right or full left, until you have enough skill and confidence to handle a close situation. Continue gentle turns and increase altitude to 200-250 ft. ALWAYS keep the plane UPWIND from you, so that if you do make a wrong move, the wind will blow the plane back toward you. If the plane gets downwind it can go farther and farther away. This can result in a lost airplane.

—When the engine quits, judge the glide descent and try to land the airplane close to you. If you are close to the ground, DON'T turn sharply--it is better to have to walk a little ways rather than to pick up the pieces at your feet, because you tried to stretch a glide or turn too short. (More on landings later.)

CHECK THE DIAGRAMS BELOW FOR PROBLEMS AND SUGGESTED CURES. READ AND RE-READ. MAKE ANY ADJUSTMENTS JUST A SMALL BIT AT A TIME--AND AS A RULE, MAKE ONLY ONE ADJUSTMENT AT A TIME. IN THIS WAY YOU CAN SEE THE RESULTS OF WHAT YOU ARE DOING.

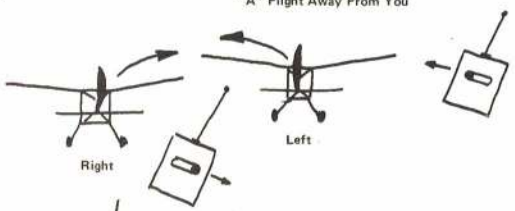
Another important thing to remember is that when the plane is flying away from you, right movement of the stick will make the plane move to the right. However, when the plane is flying toward you, a right command will cause the plane to fly to your left. This is something you must learn and keep firmly in mind. It can be very confusing to a new flyer.

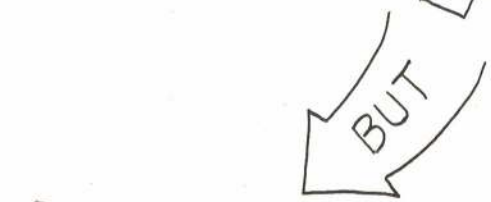
One way of handling this is that when you are flying toward you, you can push the wing up into a turn desired with your stick thumb. This is an easy method of remembering, and will come clearer to you



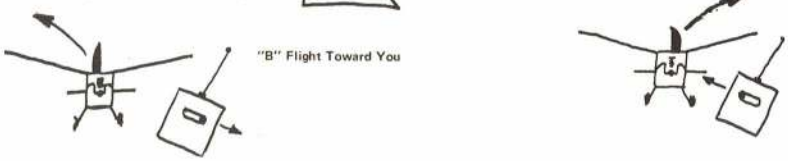
"A" Flight Away From You

FLIGHT TOWARD YOU . . . . . PUSH WING UP INTO TURN DESIRED WITH YOUR STICK THUMB . . . . .THIS IS BY FAR THE EASIEST METHOD FOR REMEMBERING THAT I HAVE DISCOVERED.





"B" Flight Toward You



INITIAL FLIGHTS: EFFECTS - CAUSES - CURES

A. Good climb out - straight, steady with good speed into wind will give the start of a satisfactory flight.

B. Good launch but is a weed cutter!! Refuses to gain altitude. . .Increase angle between wing and elevator with a shim under leading edge of elevator 1/32 - 1/16 until good climb is noted as in Fig. A, also check for excessive down thrust. (Engine points down too much)

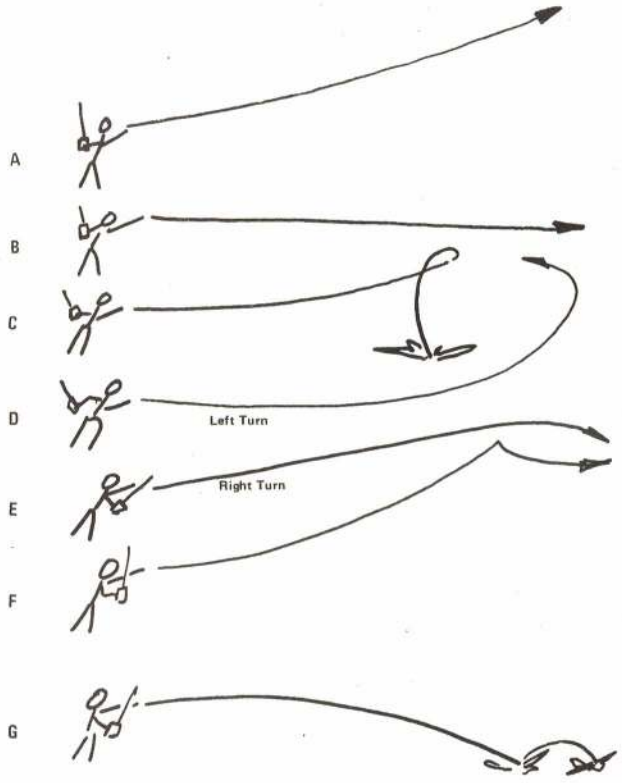
C. Everything went fine until . . . Check the radio gear with the recommended ground check. In some cases the air speed is too slow and wing stalled letting the engine torque take over--spinning plane to ground.

D. Persistent turn after launch to the left when surfaces have been checked for warps and rudder is neutral; Indicates the engine needs additional RIGHT thrust adjustments. Depending on the plane/motor combination this could be 2° to 5° or 6°, generally 2° is sufficient.

E. Right turn after launch could be too much thrust adjustment, warps, rudder and neutral. Important thing is that rudder control will respond or overcome this condition. Also when you have a difficult time it is still the best policy to spin the plane into the ground before you hurt someone.

F. The Stall . . . slight or extreme probably has done less for the modeler than any one factor of success. So if the stall did not occur in test gliding, chances are that the motor does not have enough DOWN thrust. Also the initial flight should be of SHORT duration until the flight characteristics are known. There will be some planes that will never calm down. . So hang it up and start a new one.

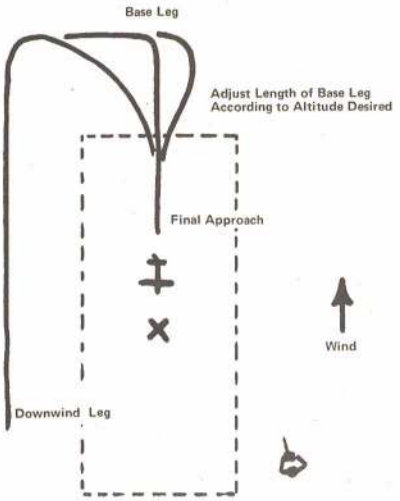
G. This is a prang . . . . .Check A thru F for help or get a bushel basket and whisk-broom and head for the barn.



LANDINGS

When the engine quits, immediately assess your position with regard to landing. For the first few flights, until you get the "feel" of things, try to land in tall grass. Pavement or other hard surfaces should be tried only after you have experience! Hopefully the airplane is upwind, and if it is, circle back until it is about even with you on the "downwind leg". See figures below (at this time its altitude may be gauged as well as the glide angle observed). From this point it is fairly easy to estimate how far downwind to let go before starting a "base leg" or turn across the wind. Again observe the glide angle, and allow the base leg to use up more altitude, if necessary, before turning it into your "final approach" directly into the wind. At this point, concentrate on keeping the wings level until touch down. You may have to do some walking the first few times, but gradually you begin to get more accurate in your judgment. Later on, after additional experience, you can learn to play the glide to land just about where you want to. This will involve tight turns and quick reflexes, but the methods will become self apparent as your learning and experience progresses.

Sometimes it happens that a touch down directly into the wind can not be made due to insufficient altitude for the necessary turns. In this instance, it is better on keeping the wings level and let it go. It is better to walk a ways than to "bust up" your airplane.



LANDING PATTERN TOP VIEW

TURNS AND ALTITUDE CONTROL

Altitude may be lost quickly whenever desired by applying full rudder and holding. The airplane will go into a spiral. See Figure D. You can neutralize the rudder at about 75 to 100 feet of altitude, but be prepared for a zoom and a stall! As soon as the nose starts to come up, apply rudder again, MOMENTARILY, until the nose stops rising. At this point, neutralize the rudder and you are flying again. Timing is critical, and should be attempted only after you have had some experience.

A safer way for beginners is to start circling and to tighten the circle until the airplane loses altitude. Apply MOMENTARY OPPOSITE rudder to stop the turn and level the wings again. Anticipate your airplane. When a change in flight path is signaled, release the command as soon as the airplane starts to visibly respond. It is far better to do a series of short, inadequate, (if taken singly) commands than a long, hard blast that must be counteracted because of overcontrol.

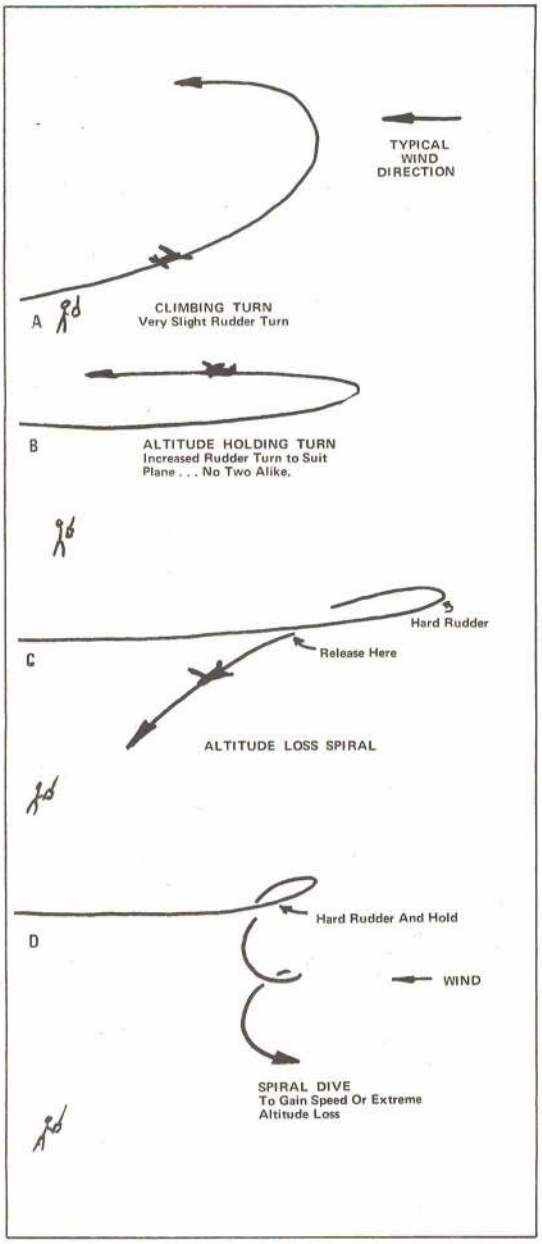
As you will see from Figure A, if you hold in only a very slight turn and your airplane is trimmed correctly, it will go into a slight climbing turn.

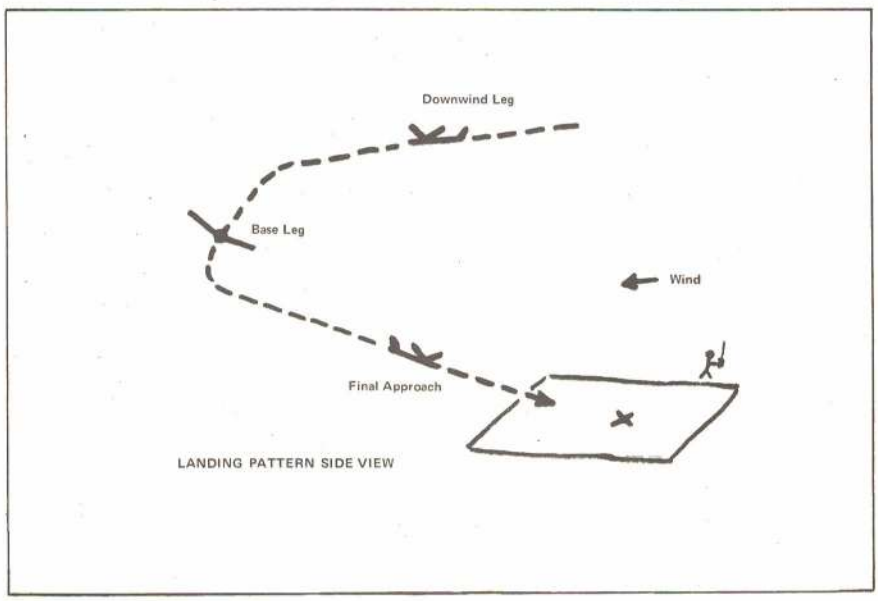
If you increase the rudder turn, you will do as in Figure B, and that is be able to maintain or hold your altitude level. This will vary from airplane to airplane, and no amount of literature can tell you exactly how much rudder this is, since this varies for each different airplane.

As shown in Figure C, if you apply hard rudder and release you will begin an altitude loss spiral. This is especially helpful if your airplane is gaining excessive altitude and you want to get it back down toward you.

Hard rudder and hold builds up a spiral dive, and also helps to build up speed. This speed is essential for any attempts at stunts and maneuvers. This will be covered in some further detail in one of the next sections.

Study the foregoing four turn and altitude control diagrams. This will simplify rudder only flying for you.





LANDING PATTERN SIDE VIEW

When your plane has been test flown and adjusted properly for weather, you will find that you should be able to fly it in winds of 15 to 20 miles per hour. This will require a decrease in the wing angle (putting small shims of 1/32 to 1/16 inch at the trailing edge as one example). The glide will not be much, but remember you are still flying and you can have fun. In calm weather, remove the shims.

It is well always to have a flight plan of some sort in mind as to what you want the airplane to try to do. This is better than just flying all over the sky, because you may find yourself in a tight squeak, and no real brain command on hand.

STUNTS AND MANEUVERS

You can perform stunts and we will cover some of them briefly. Quite generally, stunts are a result of building up speed. We've already seen that your plane will climb if adjusted right, and with a small rudder turn will still continue to climb. With a slightly increased amount of rudder turn, your altitude will hold.

If you apply harder amount of rudder you will begin to lose altitude. If you apply hard rudder completely and hold, you will go into a spiral dive. This is used quite effectively to get back down to a flyable altitude or to gain speed for maneuvers and stunts.

A few of the simple stunts which may be performed with your rudder-only airplane are: Roll, Split-S, and Wing Over. All these stunts are begun by entering a one turn spiral dive to build up speed With these maneuvers, effective use is made of the zoom which normally follows the dive.

ROLL: Spiral dive and release when the airplane is headed into the wind. When the nose has come up to about 45 degrees above the horizon, apply rudder and hold. The airplane will make a horizontal spiral. This may be rough, but it will be recognizable. Neutralize when the wings are horizontal and the airplane is right side up.

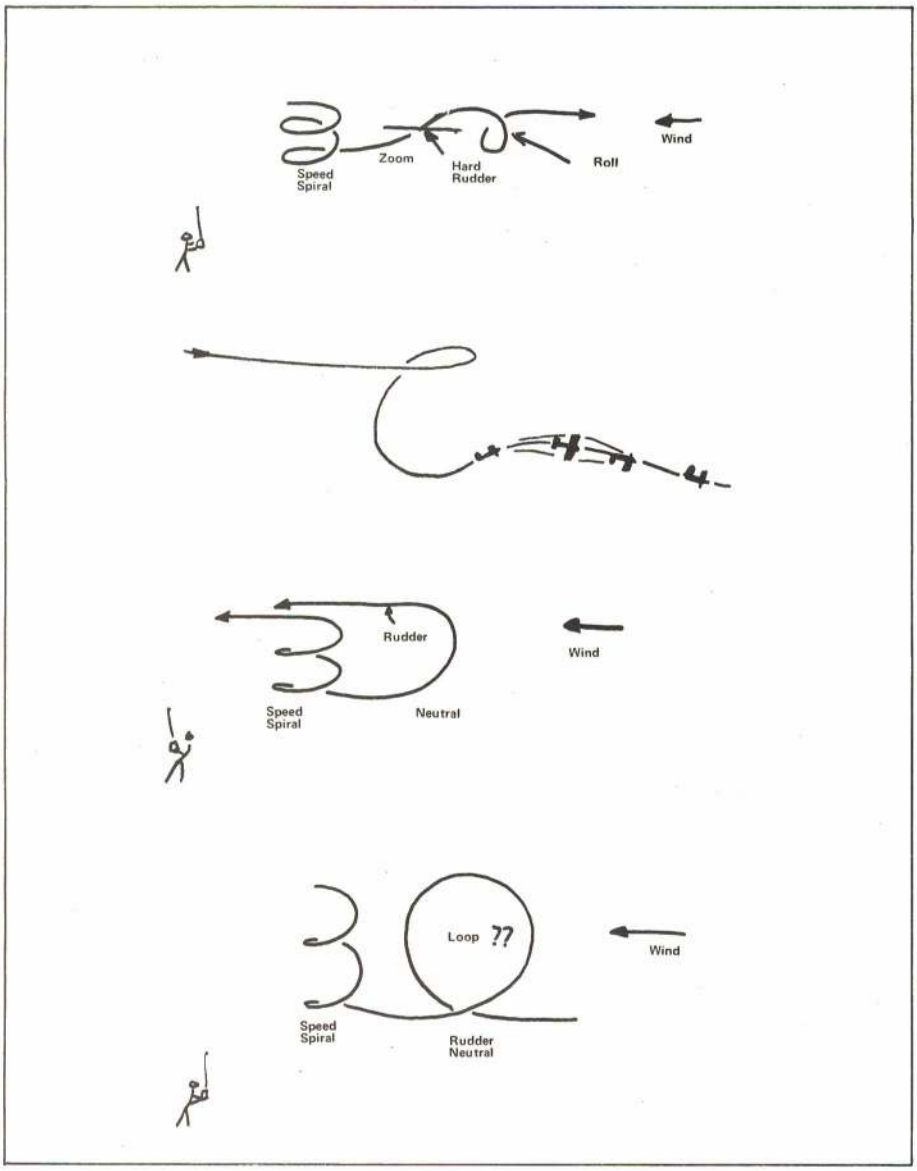
SPLIT-S: Dive and roll as foregoing, except neutralize the rudder when the airplane is upside down and the wings are level. The airplane will complete a half loop. When it comes out of the loop, be sure to kill the zoom that is liable to happen with a turn.

WING OVER: Dive and neutralize. Allow zoom to continue until the airplane is pointing straight up and almost stalled. Apply hard rudder and hold until the nose comes back up to horizontal.

All stunts should be performed with at least 200 feet of altitude. The Split-S, very definitely requires altitude, because it uses up a lot of it before it is completed.

Additional stunts which involve "going over the top" in an inside loop, such as loops, immelmann turns, etc., can be performed only by altering the trim. Considerable experience is needed to fly an airplane trimmed for these maneuvers, and they are not recommended for beginners, and we will not go into detail here as to how to perform them. After you have gained stick experience and have logged some flight hours, these will moe or less become automatic to you and you will know how your airplane responds to what commands you give it, and you can probably determine how these are performed by yourself.

This rudder only story is really never over, but the foregoing hopefully will give you some idea as to the fun that rudder only can bring.



FLY SAFELY

1. Join the AMA--among the privileges and benefits of the Academy of Model Aeronautics membership, are the fact that liability insurance is provided for all members. The dues are small--the benefits are great.

In addition to your insurance coverage, you will receive "American Aircraft Modeler" magazine, which will cover the whole field of model aircraft flying, and will enable you to read much more about radio control activities as well.

2. Avoid flying in populated areas. Try to stick to open country.

3. Don't fly over crowds--keep the airplane away from people.

4. Don't stunt at low altitudes.

5. Stay away from power lines and telephone lines. If your plane should accidentally become tangled in a power or telephone line, DON'T try to get it back yourself. Call the telephone or power company. They have the equipment to do the job safely. As a matter of fact, most of them will prefer to do it this way rather than risk a law suit over injury.

6. Never fly an airplane that isn't mechanically perfect. Never attempt to fly an airplane in which the radio response is less then acceptable. It won't cure its problems in the air if you have any slight problems on the ground.

7. Don't try to fly in areas of persistent interference.

TAKE OFFS

ROG (rise off ground) is beautiful to behold if done properly. The surface must be smooth and hard (an asphalt pavement is ideal). Place the airplane on the surface, pointing it into the wind. When ready, just release (don't push!) the airplane. Correct any turning tendencies with GENTLE commands. Easy does it! Once enough speed is reached, the airplane will lift off by itself. Allow it to climb straight out until sufficient altitude is reached before beginning a turn..

HAVE FUN!

The Pulse Rudder-Only flying story is never really over; and once having learned it, it will never leave you--just like bicycle riding. You can use it to advance up the ladder by achieving more and more finesse in R/O flying; or you will find it excellent training for full house flying.

Just one word of advice, however. Don't trade in your Pulse R/O outfit. You may want to save it to fly when it's too windy for your big job, or when your super duper outfit has had to go back to the factory, or when you just plain want to relax without your knees knocking together. Pulse Rudder-Only is FUN--and fun is what you got into this hobby for--Right?

DEDICATION

This presentation is repectfully dedicated to the memory of the late Frank "Dick" Adams in appreciation for the uncountable, pleasure filled hours he gave me. His work is responsible for the present "State of the Art" now enjoyed by many thousands who are flying Rudder Only.

Sincerely
Chris Soenksen

Chris Soenksen

C/L BILL BOSS
General Correspondent
SPORT and SCALE

Not what it seems, as any combat flier knows! Sam Bridges and Harold Brown at it.

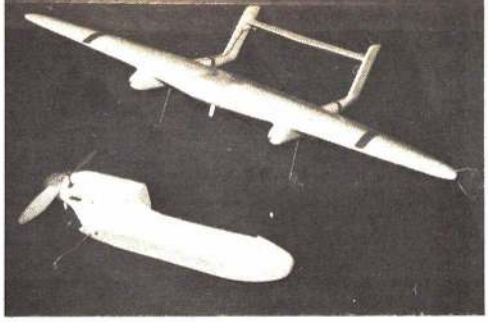
Quick Engine Change: Carl Steuer has designed a control line plane which permits an engine change to be made in a matter of seconds. Just take off the rubber bands, remove the fuselage, and put on a new one containing a motor, fuel tank and nose wheel for this tricycle landing-geared plane. All flying controls are mounted in the wing and tail section, which are completely independent of the removable fuselage section.

Steuer developed this type of plane to avoid ruining a day of flying because of motor failure. The design also permits the use of different sized motors, say a 19 for calm flying weather and a 35 for the rougher days. This type of plane also makes a good training ship. The novice can start off with a small engine and increase the engine size as experience is gained.

A further suggestion: why not build a plane in basic blocks, such as nose, wing, fuselage and tail sections. Each then can be modified as to shape, length, weight, etc., thus permitting design experimentation without having to build a completely new plane if a particular design doesn't work out . . .

Fuel Economy Run: Many clubs run events based on getting the best possible air time on a given amount of fuel. Sometimes this type of flying is incorporated into events such as the Quadrathon, which includes Stunt, Beauty, Speed and Time Duration. Other clubs simply fly a Fuel Economy Run. Vic Garner's comments on the Hows and Whys of Fuel Economy are based on his article in the WAM "Propwash Newsletter."

He states that the power output of the average model engine is usually greater than that required for level flight, therefore engine intake and exhaust can be restricted to reduce the power output. The exhaust presents no problem, just bolt on a favorite muffler using maximum restriction. This also helps to keep in part of the unburned fuel and adds noticeably to the economy. Restricting the intake may be more of a problem as a restrictor has to be made for most engines. Some suggested sizes for intake restrictors follow: 19 engine about .160", 29 about .155" and a 35 about .145". The sizes are approximate and could vary with the particular engine.



Carl Stuer's two-piece model, based on a military observer aircraft, can be flown with different units or pods. Flies on 19 to 30 sizes. Note elevator pushrod.

With the engine restricted, the available power is reduced and rpm is down. For sufficient power to ROG, Vic uses a 9/4 regular or a 9/6 narrow-bladed prop. Larger props put a greater load on the engine, making the needle valve setting more critical and causing overloading and heat. A well broken-in engine is a must. Most engines seem to have good torque characteristics at about 8000 rpm and that's what Vic looks for as maximum on the ground for all three sizes of engines.

At present, for the Economy Run event he uses a homebrew fuel made of white gasoline (67%), N.P.G. oil (18%), and nitroethane (15%). Any oil designed for two-cycle engine operation which will mix with the gas probably will work. However, the N.P.G. oil has given the best results and can be found in most motorcycle shops. If nitroethane is not available, nitropropane, propolene-oxide, or Francisco's Pickup Octanizer may be added as the igniter. Experiment with various percentages in the mixture to find the one which works best.

Providing a constant flow of fuel to the engine can be accomplished by using crankcase pressure, or by plugging the tank vent and bending the filler tube into the windstream. Pen bladders will do for normal-type fuels but are not recommended for the gasoline mixture because the gas affects the pen bladder material.

For further information, write Vic Garner, 3867 California Way, Livermore, Calif., 94550.

Nieuport 17: Dee B. Mathews, a scale builder, sent in details and pictures of his Nieuport 17 and remarked, "Wish magazines would publish more bibliographies on scale subjects. I have spent many hours gathering information and developing construction and finishing techniques, as has any avid scale man. Too bad we can't share our gleanings."

In view of that desire, here are details on his Nieuport. The model is based on a V-K kit, powered with a ST56 and employs an

Lovely CL version of VK Nieuport 17 kit by Dee Mathews. Interesting feature is long shaft to hide model motor.

extension shaft through a dummy scale Le Rhone engine. All control surfaces are operable from the cockpit. Silk covering is finished with three coats of a mixture of Ambroid Cement and thinner. Clear dope is then applied. This combination gives the plane an oxidized varnish appearance. Silver areas are sprayed with silver Aerogloss, and then oversprayed with Hobbypoxy satin clear, providing an authentic finish (Re: Bergen Hardesty and Muse De'Air).

The plane is a good flier. During the past two years it placed first in both the Wichita Midwestern Champs and Tulsa Glue Dobbers Annuals.

Many of you have a pet scale project, construction or finishing techniques which would interest other scale modelers. Why not send them in? Your idea might help solve someone's most difficult problem, or you may find an idea to help you.

C/L JOHN SMITH
Specialist Correspondent
SPEED and RACING

FAI Speed Team Qualifications: Thirty finalists for the three-man FAI Speed Team for the world championships in 1972 will be selected by the following methods. Last year's team is already qualified for the finals. Seven men will be qualified by the best seven speeds at the 1971 Nats (all age divisions). The remaining twenty will be picked on a point basis, points being accumulated by flying in FAI meets from January-August 1971. With a minimum of ten contestants in each con-

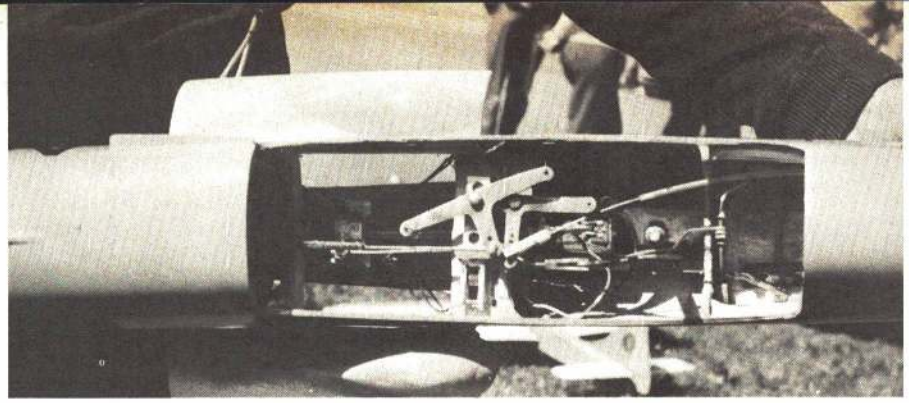
(Continued on page 82)

The Vasillo and Hemmingway team with their A record ship. Partially built-in pipe on a TWA 15 with a polished tail.

C/L JOHN BLUM
Specialist Correspondent
CARRIER and STUNT

From Across the Sea: Stephen Blake sends photos and information on some of the top British Stunt fliers. England's team for the World Champs in Belgium (August 1970) consisted of Mick Reeves, Jim Mannall and Steve Blake.

The team was selected by the SMAE (AMA equivalent) program through a series of established qualification contests. An elaborate tabulation of number entered, with scores tallied by contest and averaged to determine individual placings, is maintained. In 1970, 29 modelers entered six major competitions in an attempt to qualify for the World Champs Team.



Inside Cedric Elliot's ship (see below) is a mechanical marvel, which retracts the three-wheel landing gear with the same motions as the real U.S. Navy Crusader fighter. It is an electrical system. Obviously the wing is removable. Complete plane weighs only 58 oz.

Photos indicate that the models are similar to those of the U.S. in design and outward appearance and with attention to paint scheme, lettering and details. Of particular note is that each is equipped with a muffler. Although a requirement in FAI Stunt in 1971, their presence conforms to the SMAE ruling of several years ago requiring the use of mufflers in England. This reflects recognition of a growing problem and an attempt to solve it . . .

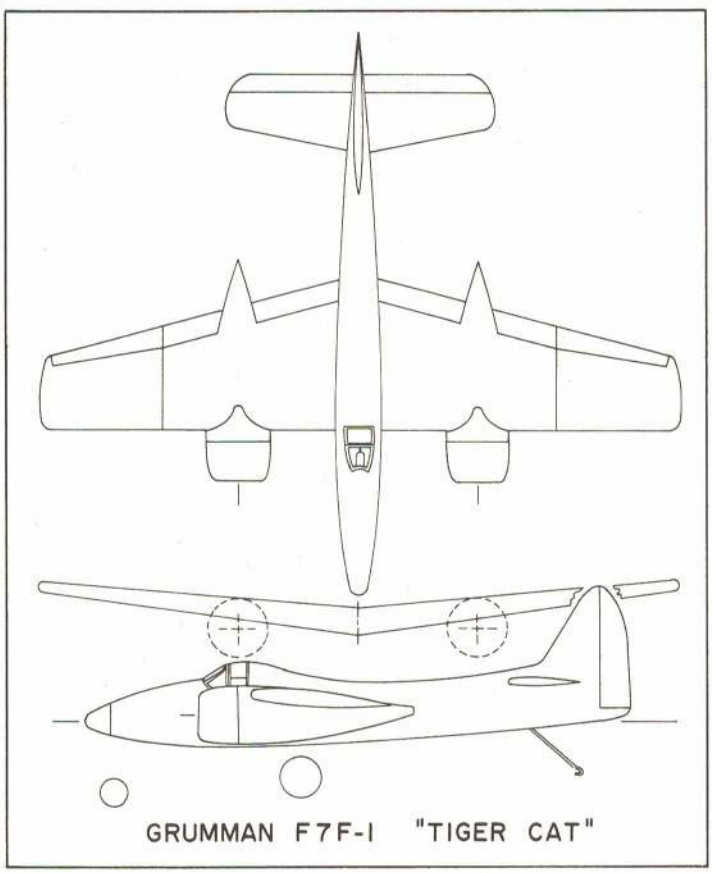
How To Handle: Thirteen-year-old John Roberts presents a crafty idea on UC handles.

(Continued on page 82)

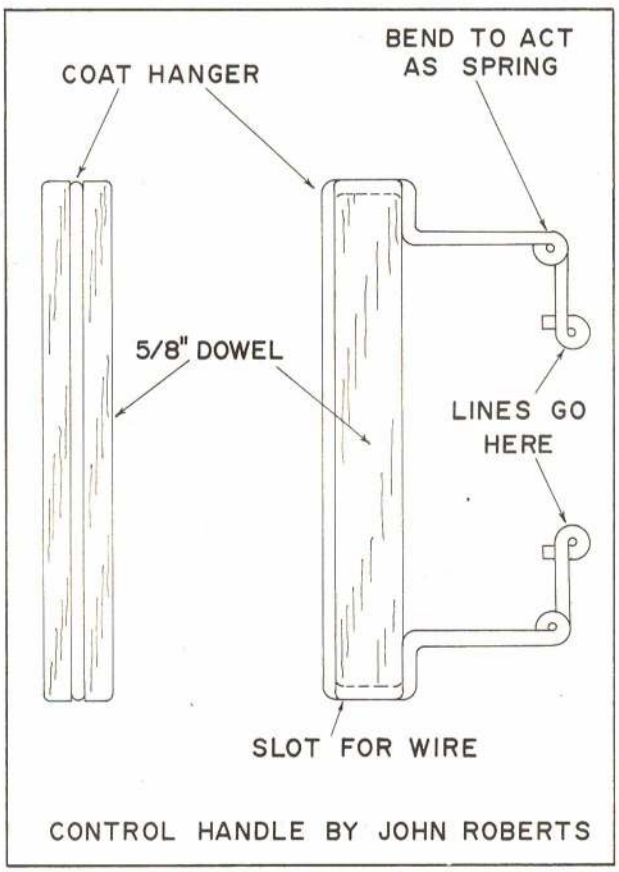
A hot Carrier ship by Edwin Sensebaugh is K&B-powered. Uses flaps and auto rudder. Note aileron positions. Weights 34 oz.

The Elliot Crusader. Engine is very well-hidden in the air intake. Stabilizer is apparently all-moving. This must look fabulous in the air with the wheels up. Even muffler is inside.

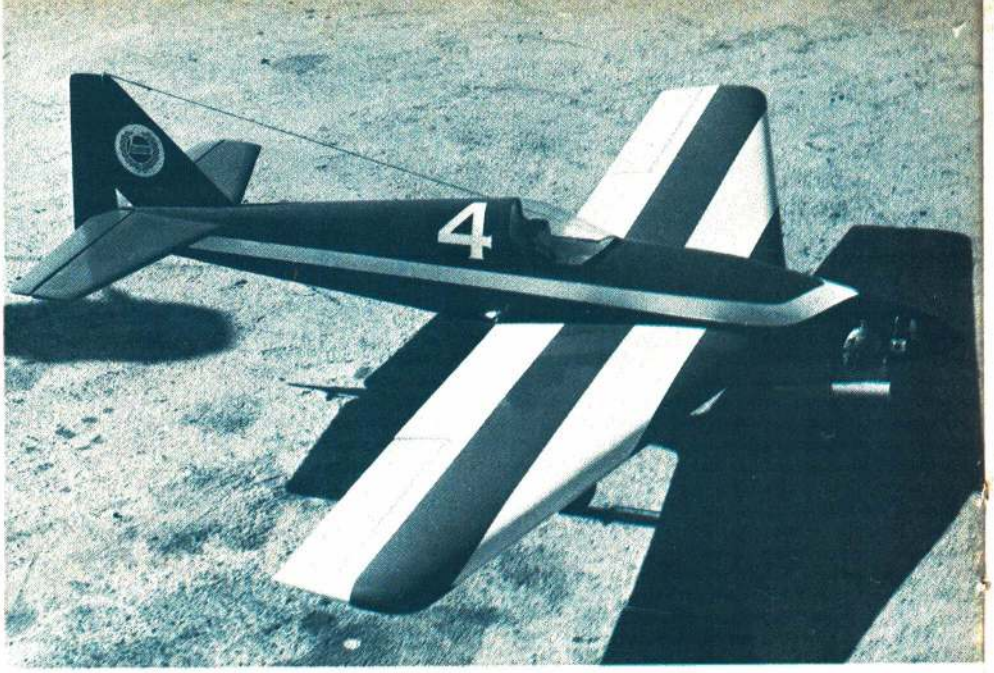
Twin Carrier job must have both engines running throughout flight.



A fine handle can be simply a dowel and a wire. It's cheap too.



R/C DON LOWE
General Correspondent
SPORT and PATTERN



Schimitar by John Hancock, Macheke, Rhodesia, Africa. A colorful plane from AAM plans.

False Economy?: Under discussion lately has been the prospect of cheap FCC licenses by means of a club license. With the fee increase from $8.00 to $20.00 for a five-year license, many clubs are turning to the provision in the law which permits a club to obtain a license covering all members. Apparently this is legal and various club newsletters note that it is being exploited.

Two thoughts on such licensing are worth serious consideration. The first concerns the FCC response to the apparent reduction in the number of individual users of the allotted frequencies. Presumably, when considering frequency assignments, the FCC responds to the projected need on the basis of the number of users and the worth of the need. The question is, does the FCC respond to the number of individuals using the frequencies or to the number of transmitters? It would seem a lengthy list of names is more impressive than a number.

I would rather pay the $20.00 than jeopardize something which a number of people worked long and hard to obtain and which serves us all extremely well. Remember when we had one frequency? And remember the AMA RC frequency fund? What we have wasn't obtained overnight. Lots of other people are clamoring for our allotted frequencies. Should we make it easier for them?

The second point has to do with the AMA legal council's views relative to club control of the activity. It is assumed that any transmitter licensed under the club arrangement may be used only when the use is "under the direction of the club." This presumes that the activity primarily would take place at the club field or in a circumstance where club officials control the activity. Does this include contest activity by individuals or casual flying by members at other than club facilities? I would think not. For example, as a board member of the WORKS Club I would not want to assume responsibility for Joe Doakes of the WORKS Club flying in a lower Slobovia AAAAA contest 10,000 miles away. What do you think? . . .

Equipment Reliability: An item in the North Jersey R/C Club newsletter, "Printed circuit," brings up a subject close to the modeler's heart. Under certain circumstances a modeler bashes plane after plane with a rig which presumably has received the full factory treatment after each bash and has been pronounced healthy. This is discouraging to the modeler and has driven some to take up golf!

Why does this occur? Some modelers do treat equipment pretty badly and it's easy to blame the problem on faculty installation, failure to charge batteries, etc. But in many instances, this just is not the case. Manufacturers must shoulder some of the blame for doing a less than thorough job of equipment repair. Most modelers would rather spend a little more to eliminate the problem than to spend many hours and extra dollars building or rebuilding their aircraft.

Reliable repairs affect not only dollars and airplanes but also lives. A 100-mph Super Retract No. 8 bomb is dangerous enough under full control! Present model aircraft equipment is super-sophisticated and even outclasses what the military uses for similar purposes. Super-small servos, silky-smooth control sticks, peachy-keen buddy systems and even

Navy's Blue Angels team members inspect Reno R/C Club model display at 1970 Reno National Championship Air Races—for big planes.

Hong Kong's No. 1 flier, K. H. Tang, flies Beachcomber at Republic of China Nats.

Lee Shulman (standing) and associates demonstrate the Shulman system for RC Pattern contest management. Note racks in background for flier and frequency control. See text.

select-a-frequency options are already available. Instead of a projected face-lifting or super shrink job, why not spend model change dollars on the nuts and bolts of reliability? I think the modeler would vote for this. . . .

The Shulman System: Leon Shulman is a man of many talents, one of which is organizing and running the annual Eastern States RC Championships in New Jersey. He operates what some call the Shulman System—an organizational and operational technique for getting the maximum number of flights for all contestants with less work for everybody. It encompasses the basics of a shortened flight pattern, visual display of flight order, multiple flight lines and making the contestant responsible for assuming the position when it is his turn to fly.

Lee has put together a nine-page document complete with pictures and all the details of his system. This report would be of value to contest directors who want to spruce up their operations. Those interested may contact Lee at 42 Blake Ave., Cranfield, N.J. 07016. . . .

Taiwan Report: From Taiwan, Republic of China, via L. W. Hoffman, comes news of a model Nats sponsored by the China Youth Aviation Association. Some 325 contestants were in attendance, with 57 RC registrants. A modified FAI pattern was used and J. C. Chin was the RC winner. RC is popular in many countries and is growing by leaps and bounds. . . .

Help for the Needy: Gary Moore is teaching model aircraft building to orphans at a "Big Brothers" Home near Neosho (Joplin, Mo.). The home handles about 150 kids in a year's time, and Gary is seeking help in the form of models, supplies, excess radio gear, etc. Anything you might offer would be appreciated. Contact him at 328 Adams, Neosho, Mo. . . .

Help for MonoKote Fanciers: Bob Stumpp suggest using a knife or wide screwdriver heated with the MonoKote iron for those hard-to-get-to edges which the iron simply can't reach. . . .

Special Issue: The Tri-Valley RC newsletter (South Bend, Ind.), edited by Jerry Smith, put out a special five-year anniversary issue that is outstanding. The newsletter, with its pictures, news and gimmicks, plus professionally drafted hints, is always a real pleasure to read. Some of the ideas have been reprinted in national magazines, but a choice collection of these items is contained in the special issue. Congratulations to Jerry and his cohorts, Eva Kouse, typist; Howard Nelson, photographer; and Robert Hensler of "Baron Grinit" fame.

R/C CLAUDE McCULLOUGH
Specialist Correspondent
SCALE

Help Wanted: Members of the 1970 U.S. Team to the Scale World Championships had to pay their own travel costs to and from the East Coast because so little money was donated to the Scale Fund. Since the team for 1972 may be picked as early as the 1971 Nationals it is not too soon to begin a drive to provide proper support comparable to that available to our World Championship fliers representing other events. Taking up a collection at club meetings is a quick and effective money raiser. A small contribution from everyone interested in scale would do the job. Dig down and send to 1972 Scale Team Fund, c/o AMA Headquarters. . . .

Measure Up: Care spent in research and drawing up accurate plans will be wasted if close tolerances are not held during construction. This common fault is not realized by the builder until a scale judge finds something like a wing chord ⅛" to ¼" oversize. Lapping top and bottom planking invariably produces a longer trailing edge than the same combination does on paper. Such areas require checking and special attention with a sanding block. Worse than dimensional errors from a scale appearance standpoint are those of shape, particularly leading edges and wing-tail tip cross sections. Many otherwise beautiful models are spoiled by hasty carving, leaving outlines too thick, blunt or squarish. The only way to get these right is by constant reference to photos of the prototype aircraft while building. . . .

Big Wheel: Building scale subjects calling for four and five-inch tires will be easier with the new English Micro-Mold line. Sizes start at two and one-half inches. Tough and well made, they have a tread pattern and an ingenious interchangeable hub design allowing selection of three different styles. Walt Moucha picked up a pair of the five-inchers while in England and has installed them on his Fly Baby. Sig will carry them in this country. . . .

Low Tack: Some types of finish cannot tolerate masking tape that sticks too tightly. World RC Scale Champion Mick Charles had to redo the paint job on his Sirocco when part of it stripped off with the tape. This nearly put him out of the running and caused a lot of extra last-minute work. Try the tape sold in drafting supply houses for fastening paper to a drawing board. It resembles masking tape but is specially made not to lift the surface on removing. Don't leave any type of masking tape on a model very long for it begins to set up and will be difficult to remove.

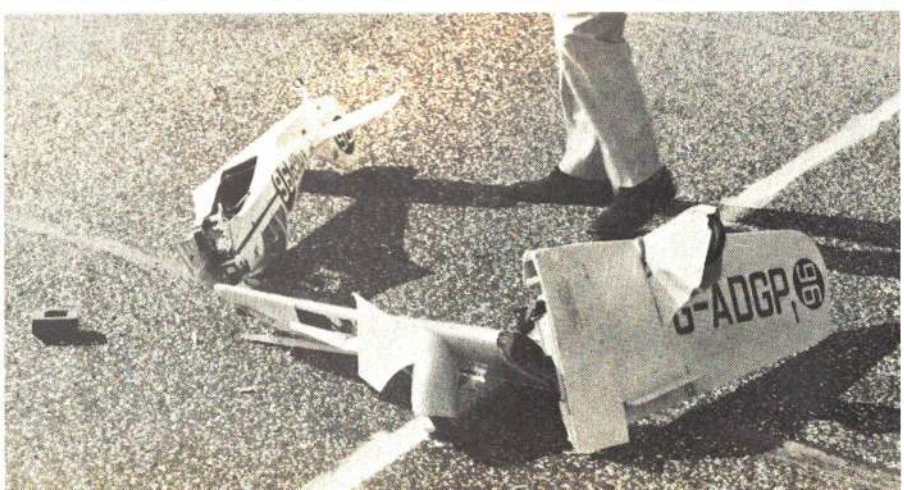
Roy Scott's B.E. 2C is a true masterpiece. Realistic flier is not for strong winds. Bombs too.

Another useful aid in doping and decorating is liquid masking, available in art supply stores. Hobby shops featuring model railroad or plastic kits have a similar product called Magic Masker. Painted on with a brush, it dries to a rubbery film which can be picked up after completion of the color scheme and pulled off the painted area. Good for intricate outlines and surfaces with compound curves. . . .

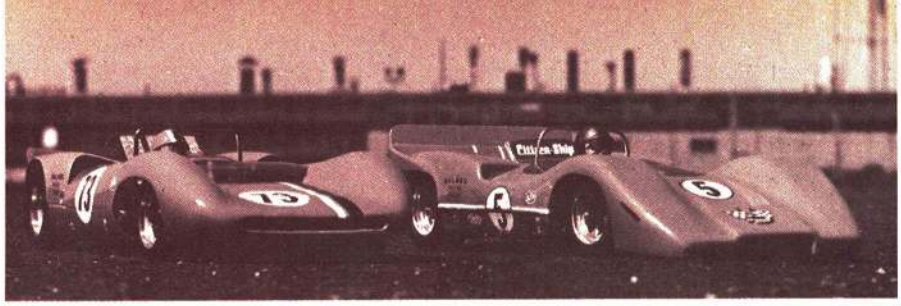
Sticky Problem Solved: Plastruct model railroad butyrate tubing and structural shapes have been previously suggested in this column for many detailing applications. The makers now offer Plastic Weld, a bonding fluid that is a whiz at gluing up Plastruct parts. Also works well on many other tough-to-glue materials useful in scale building—plexiglas, ABS, styrene, etc. . . .

Scale Data Sources: Federal Records Center, General Services Administration, Naval Supply Depot Bldg., Mechanicsburg, Penna. 17055, has a million cubic feet of records and in that mountain of paper are many 3-views, inboard profiles, cockpit construction drawings and framework assembly layouts, primarily of Navy aircraft, some of the 1930's and earlier. State the type of drawings required and they will advise as to availability and cost of reproduction. Some delay can be expected in reply.

Sad! Radio failure totaled Terry Melleney's beautiful Miles Hawk. Luckily, pilot survived.



R/C GEORGE SIPOSS
Specialist Correspondent
R/C CAR RACING



Cars of the Balnel racing team, are scratch-built, heavy, reliable, and regular winners.

New Concepts: As more and more people are drawn into our hobby, new ideas are being tried out. Some of these ideas are merely rebirths of old and disproven theories, while others are very novel and worthwhile concepts. In this month's column, I will describe some of the latest trends in RC cars.

Engines: The trend is toward mounting the engine in a horizontal position to neutralize the up and down vibrations generated by the piston; these may lessen adhesion by the tires. Heatsinks are readily available but during the winter months these are not used at all. The new VECO engine has deep fins on the cylinder head to preclude any necessity for additional heatsinks. Many racers now mount 29, 35 and even 40 carburetors on the 19 engines. This is quite legal because only the engine displacement is limited by the national racing rules.

Radios: These are becoming smaller, simpler and cheaper. We used to have to pay up to $500 for RC gear, but now there is a basic radio (by Kraft) which sells for less than $100 and can be used for cars. Many manufacturers are seriously considering specially-made sets for cars with reduced power output (to eliminate the need for licenses and to reduce interference), switchable frequencies, and human-engineered controls. Many modelers put the antenna on top of the set, on its face, rather than on the side as is done for planes. This eliminates the hazard of poking somebody's eyes out while you are driving from the driver's platform. Also, the vertical antenna radiates a better signal and prevents the transmitter from tipping over when not in use. As most cars use only two controls, one tiller or steering wheel controls the steering while the other is for throttle. The two are occasionally combined.

Chassis: Most chassis that you can buy are in kit form. They are fairly heavy but can be lightened by drilling holes in the metal. Radio compartments are covered up with a vacuum-molded cover or plastic sheet. There is a new trend toward ultra-light chassis but these should be considered by experts only, as they are quite fragile. A good reliable chassis which will take a lot of hard knocks, plus the stresses associated with starting the engine, is worth more than a lightweight one which will flex, bend and lose alignment.

Bodies: The struggle is on between the purists (good guys) who believe that we should race cars and the others (bad guys) who will not hesitate to put a shoebox on four wheels if it increases the speed of the car. These contraptions are called "thingies" and they are felt to reduce a dignified hobby to a fad where speed and speed alone counts.

Tires: Front tires are quite narrow, small and hard in order to reduce their steering effect to a minimum. Rear tires, on the other hand, are getting to be quite wide and soft, although on many surfaces only the hard rear tires (such as those offered by Heathkit, Wen-Car and Ra/Car) will work well. Witness the 1970 Nationals. The 1971 National Racing rules definitely call out tire diameters, widths and even color, so check the rules before you invest.

R/C FRED MARKS
Specialist Correspondent
TECHNICAL ITEMS
AERODYNAMICS

Mitter-Minder: From Sid Kaufman comes an idea for an automatic warning device for transmitters. Whenever the battery voltage decays to a preset level, an audible signal is emitted and, if the flier doesn't drop the transmitter from fright, he can bring his plane in and land it before the transmitter ceases functioning.

The schematic for the Mitter-Minder is presented here. According to Sid, none of the parts is critical and the components cost less than $3.00. The speaker is epoxied to a two-inch square p.c. board with the components mounted around it. The potentiometer can be set to allow oscillation at 1.1 times the number of cells for nickel-cadmium batteries or 80% of rated voltage for dry cells. Drain is about three milliamperes with or without audio oscillation . . .

Old Fumble Fingers: The equations given in the October column for calculation of Vmax in miles per hour contained two typographical errors in the figure I laid out.

The 375 in equation one should have had a decimal point in front of it, and the 712 factor in equation two should be outside the cube radical. My apologies to Jack Burns—and to Nic Damuck, who wrote to say trial calculations for his H-Ray showed it would reach about one mile per hour! The corrected formula yields 53 mph for the H-Ray. This may be a bit high, I suspect, but it also reflects in the curve wherein the H-Ray with a 19 indicates something better than marginal out of grass. Actually, the grass has to be very short, but we won't quibble over a blade or two! . . .

Noisy Boat Servo: Frederick C. Williams is interested in RC boats but has been unable to find a basic book for a beginner. He writes, "I recently built the Caltex Lumba-Lumba as my first attempt. It turned out rather well, so I decided to install radio equipment. After its purchase and on learning more about RC, I realized I had been misinformed by the dealer who had sold me an MRC Arcon transmitter and matching relayless receiver with an Aristo-Craft Boatomatic actuator.

The equipment operated erratically because of electrical noise generated by the servo. After considerable trial and error application of capacitors and RF chokes, I finally suppressed the noise. Ultimately, satisfactory operation was achieved only by detuning the receiver to provide reduced sensitivity. However, this reduced range to about 100 feet. The motor control of the Boatomatic would not work successfully because of electrical noise from the switching contacts involved. How can I get the equipment to function as it should?"

Mr. Williams' letter raises three points. The first is that of information for beginners. **AAM** has available a bound collection of Howard McEntee's monthly feature, "Getting Started in RC." For a beginner, this will be money well spent. Another excellent book, **Radio Control for Model Builders**, by William Winter (Hayden Publications), describes numerous installations in unusual models. (Now out of print, but to be reissued next year—Publisher.)

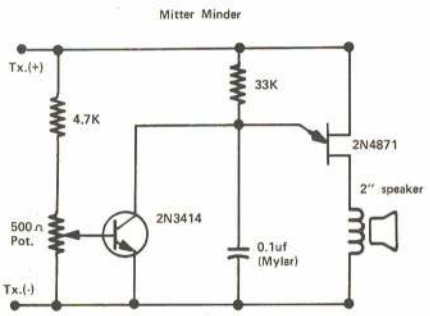
The second point is the practice by a few hobby shop owners of selling to inexperienced modelers equipment which is out of date or about which the seller knows nothing. The same is true of buying used equipment from other modelers. To those who mislead knowingly, I only can say that personal integrity is an extremely important commodity and is absolutely necessary to retaining lasting friendships and keeping repeat customers.

To the inexperienced modeler: learn before investing. It's much less expensive. Get to know modelers who are experienced. Join a club. Subscribe to or purchase model magazines which have how-to articles in them. Purchase some RC books, such as those listed earlier. Write to the equipment manufacturers for literature. Get catalogs from ACE RC, World Engines and other advertisers in this magazine. While the spectrum of equipment available will confuse a new modeler, he can no longer plead ignorance. Finally, if no one is readily available to consult, write me about your specific problem and I will either advise you or refer you to someone who can.

Finally, the MRC set purchased by Mr. Williams is a low-power, relayless unit designed to operate an escapement in one of the 020- to 049-powered planes. It is not readily suited to his intended application. The Boatomatic requires a single-pole double-throw relay. The receiver must be operated from a separate power supply.

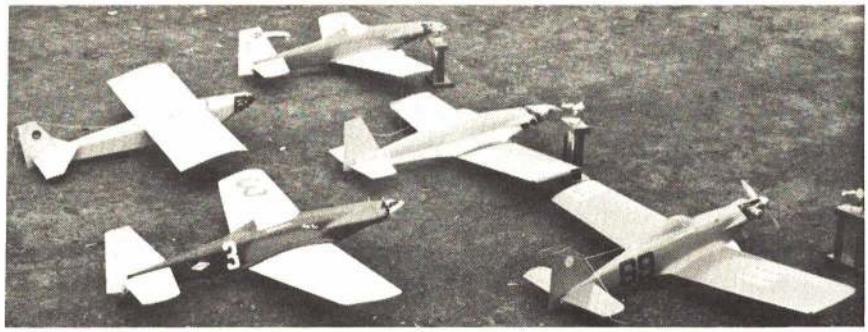
In this instance, the receiver should be mounted in a shielding metal can, the output leads should be brought out to a separate, externally mounted relay through 12 microhenry RF chokes. The receiver should be mounted as far from the electrical drive motor and the servo as practical, and it will be necessary to have arc-suppression on the relay contacts. Usually .01 microfarad capacitors from the common contact to the normal open and normal closed contacts respectively will suffice.

If the problem isn't cured by this, use the system in the application for which it was intended and purchase a good, used reed set (around $50) which is ideally suited to boat control.



Sid Kaufman's Mitter-Minder watches voltage.

R/C BOB MORSE
Specialist Correspondent
PYLON RACING



Lineup of Quarter Midget racers. Correspondent's Klooge is obvious, others are either new K&K Quarter Midget Ballerina with K&B's or Bob Francis Products' Little Toni.

Quarter Midget Racing: The Pioneer RC Club completed its seventh AMA-sanctioned event of the year by hosting one of the first quarter midget racing meets in Northern California.

Gary Korpi took first, Bud Phillips second, both flying the new K&K Ballerina with K&B 15 power. Rick Walters finished in third place with the new Andris Little Toni which had an O.S. 15 in the nose.

Of a total of ten entries, eight still were flying at the conclusion. Hoke Taylor and I entered a hastily built klooge and flew as the Over the Hill team. We finished far down the list, but we did enjoy the racing.

After flying in quarter midget, we feel Formula 1 racing is still the premier event, but quarter midget racing does offer speed and thrills. Those who haven't tried it yet will be pleasantly surprised at the speed these tiny ships with pipsqueak engines can reach.

One of the major problems with quarter midgets is lack of a national standard for rules. At present, a flier may travel a great distance to enter a race and then find the ship he built to enter in the Sleepy Hollow race was disqualified at the Country Corners Event.

Bob Andris and a group of quarter midget devotees are meeting in an attempt to formulate a national set of rules from the many variations used around the country. Those interested in joining this program may contact Bob at 12155 Terrence Ave., Saratoga, Calif. 95070. . . .

New Products: Most impressive at the quarter midget races was the appearance of two new fiberglass and foam ships for this event. Both were nicely done and flew extremely well with speed enough to take top places. Placing first and second was the K&K Products Ballerina which appeared to fly equally as well as its larger stablemate, the Formula 1 Ballerina. Taking third and fourth places was Andris Products Little Toni which showed excellent workmanship and very attractive lines.

Another new item is a nylon servo tray ($2.95) for the Micro-Avionics XL servos. Many who are flying these servos will welcome this product. We are presently flying with such a tray and do not hesitate to recommend it. Available from D&R Products is a bulkhead switch mounting kit. Send orders to 27635 Forbes Rd., Laguna Niguel, Calif. 92677.

R/C HOWARD McENTEE
Specialist Correspondent
GLIDERS and FAI

Rocket-Powered Gliders?: Well, not exactly. Model rocketeers call them boost gliders and they look something like hand-launched FF gliders. They must be rugged because of the speed at which they travel under rocket thrust! Power flight is practically vertical until engine power ceases. Then the engine is jettisoned to float slowly to ground by parachute, while the craft assumes a gliding attitude. Boost gliders have been flown by rocketeers for some years and a contest category is set up for them. A fair number have been lost, drifting away on thermals or landing where they cannot be found.

The dream has been to control the gliding flight by RC. Very lightweight equipment is now available to do this, and a successful pioneer in the field is Doug Malewicki, who has done an article on the subject in **Model Rocketry**. In his design, the rocket engine is in the elevated nose pod of the 17-in. span glider. The whole propulsion unit drops off at peak of climb. The glider weighs 2.8 oz., including loaded rocket pod, and carries a tiny Bentert receiver and actuator which control the rudder via thread linkage. Fifty maH nickel-cads furnish receiver power. Radio installation is carried in a pod beneath the wing. Many successful flights have been achieved, including some high competition places. . . .

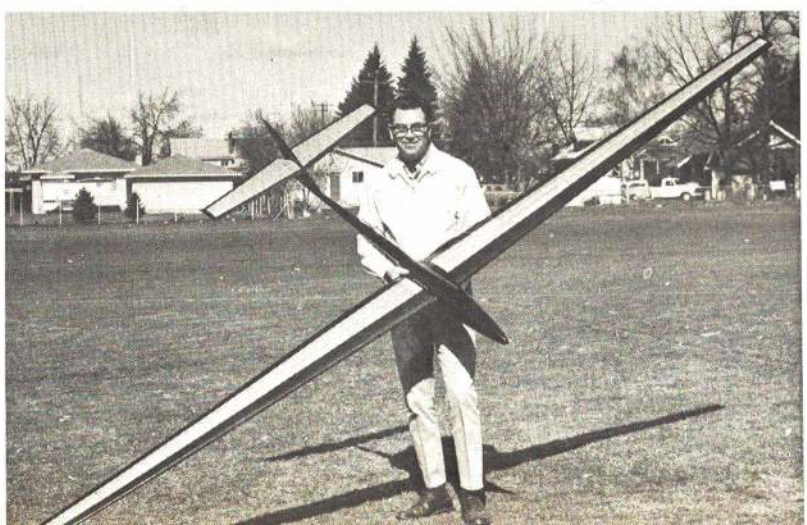
Commercial Thermal Sniffer: In addition to units previously mentioned is one designed by Dick Jansson. It will be marketed through Willoughby Enterprises, 14695 Candeda Pl., Tustin Calif. 92680. The entire package weighs about 1¼ oz., measures ⅝ x 1⅝" and is in sealed ABS case. It operates from receiver batteries, 4.8V at less than 30 ma. The unit has been air-tested extensively and has enabled Jansson to win at least one thermal meet. Two 18-in. wires attached to the unit may be taped to the wing LE for antenna. Operation is on five spot frequencies on the Amateur two-meter band and the crystal-controlled transmitter produces FM output. Plane unit and a suitable receiver list for around $100. . . .

ECSS Reorganization: The East Coast Soaring Society has made quite a few changes in its setup. Membership will henceforth be on an individual basis, rather than by clubs as was the case in 1970. It is expected that at least five meets will be held in 1971, but the schedule is not complete yet. All glider fliers who attended ECSS meets in 1970 will receive membership forms; other interested fliers may contact Carl Lorber, 8306 Fremont St., Carrollton, Md. 20784, for information. A permanent group of officers will be elected early in 1971, including a nine-member Board of Directors. Members will be kept informed, by a newsletter, of meet locations, results, rules, glider flying spots on the East Coast, etc. Dues will be $5 per person, to cover newsletter cost. . . .

HSSS Goes AMA: This pioneer RC glider club, based near Santa Ana, Calif., has applied for AMA Charter, which is expected to bring many benefits to this active group. Club members were warming up for a North vs

(Continued on page 80)

The Michaelis Miskeet, held by designer, now available from Fliteglas.



Yes, it is a small pulse RO boost glider. See text.

F/F BOB MEUSER
General Correspondent
SPORT

Simple Tailboom Form: Rolled-up tapered balsa tubes are used as tailbooms on Wakefield and Coupe d'Hiver rubber-powered models and Nordic gliders. Some use a pool cue as a form to wrap the balsa around, but the dimensions and taper are not usually the best. Detroit Balsa Bugs Earl Schick and Phil Klintworth have worked out a way to make a better form. Both Phil, a former U.S. Nordic Team member, and Paul Crowley have used the method successfully.

Basically, the form consists of a sheet of brown wrapping paper cut to a taper and wrapped around a steel rod. A ⅜-in. dia. rod is a convenient size and can be bought at hardware stores. The wrapping paper must be a little wider than the length of the tailboom. The thickness of the paper must be determined, so measure a stack of ten layers of paper with a micrometer and divide by ten. Determine the diameter the form should have at both ends—equal to the inside diameter of the tailboom. Use the graph to determine the lengths of the two sides of the paper, L1 and L2, corresponding to the end diameters D1 and D2.

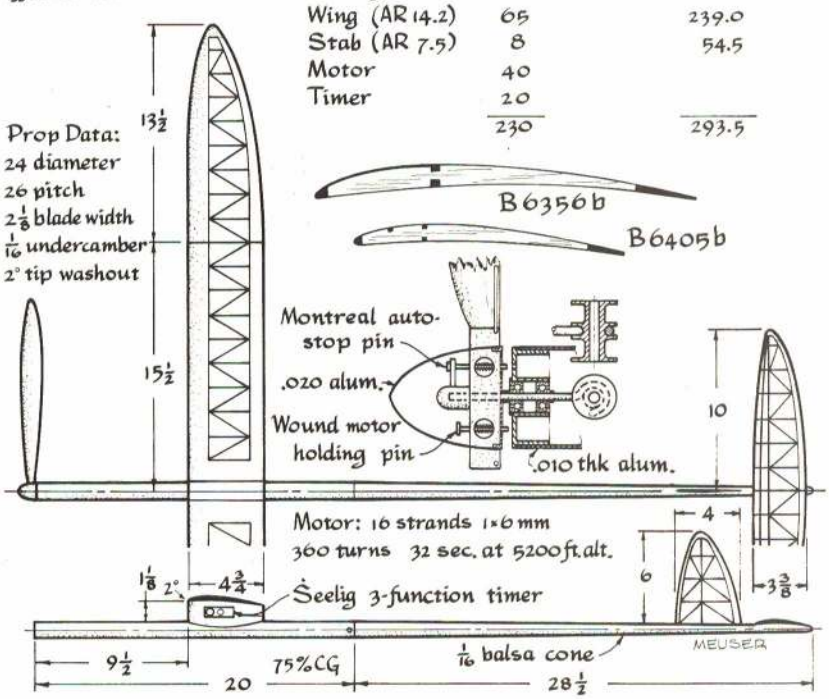
Roll the wrapping paper out on the floor

(Continued on page 76)

Dihedral:
5¾ at tip
1 1/32 at break

	Weights, gm	Areas, sq.in.
Prop & spinner	35	
Fuselage	62	
Wing (AR 14.2)	65	239.0
Stab (AR 7.5)	8	54.5
Motor	40	
Timer	20	
	230	293.5

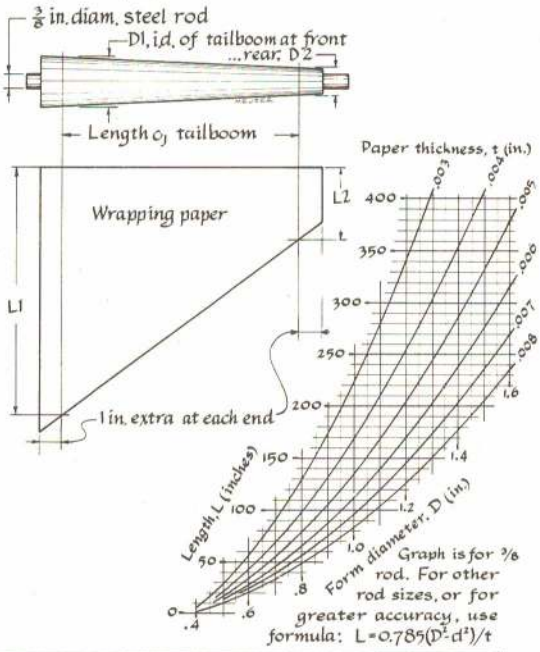
Prop Data:
24 diameter
26 pitch
2⅛ blade width
1/16 undercamber
2° tip washout



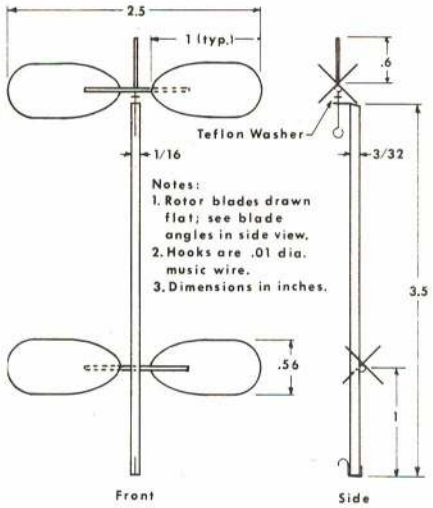
Covering: red transparent Super MonoKote. Flight pattern: right right.
Auto stab: 0° incidence for climb changing to -1½° at 15 sec.

CITADEL — John Allen, Albuquerque NM
First place, 1971 USA Team Finals

Members of the Detroit Balsa Bugs worked out this method, which uses heavy wrapping paper, to make forms for rolling balsa tail booms. Pool cues do not usually have proper taper and dimensions.



F/F BUD TENNY
Specialist Correspondent
INDOOR

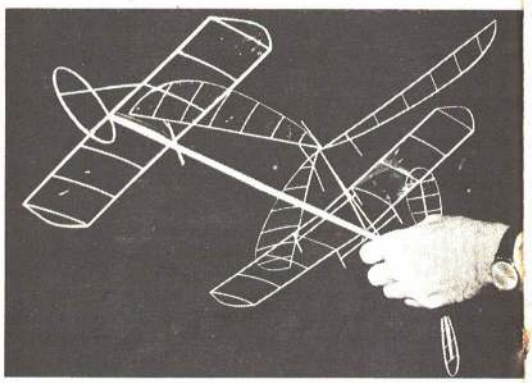


MATCHBOX HELICOPTER
Mike Fedor

Success Story: Richmond, Virginia, now has a modest site for indoor flying, due to the efforts and perseverance of Fred Harlow. He began by looking around for possible sites and finally decided to contact the Henrico County Recreation Department. When he presented the idea to Ellett R. McGeorge, Fred found Mr. McGeorge, in common with most people, envisioned gas-powered models, with the attendant noise, smoke and mess.

Fortunately, Fred was prepared with models and put on a flying demonstration. The contrast between an expected growling monster and a sedately silent indoor model won over Mr. McGeorge. Now Fred and his friends have a school cafetorium available for indoor sessions. It is interesting to note that Fred had previously furnished photos and an article about indoor models but they did not dispel the noisy bomb preconception. It takes a live showing to be convincing! Needless to say, Fred and his friends are grateful to Mr. McGeorge for his help, and they hope their success will encourage others to make similar attempts . . .

Instant Helium: A service for gala party hosts may well be a boon to indoor fliers. Tiny Harley has alerted us to the availability of helium gas in pressure cans, $5 for three cans. One can should fill at least one model steering-size balloon, perhaps with some to spare. If this seems like a high price, try renting a helium bottle and carting it to indoor contests!



John Triolo's microfilm autogiro. To classify as such, rotor area must equal or exceed other lifting areas. Other classes included ornithopters and helicopters. Each type is an ambitious project. Yes, it flies.

For that matter, $5 worth of helium in this form would have been worth its weight in gold to the U.S. Indoor Team last spring while flying at the 1970 Indoor World Championship! Even if the models had been too high to steer effectively, most of the models could have been saved from their untimely ends on the salt mine walls . . .

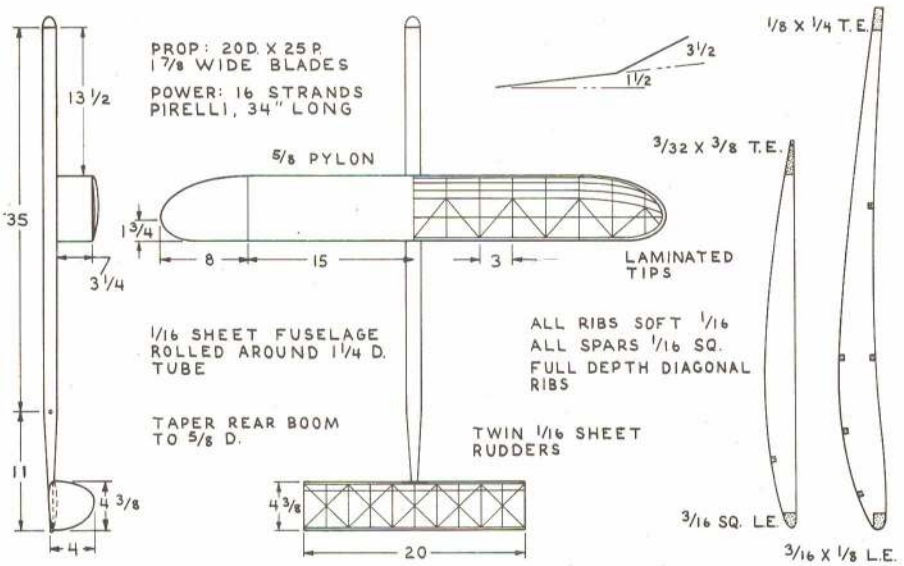
(Continued on page 76)

F/F BOB STALICK
Specialist Correspondent
GLIDER and RUBBER

The Case for Unlimited Rubber: With the coming of the three-min. max in many areas, including the Navy-sponsored Nats, an obvious problem arises in Unlimited Rubber. A look at the 1970 Nats Open winners (and 1969 winners) indicates that to take first place 12 three-min. maxes had to be flown, second place required only 11 three-minute maxes plus. How much of this kind of endurance contest is dependent upon the model and how much is dependent upon the resiliency of the flier is a moot point—sometimes it's a matter of who decides to quit flying first . . .

Another Case in Point: Unlimited Rubber has perhaps the greatest variety of design approaches of any FF event now being flown, since its sole restriction is a 300 sq. in. maximum wing area. Where else could a hotly contested Unlimited event be won by an EZB, as recently happened in the Northwest? Where

(Continued on page 78)



WEIGHTS	GMS	OZ
WING	34.1	1.20
STAB	12.4	.43
PROP	19.8	.70
FUSE.	44.7	1.57
RUBBER	76.0	2.67

UNLIMITED RUBBER DESIGN
BY BOB WHITE
2 TIME RECORD HOLDER &
WINNER 1970 SAN VALEERS

F/F WALT MOONEY
Specialist Correspondent
SCALE

Bob Peck's Longster climbs aloft on 020-power, It's always a high-time flyer.

Bill Warner's nifty semi-scale Peanut is a Poullin J.P. 30, which placed first with an average of 51 seconds for best three flights at Las Vegas New Year's meet.

Jumbo Scale: N.A.R. Flightmasters have come up with a new requirement in their annual Jumbo scale contest for rubber-powered scale models with wing spans of four feet or more. No flight is official unless a scale pilot is in the cockpit during the flight. For a small additional effort, considerably more realism is attained. Since these are rubber-powered models, the requirement leads to comments such as, "Your pilot is a bust, isn't he?"

This year's Jumbo contest attracted more than a dozen entries, and the air over the Los Angeles' model airport at the Sepulveda basin was graced with a flock of large, quiet, and piloted scale birds.

(Continued on page 79)

F/F CHUCK BROADHURST
Specialist Correspondent
POWER

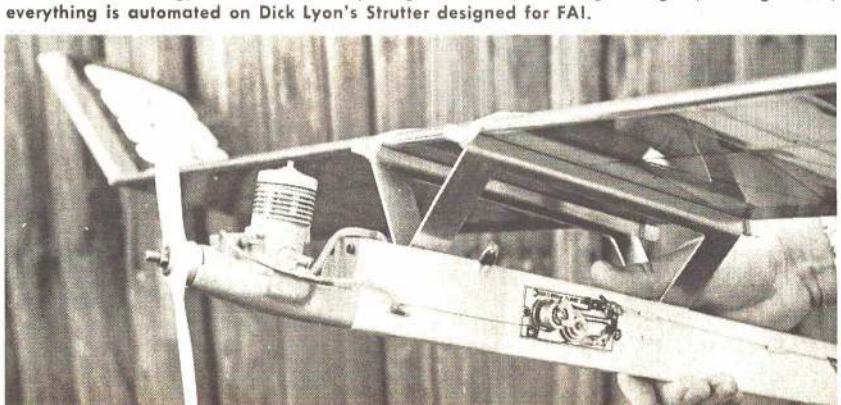
Prop Blades Break: You'd better believe it when Doug Galbreath says he'll never use a Cox gray 7/3.5 prop on his FAI Power models unless they're beefed up. This prop was originally intended by the manufacturer for use on the Cox 09 engine, but Doug insists that for sheer pulling efficiency they're the best he's ever used on his 15 engines.

At a recent Northern California Free Flight Council contest, a wrenching, ear-splitting sound belched from Doug's Eros. It came three seconds after launch, when the model was about 100 feet in the air. The plane's engine, a Rossi 15, obviously had undergone a sudden and enormous increase in rpm's. Shaking violently, the model became almost a blur. Its rudder came off as the model appeared to stop in mid-air, its forward thrust gone. Then it did a tail slide and headed, power on,

(Continued on page 79)

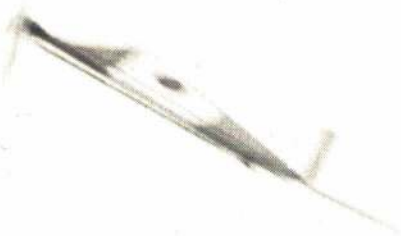
Torpedo 40 hauls Howard Harvey's C job straight up. Plane is named Tiny Tim, but no one knows why. Note color pattern.

MonoKote covering, Van Nest-Cherny engine mount, hot Tigre engine, Seelig timer, everything is automated on Dick Lyon's Strutter designed for FAI.

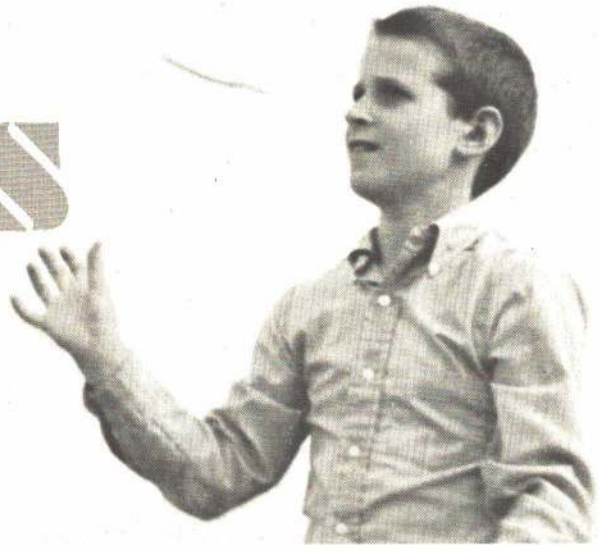


Where the action is... FREE FLIGHT

A free flight kite, alias Ben Franklin's Revenge, uses rubber motor for its own wind.



Stringless Wonder



BILL HANNAN

HERE'S A LOW-COST project which can be completed in a few hours and which is guaranteed to attract attention! Stringless Wonder is the result of a desire to enter something out-of-the-ordinary in a local kite contest. I've always enjoyed flying kites but, like Charlie Brown of "Peanuts" fame, I generally ended up with tangled strings. Solution? Eliminate the string!

The prototype of Stringless Wonder was accepted as a legitimate entry at the kite contest by the judges, who finally decided that my entry simply "made its own wind!" To see just how far rules could be pushed, I also entered my scale towline glider, and it was also welcomed, which goes to show that there are still unexplored ways to have fun with this hobby.

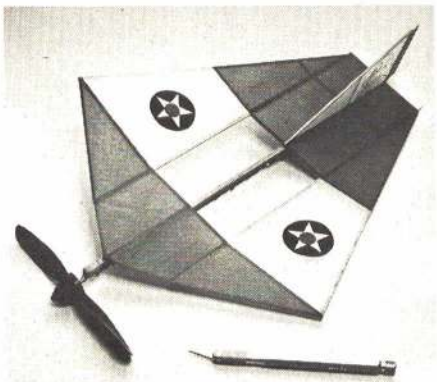
Kites have traditionally been colorful, and Stringless Wonder is no exception. The original is red, white, and blue, but why not let your imagination go wild and really be creative?

Construction

The plan is full-size and should be covered with plastic wrap or waxed paper. Select several straight medium-hard 1/16" square balsa strips, and cut them to the length shown. Cutting the long pieces first will minimize waste. Take time to achieve good fits for maximum strength as well as neat appearance. The outer wing panels and stabilizer are not glued to the wing center section until after they are covered.

After the frames have dried thoroughly, cover them on the top side only (the fin is covered on just one side) with lightweight tissue. It may be applied with clear dope or thinned-out white glue. To prevent warping, pin or weight the parts to the building board for an hour or two, while the tissue adhesive dries. Do not water shrink or dope the covering, as it would surely distort.

Motor Stick: Select a straight, very hard ¼ x ⅛" balsa strip and cut it to the length shown. A scrap of ⅛" balsa is glued to the underside of the motor stick to shim it to the size required for a North Pacific propeller bearing assembly. This is the type of plastic thrust bearing which is furnished with Delta Dart kits (AMA Cub), North Pacific Skeeters, and Sleek Streek ready-to-fly models. The rear rubber motor hook is bent to shape from a thin-wire paper clip and bound to the rear of the motor stick with thread and glue. Don't get carried away with the amount of thread, or the resulting lump will prevent the wing from seating properly. Only a few turns of thread are needed.



Not-so-obvious detail is absence of covering material at center. See plan.

Assembly: The perspective drawing shows the relationship of the various parts. First, place the wing center section flat on the building board and weight or pin it in place. Next, glue on the outer wing panels, adding suitable blocks under each tip for 1¼" dihedral per side. Allow plenty of time for drying. Turn the assembly over and add a little extra glue in the V slots at the dihedral joints. Use discretion, as an excess of glue may soften the joints, and the dihedral will be lost.

Next, glue on the motor stick in its correct location. Add the vertical fin, centering it carefully. Then the stabilizer may be installed. It is glued to the underside of the fin, creating an incidence angle. The small paper rudder and elevator (typing paper) are glued in place next.

The optional kite tail is made from tissue about ¼ in. wide, and two or three ft. long. This is strictly for effect, and helps create the illusion of a kite while flying. An overly long tail will add excess drag and reduce performance.

Propeller: The prototype model performed best with a 5½" dia. plastic VF-8000 propeller, which may be obtained from Sig Mfg. Co. This propeller features a neat spinner and also an effective free-wheeling device. The model also has been flown with other plastic props, including the Kaysun 4" dia., Kaysun 5" dia., North Pacific Skeeter (4⅛" dia.), and the North Pacific Sleek Streek (5½" dia.).

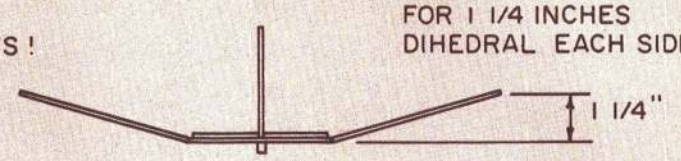
Since the model was designed for the VF-8000, which weighs more than any of the others because of its spin-

(Continued on page 73)

TO USE FULL-SIZE PLAN, REMOVE CENTERFOLD FROM MAGAZINE AND TURN OVER →

POWER: ONE LOOP OF 3/32" PIRELLI
OR 1/8" BROWN RUBBER.
EXPERIMENT FOR BEST RESULTS!

BLOCK UP WING TIPS
FOR 1 1/4 INCHES
DIHEDRAL EACH SIDE



FRONT VIEW
(NOT TO SCALE)

1/16" SQUARE MEDIUM-HARD BALSA
(TYPICAL)

ELEVATOR
(TYPING
PAPER)

STABILIZER

1/16" SQUARE
BALSA

RUDDER
(TYPING
PAPER)

FIN

K
BALSA

MUSIC WIRE HOOK
WITH THREAD BINDING

"SUPER DELUXE" PILOT ARF'S

There are various degrees of almost-ready-to-fly airplanes. Some are finished to a higher degree of almost ready to fly-ability than others. If you look at some of these Pilot airplanes, I am sure you will agree they have added an extra dimension into the art of preparing an almost-ready-to-fly model. To get a real nice job on the Cavalier, which is the flagship of the Pilot line, you should spend two evenings. This includes radio and engine installation. The other planes should finish up in an evening. Wherever possible, the aileron and rudder are on and hinged. The Cavalier and the Shell Fly "B" are superb low wing, high performance, airplanes. The high wing symmetrical section Sky Wagon with its long tail moment is an especially fine acrobatic trainer. The Olympia and the Cessna Cardinal are excellent 3 channel beginner's models. The little Piper Cherokee, being a low winger, might frighten some beginners but, with the dihedral that this model has, it is a beautiful and docile 3 channel airplane. We would recommend a 60 size engine for the Cavalier, a 40 for the Shell Fly "B" and the Sky Wagon (or maybe a 35), and a 15 to 19 for the Olympia, Cherokee and Cardinal. Because of the extra effort that has gone into these Pilot kits they are a little more expensive, inch for inch, than many almost ready to fly models. For somebody who highly values his time, we think that even at the slightly increased price the extra finish is well worth the effort.

CAVALIER

Wing Span	63.78"
Length	49.60"
Wing Area	635 sq."
Engine	60
R/C Mech.	4 Ch

$69.98

CESSNA CARDINAL

Wing Span	63.78"
Length	35.43"
Wing Area	397 sq."
Engine	15 to 19
R/C Mech	1-3 Ch

$34.98

SHELL FLY B

Wing Span	51.21"
Length	39.4"
Wing Area	480.5 sq."
Engine	30 to 40
R/C Mech.	4 Ch

$49.98

CHEROKEE

Wing Span	46.48"
Length	35.23"
Wing Area	387 sq."
Engine	15 to 19
R/C Mech.	1-3 Ch

$34.98

SKYWAGON

Wing Span	52.75"
Length	40.55"
Wing Area	485 sq."
Engine	30 to 40
R/C Mech.	3-4 Ch

$49.98

OLYMPIA

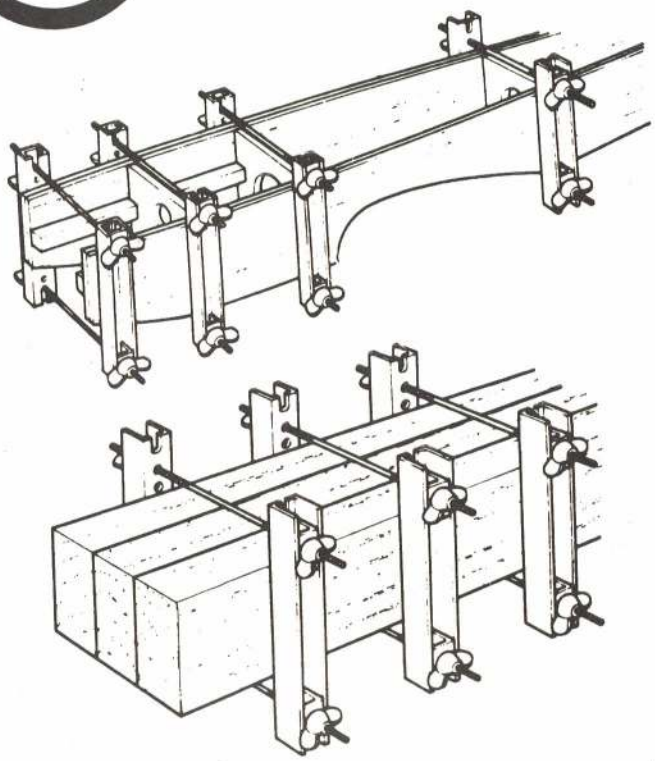
Wing Span	46.06"
Length	34.25"
Wing Area	379 sq."
Engine	09 to 19
R/C Mech	1-3 Ch

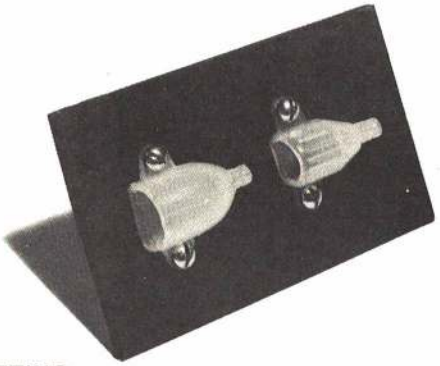
$34.98

WORLD ENGINES INCORP

8960 Rossash Avenue, 45236

I. M. PRODUCTS ACCESSORY LINE





RAM AIR FITTING

This is an air scoop package, contains two scoops to a package and comes complete with the wood screws necessary to mount them to the side of your fuselage. These air scoops act like a supercharger and the air rams into the scoop and then on into your fuel tank. You connect the vent line from your fuel tank to the back of the scoop. Our tests indicate that the real payoff on these air scoops is in the idle. They just seem to make the engine run a lot more solid than without them. It is something we have needed for a long time. Incidentally, there are two different sizes in each package, one large and one small.

.50 Catalog No. IM0065

GRIP TUBING

This large heat treat tubing is used to hold a push rod wire into a push rod dowel. The small size works very well with ¼ inch dowel. The large size is recommended for use with 5/16 inch square balsa push rods. Another very clever idea from IM Products.

Push Rod Keeper Tubing, Small .99 Catalog No. IM0066
Push Rod Keeper Tubing, Large .99 Catalog No. IM0067

"H" CLAMPS

These clamps can be used in fuselage construction or many other ways in the workshop. This is something we have needed for a long time to keep fuselages square, etc. These are packed two in each package.

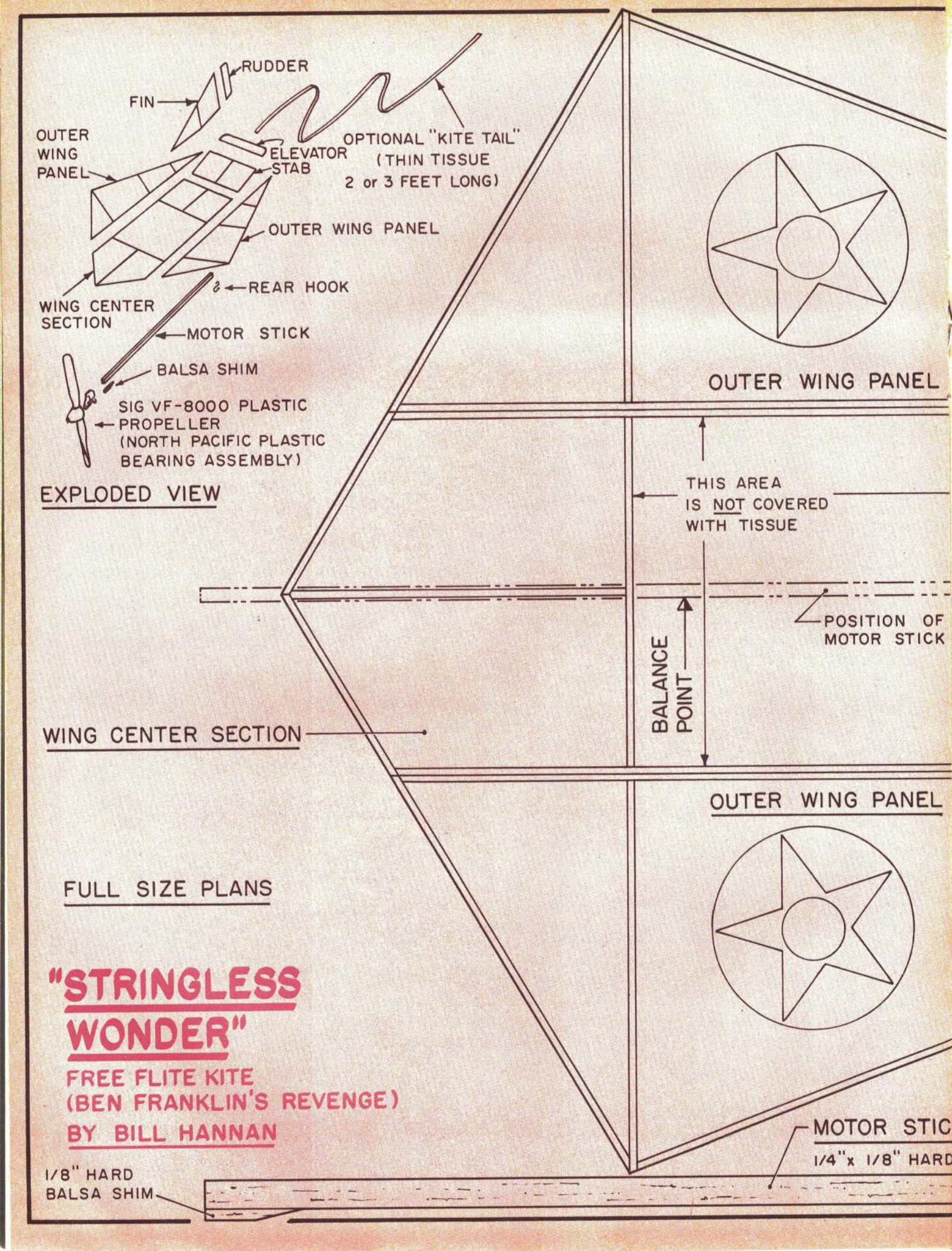
2.50 Catalog No. IM0068

PILOTS

One of these pilots is 2 inch scale, the other is 1½ inch scale. These pilots come in white plastic. We recommend that you use some sort of enamel to paint the pilots. The pilots seem to be made of a material similar to that which tanks are blow molded from. These are really sharp for open cockpit type aircraft. In order to form these pilots it was necessary to make them so that the legs come off. These can be put on permanently with a little plastic cement.

1½ inch scale IM Pilot 2.50 Catalog No. IM0069
2 inch scale IM Pilot 2.95 Catalog No. IM0070

PORATED, CINCINNATI, OHIO
Telephone 513-793-5900

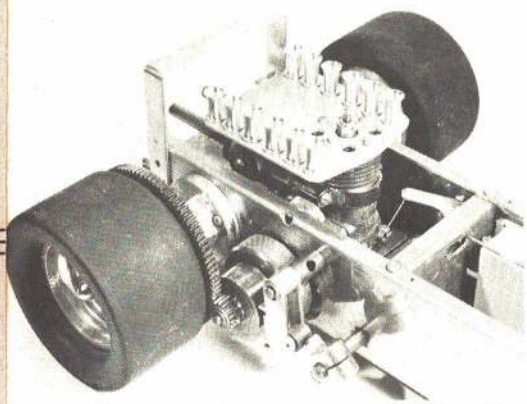

RUDDER
FIN
OUTER WING PANEL
ELEVATOR STAB
OPTIONAL "KITE TAIL" (THIN TISSUE 2 or 3 FEET LONG)
OUTER WING PANEL
REAR HOOK
WING CENTER SECTION
MOTOR STICK
BALSA SHIM
SIG VF-8000 PLASTIC PROPELLER (NORTH PACIFIC PLASTIC BEARING ASSEMBLY)
EXPLODED VIEW
OUTER WING PANEL
THIS AREA IS NOT COVERED WITH TISSUE
POSITION OF MOTOR STICK
BALANCE POINT
WING CENTER SECTION
OUTER WING PANEL
FULL SIZE PLANS
"STRINGLESS WONDER"
FREE FLITE KITE
(BEN FRANKLIN'S REVENGE)
BY BILL HANNAN
MOTOR STIC
1/4" x 1/8" HARD
1/8" HARD BALSA SHIM

Our MCE is shown decorated with colored tape. It is white with green and yellow trim. Other color bodies available are red, blue, and yellow. Nice decal sheet is included. The body is not scale as such but, with trim and decals, it becomes unmistakably realistic.

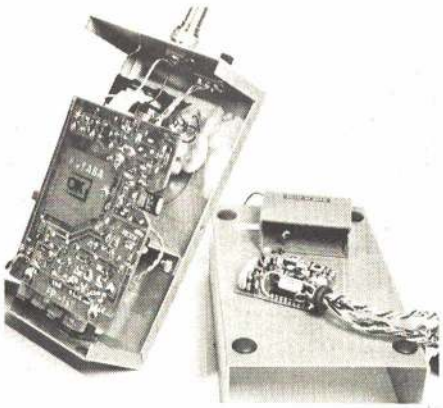
Blue Ribbon Review

MRC Two-channel Radio in the MCE Sidewinder Indy Wedge

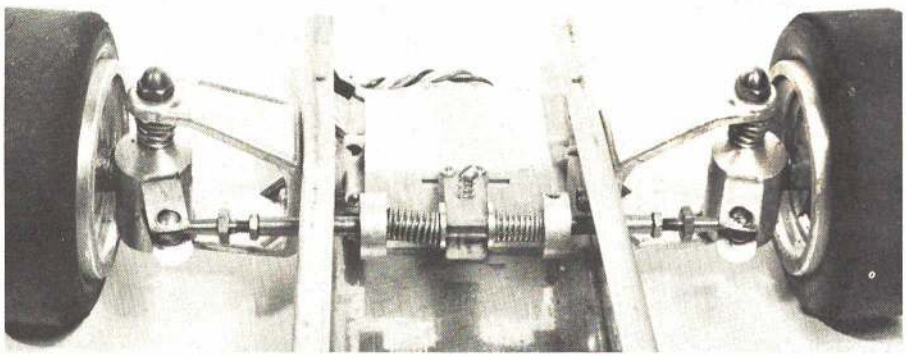
WENDEL GREEN and FRED MARKS



Most fascinating component is highly effective cam-actuated brake system which is coupled with the throttle servo.



Changeable crystals are useful feature. IC decoder. The system's great range makes it suitable for aircraft use also.



Patented steering system offers excellent servo gear-train protection and variable intensity steering. In other words, it helps prevent spin-out. Lots of caster effect used.

Technical Feature

THE MCE IS a well-built, rugged car which makes no compromises on quality and which is as fast around a course as any car in current production. During five and a half hours of track testing no part fell off of it or failed, even though the testing inadvertently included two rather brutal crack-ups. MCE has designed and produced an RC model based on the premise that the car must finish a race in order to win it.

The MCE's basic layout is similar to many RC cars: sidewinder-mounted engine which drives the rear axle through spur gears and a sliding pillar front suspension, all held together with a deep aluminum-channel chassis, three inches wide and two inches deep. A firewall just aft of the cockpit provides part of this car's excellent radio compartment sealing. Fasteners are aircraft quality with self-locking nuts.

Front suspension pillars are constructed to provide Akerman effect steering and the front wheels turn on bronze bushings. Massive alumimum carriers provide ball bearing support for the rear axle. By placing the ball bearings at the centerline of the rear wheels, axle bending in case of a bad crack-up is retarded.

The car's most unique feature is its cam-actuated brake assembly. External adjustment can be made to suit individual driving preference and type of course simply by adjusting the setscrew holding the cam onto the shaft.

The driven cone of the clutch is carried on a bronze bushing on an extension of the engine crankshaft. This arrangement provides excellent support. After five and a half hours of very hard driving, the driven cone of the clutch showed no observable wobble. An Enya 19 engine we used provided more than sufficient power and operated smoothly throughout the rpm range. Other vital characteristics are found in Table I.

To track test an RC car, it is run on various surfaces under various conditions to determine its durability and handling characteristics and to evaluate any unique features. Three types of courses, the 20-ft. radius circle, the

(Continued on page 87)

TABLE I

Weight—6.4 lb.
Wheelbase—11 7/8 in.
Tread front—9 in.
Tread rear—9 3/16 in.
Rear tire width—1 3/4 in.
Rear tire diameter—3 3/16 in.
Front tire width—1 5/16 in.
Front tire diameter—3 in.
Front suspension travel—3/16 in.
Drive train
  16-tooth pinion
  96-tooth bull
Center of gravity (as tested)—4 1/4 in. forward of rear axle
Radio compartment sealing—excellent
Bearing material
  Rear axle—ball bearings
  Clutch—bronze bushing
  Front wheels—bronze bushing
Wheels—five-spoke aluminum

THIRTY EIGHTH

IN A SERIES

HOWARD McENTEE

Getting Started in RC

Suggestions from the Pro's

THE PROFESSIONALS in the modeling field—the hobby dealers and RC manufacturers—should have definite ideas on what's best for the RC beginner. For their suggestions, **AAM** contacted some 20 people known to be active RC fliers, as well as being leaders in marketing and retailing RC plane kits and equipment. Despite followups, only four answered, but their worthwhile comments follow.

Carl Goldberg referred us to the beginner RC information in his catalog, which he obviously has given a lot of thought. He recommends that the beginner get into RC with a plane of modest size, equipped with rudder, elevator and engine throttle. The plane should be flown with rudder only at first, until the technique is learned. Other controls may be brought into use once the flier develops the desired automatic reflexes. Carl notes that proportional with its natural and logical control movements is much to be preferred over escapements or other elementary control systems. He feels the plane should be of moderate size because "the smaller models bounce better," emphasizing the fact that most beginners are going to have a goodly proportion of hard landings (or worse!).

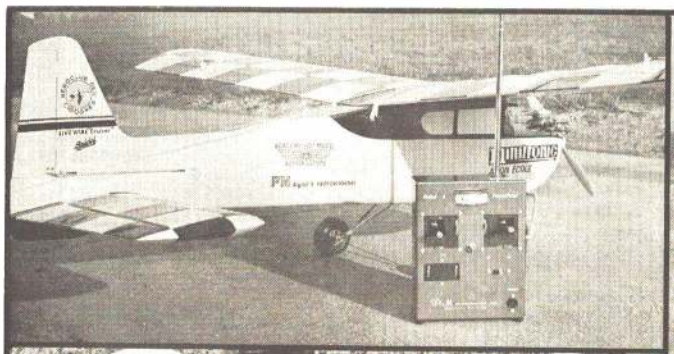
Carl suggests that the beginner avidly read the model magazines as well as one or two RC books. Among others, he recommends *RC Primer,* by H. G. McEntee, and *How to Build RC Models,* by William Winter. For equipment, Carl recommends single-channel pulse apparatus, which may be used either for rudder-only or adapted to Galloping Ghost, and with superhet receiver only (Ace Pulse Commander systems and World Engine Digit Migit mentioned specifically).

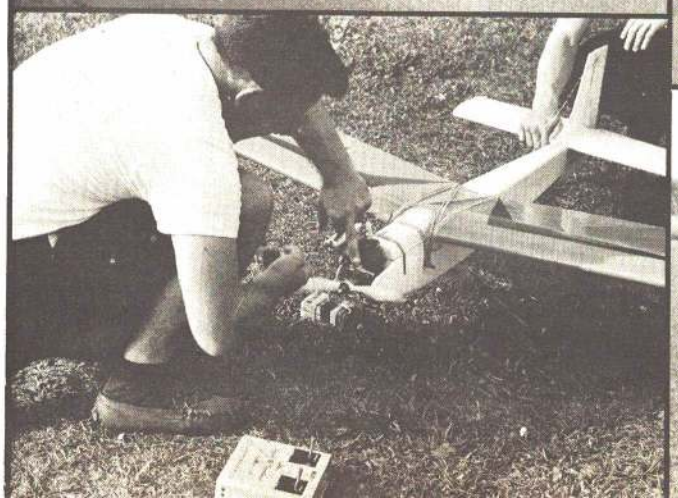
Several of his kit planes are well-suited for the beginner: Junior Falcon, ½A Skylane and Ranger 42. These planes have been flown with full house propo (rudder, elevator, ailerons and throttle), but such installations are definitely not for the beginner!

Another manufacturer to answer our request was Jack Stafford, who specializes in top-grade RC scale kits. Noting that he has no trainer in his line and is therefore not biased in this area, Jack usually recomends that a beginner buy a Lanier plastic job, use a Veco 50 or 61 engine and four-channel radio, and get an experienced pilot to help him out. Jack does not recommend: small engines, small planes, going it all alone, less than four-control digital radios, scale models.

Glen Sigafoose, boss of the well-known Sig Manufacturing Co., Inc., remarks that Ace Radio Control is doing a fine job of supplying top quality single-channel equipment for those who have neither time nor inclination to spend $300 to $400 on equipment. He points out that, once a modeler has become adept with this equipment, he can do a creditable job of flying if it is matched to a suitable model. He mentions Goldberg Jr. Falcon, ½A Skylane, Ranger 42, deBolt Cub and Champ, Andrews H-Ray and similar craft. Sig Mfg. has a line of similar planes such as the RC Sport, DH Beaver, Stinson L5, Relic, Stits Flut-

(Continued on page 85)





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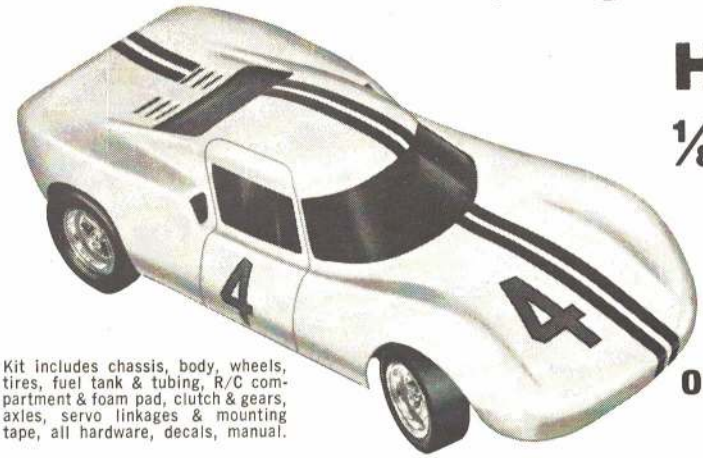
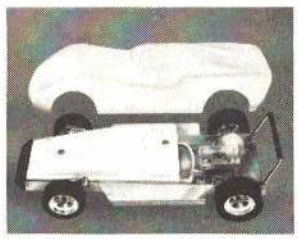


Kit includes chassis, body, wheels, tires, fuel tank & tubing, R/C compartment & foam pad, clutch & gears, axles, servo linkages & mounting tape, all hardware, decals, manual.

Heathkit "Spectre" 1/8 scale R/C car kit

only $49.95*



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Other Features Include a high impact plastic body . . . coil spring suspension . . . a dirtproof, oilproof box inside to protect your R/C equipment . . . locking hardware. And the "Spectre" comes complete with everything you need except engine and R/C equipment . . . there are *no* extras to buy or make as with many other R/C cars.

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Kit GD-101, R/C car only, 8 lbs. **$49.95***
Assembled GDA-101-2, Veco .19 engine, 1 lb. **$29.95***

Heathkit 3-Channel R/C System

only $129.95*

The Ideal System For The "Spectre" . . . reliable digital circuitry gives you interference-free operation. Powerful transmitter with pre-assembled RF section has trim controls that leave sticks always centered. Receiver is housed in a virtually indestructable nylon case and weighs just 2 oz. . . . measures just 2 3/32" L x 1 3/16" W x 1 3/32" D. Double-tuned front end, RF amplifier, dual AGC and ceramic IF filters assure peak performance. System includes 2 servos having 2 linear and 1 rotary output each for extra versatility. Rechargeable nickel-cadmium battery packs in both transmitter and receiver with built-in charger.

Kit GD-57, transmitter, receiver, 2 servos, batteries, charging cord, switches and soldering iron, (specify, 27 MHz, 53 MHz, or 72 MHz — 72 for planes only), 11 lbs. **$129.95***
Kit GDA-57-1, transmitter, battery, charging cord, (specify freq. desired), 5 lbs. **$54.95***
Kit GDA-57-2, receiver only, (specify freq.) 1 lb. **$34.95***
Kit GDA-19-4, 1 servo, 1 lb. **$21.50***

Best-Buy 5-Channel R/C . . . Heathkit GD-19 only $219.95*

• Powerful transmitter has pre-aligned & assembled RF circuit • Kraft sticks with thumb lever trim adjustment • Flat-pack rechargeable receiver & transmitter batteries • 2.3 oz. receiver has ceramic IF filters for sharp selectivity • Four servos • Choice of 5 frequencies in each of 3 bands. Includes soldering iron. 11 lbs.

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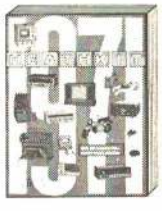
• Measures RPM at any rotating device . . . propellers, gears, flywheels, shafts etc. • Two ranges — 0-5000 & 0-25,000 RPM • 3% accuracy • No direct connection — uses reflected light pulses — can't load engine • Unlimited uses in R/C modeling — needle valve adjustments, comparing fuels and glow plugs, indicates power loss, shows peak in RPM you can't hear. Fast, easy assembly • GD-69, 1 lb.



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Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."

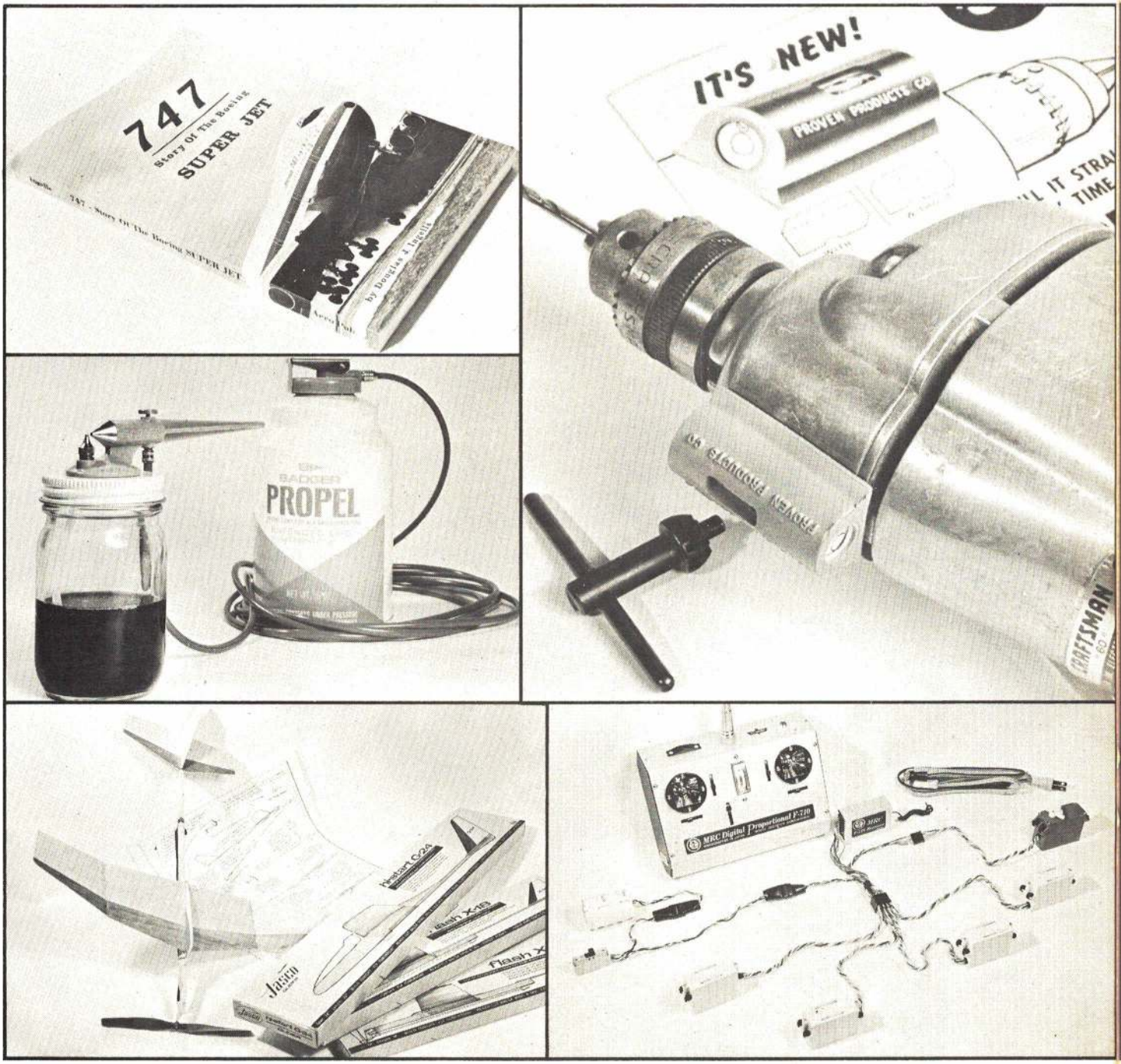
FRANK PIERCE

Aero Publishers, Inc./747. 272 pages of data on everything you could ever want to know about Boeing aircraft, from Bill Boeing's first flight in a Curtiss Hydroplane up through the Jumbo Jet. Planes and the people who built them. Paperback, $7.95; hardbound, $12.95. Aero Publishers, Inc., 329 Aviation Rd., Fallbrook, Calif. 92028.

Proven Products Co./Drill-Align. Ensure accurate 90-deg. cutting even with hand drill! Mounts on any drill, contains two spirit levels for horizontal and vertical orientation. With mounting cement, $4.00. Proven Products Co., 19644 Ventura Blvd., Tarzana, Calif. 91356.

Badger Air Brush Co./Mini-spray gun. Lightweight for small scale models or touch-up, gun provides small controllable spray pattern. With long-lasting 15-oz. compressed air supply, $9.00. Badger Air Brush Co., 9201 Gage Ave., Franklin Park, Ill. 60131

Jasco/Beginner's free-flight and glider. Quality for beginner with complete but simple instructions, kits employ many simplified pro features for successful flying. Present line has two gliders, two rubber jobs. Prices range



from $ .69 to $1.98. Frank Zaic, Jasco, Box 135, Northridge, Calif. 93124

MRC/F-710 Digital system. On 27 or 72 mHz, F-710 permits option of 5 frequencies on 27, 3 on 72. Change in field by plugging in optional MRC matched crystals. Increased RF efficiency with lower battery drain than previous models. Five channels available. With four linear servos, $320.; with four rotary servos, $300. Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, N. J. 08817

MCE/Complete RC racer system. Not a kit, unit has fully assembled production racer chassis, digital two-channel RC, molded plastic body, all other parts metal. With Porsche, Ford GT, or Indy turbine wedge body, engine, RC gear, $249.95. Model Car Enterprises. Available exclusively from Model Rectifier Corp., 2500 Woodbridge Ave., Edison, N. J. 08817

Dave Bloom/"Pro" Starter. Heavy-duty starter for model cars. Rubber insert on edge of flywheel revs engine via its flywheel. Series-connected starter button, heavy copper alligator clips for 12V battery. $34.95. Dave Bloom, 3211 S. 52nd Ct., Cicero, Ill. 60650

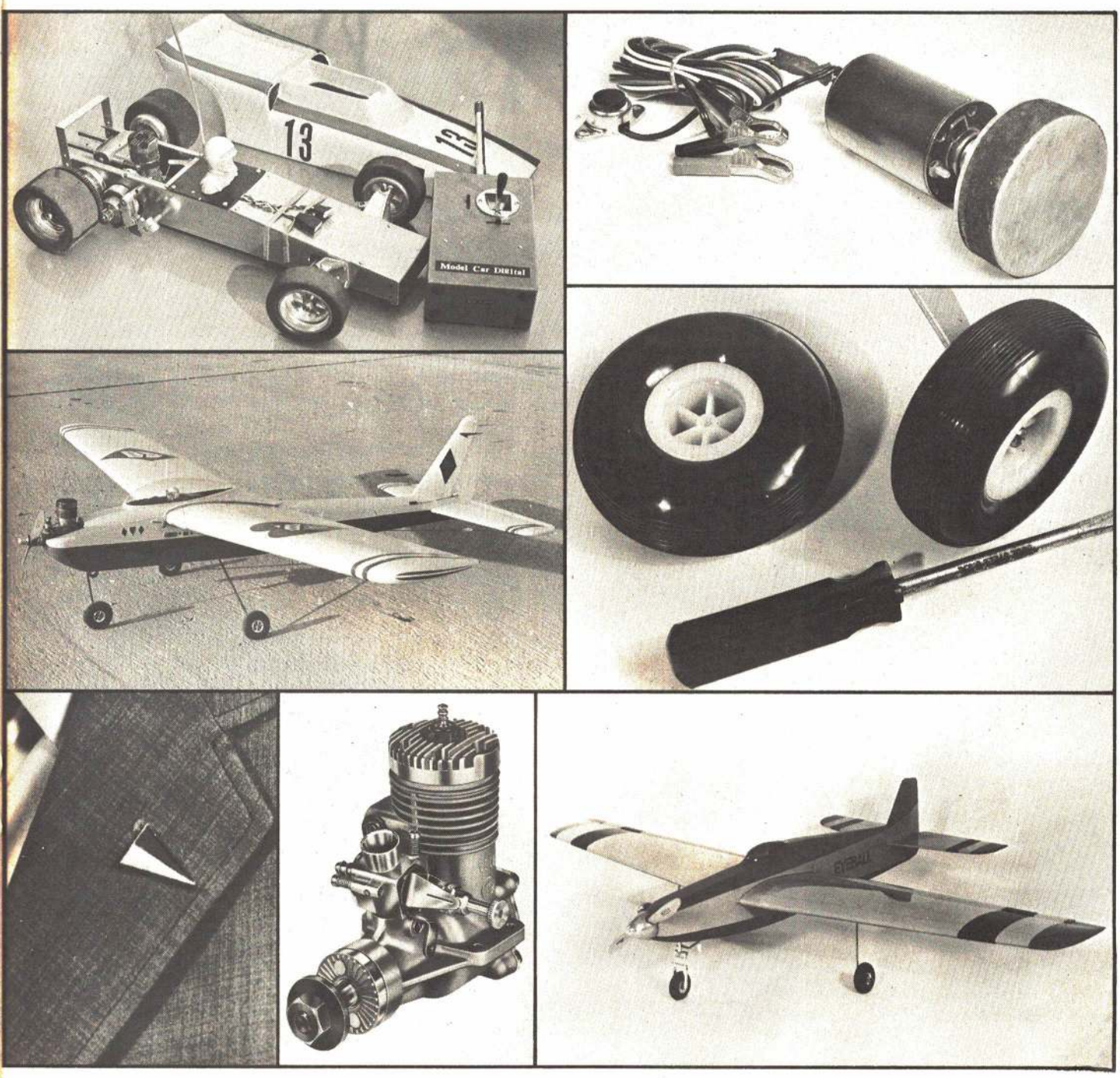
Lanier Industries, Inc./Comet. Restyling of old standby Comet produces Comet II. New access hatch and doublers to reinforce aft fuselage are some of the changes. $46.95. Lanier Industries, Inc., Briarwood Rd., Oakwood, Ga. 30566

Marco/RC lapel pin. RC'ers can have own status symbol. All current frequency colors available as miniature flag for lapel or tie-tack. Solid color for 27 mHz, two colors for 72 mHz and 6 meters. $2.95. Specify color to Marco, Ltd., 200 Prospect St., Lunenburg, Mass. 01462

K&B Mfg. Co./New Veco. 19 RC "Series 71" engine uses new hemispherical head with extra deep cooling fins. Machined surfaces eliminate head gasket. $30. With hi-performance "squish band" head, $33.50. K&B Manufacturing Co., 12152 Woodruff Ave., Downey, Calif. 90241

Bob Holman Plans/Scale wheels. Soft, shockproof wheel with plastic hub adds realistic touch to WW II scale models. From 2 1/2" to 5" diameter, from $3 to $6.95 per pair. Semi-pneumatic. Bob Holman Plans, Box 741, San Bernardino, Calif. 92402

J & J Industries Inc./New 60 RC. All-balsa precut construction, top-quality wood. Seven-hour building time. With full-house RC, Eyeball can do every AMA and FAI maneuver. Recommended for 60 engine. $49.95. J & J Industries, RC Model Aircraft Division, Box 202, Oakhurst, N. J. 07755



Ed Ellis Wins

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APRIL 1971

MODEL AVIATION

Official magazine

A.M.A. NEWS

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

RC Modeling Event of Year Slated for Pa. in Sept.

The Commission Internationale de Aeromodelisme (CIAM) of the Federation Aeronautique Internationale (FAI) has accepted the proposal of the Academy of Model Aeronautics to organize the 1971 RC World Championships in the United States of America. The event is scheduled to be held next September 15-19. Location is the Central Bucks County Airport near Doylestown in the state of Pennsylvania, about 50 miles southwest of New York City.

FAI Class F3A Aerobatics will be flown in the World Championships competition. In addition, during surplus time, FAI classes of Pylon Racing and Thermal soaring will be flown. An international RC Exposition will also be held, featuring displays and demonstrations of models, engines, RC equipment and accessories.

The site is near the scene of many past National Model Airplane Championships which were held in the Willow Grove area in 1969, '65, '61 and other years. Nats veterans are familiar with the area motels and restaurants—these are expected to be filled with modelers from all over the country next September.

Many Locations Surveyed

The site is one of about twenty which were considered for the event. For several months it appeared that Norfolk, Va., was to be the location, but problems developed concerning site availability so the AMA committee had to look elsewhere. Another Virginia site, nearer the Washington area, was also in the running but lost out due to cost and travel factors.

In the final analysis the site that was selected provided the best combination of a dozen factors, only one of which was its suitability as a flying site. Contestant and supporter accommodations were an important factor as was the cost involved. In fact the cost and income factors dominated all others since the operation of a World Championships requires a major financial investment.

Several military installations, including nearby Willow Grove Naval Air Station, were ruled out due to poor income potential—it was not possible to charge for parking or general admission, vital sources of revenue. In contrast to most AMA meets in which contestant fees finance the event, FAI requirements concerning entry fees, food, and lodging require a substantial subsidy on the part of the host country.

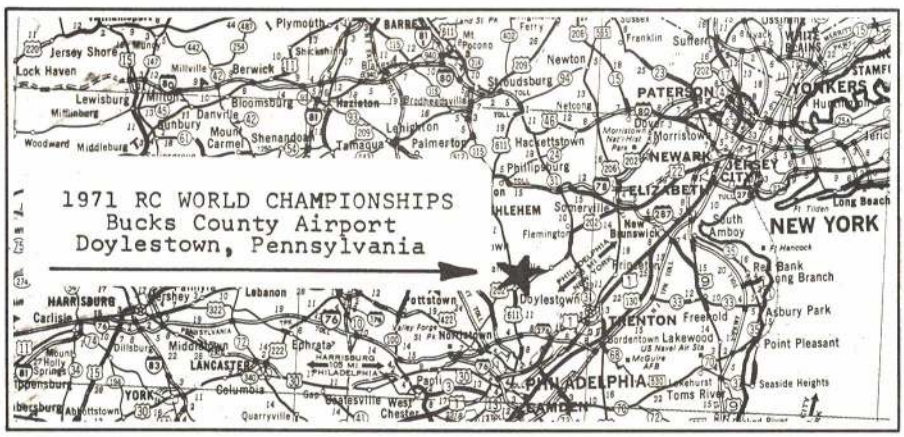
At Doylestown the enthusiasm and cooperation of the airport operator, **Mrs. George Lemmon**, produced the necessary combination of all factors. In effect we have been given the airport for the contest period, to operate as necessary. This includes use of hangars and grounds, plus parking and admission control.

The site is small compared to those typically used for other major U.S. RC events, but this will be an advantage in control and compact operation. Two flying circles will be provided on the airport's single runway, and a close-by RC Exposition will be provided in the hangar area.

Operation Friendlift

Because most of those who participate in FAI RC World Championships live in or near Europe, a special transportation arrangement has been made available by the AMA to assist those who must cross the Atlantic Ocean to participate. The arrangement is called Operation Friendlift and is intended to reduce the cost of travel for competitors and their families, friends, helpers, and observers.

This special travel arrangement is the primary factor which has enabled the World Championships to be held in the U.S.A. Without it insufficient European participation would have resulted, preventing international approval of the event in the western hemisphere. Through the arrangement, supporters using it are sharing the cost of subsidizing European teams. (turn page)



AMA Reservations for World Championships

Members of national aero clubs (AMA in U.S.A., MAAC in Canada, equivalent organizations in other countries) may obtain a special package reservation for the 1971 RC World Championships. The package is for two people to share: one motel room (with two double beds), parking at WC site (1 car), two admissions to site, two admissions to RC Exposition, two special identifications, two program booklets, two souvenir packets. Package cost is $30 for one day, plus $20 for each additional day.

Accommodations will be at a major hotel in the World Champs vicinity. The package arrangement will assure that modelers will be lodged together rather than booked at random, so that they may contribute to and share the World Championships atmosphere. Because of the anticipated demand, however, early reservation is recommended to avoid booking at alternate motels if an overflow situation develops.

The World Championships schedule provides for practice flying on two days, Wednesday and Thursday, September 15-16; competition flying on Friday through Sunday, September 17-19. Requests for reservations should specify which nights are desired for lodging. Payment for package reservations must be made in advance, in full, no later than August 31, 1971. Checks or money orders should be made payable to AMA (RC/WC Package) and sent to Academy of Model Aeronautics, 806 Fifteenth St., N.W., Washington, D.C. 20005.

Operation Friendlift has been made possible by the enthusiastic support of many U.S. modelers who are contributing funds and hard work to make this a most pleasant and exciting RC World Championships experience for all participants. They look forward to this opportunity for repayment of many kindnesses to U.S. modelers at past World Championships. Here's how Operation Friendlift works:

AMA, as the FAI aeromodeling representative in the U.S., is currently accepting reservations and fees for seats on a chartered jet airliner. AMA is also accepting Operation Friendlift reservations and fees for accommodations at a headquarters hotel near the site.

The charter flight, by Boeing 707 or Douglas DC-8 jet arranged with a major U.S. airline, is scheduled to depart from Paris on Tuesday morning, September 14, to land at London for additional passenger pickup, then proceed to New York for arrival there the same afternoon. The flight will return the following week.

Competitors on official teams using this flight will pay a special round-trip fare of only $50 per person, to and from either London or Paris. Seats are also available to supporters: mechanics, friends, family members, model press representatives; all of whom must be members of FAI national aero clubs (equivalent to AMA in each country). The supporter round trip fare is $150 per person.

Accommodations at the World Championships headquarters hotel will be provided for six nights, including meals. Competitor entry fee payment by a national aero club will automatically obtain accommodation and meals. Supporters who use the charter flight may obtain similar accommodations for the six-day period.

Charter flight and accommodations reservation forms for supporters, including site maps and hotel brochure, are obtainable from the national aero club of an FAI member-nation or by writing direct (via Air Mail) to the following address: FAI RC/WC Forms, Academy of Model Aeronautics, 806 Fifteenth Street, N.W., Washington, D.C. 20005.

Following the contest, which will conclude on Sunday Sept. 19, there will be several days without competition activity. Arrangements will be made, however, for sightseeing through conducted tours or individual visits. Competitor and supporter meals and accommodations for this period following the contest will not be provided, but the AMA will assist with special arrangements, as follows:

a. Those who wish to be guests of U.S. families will be housed at no charge, to the extent that such accommodations are available.

b. Those who wish to stay at a U.S. hotel will be assisted to obtain the minimum cost in accordance with the class of accommodation desired.

The AMA estimates that approximately 100 seats on the charter flight will be available for supporters. A similar number of accommodations at the headquarters hotel will also be available. **Note: The arrangements described apply to those able to use the chartered jet—different arrangements are being made for those coming from countries other than Europe. Team entry fees are the same but supporter fees for accommodations will vary in accordance with lodging arrangements.**

Whereas supporters who use the charter flight obtain a package arrangement which includes air fare, lodging and meals, other supporters who do not use the flight (up to four for each team, with names and fees to be submitted with the official team entry form by the national aero club) pay only for lodging —food is not included. All other aero club members have still another arrangement, as described on page 55.

First RC Championship in America

It has been sixteen years since an aeromodeling World Championships has been held in the U.S.A. (Free Flight in 1954), and this is the first time an RC World Championships will be held anywhere except in Europe. AMA officials are planning to make this the greatest RC event ever held so that anyone who is able to participate will enjoy a grand and happy experience.

At the FAI meeting in Paris, fourteen countries indicated intent to send teams. These, plus others from North and South America and various other countries outside of Europe, indicate a big World Championships turnout of twenty or more teams. Enthusiasm in Europe is very high, and a big crowd of supporters, in addition to team members and their families, is expected.

RC World Championships Fund—Contributions Tax Deductible!

It is estimated that $20,000 will be needed to cover obligations necessary to host this event. This in itself is not an unusual amount—the annual National Contest typically costs AMA about $35,000. But at the Nats there are usually well over a thousand modelers to pay entry fees, plus about fifty sponsors. The World Championships, however, involves fewer than 100 contestants, and there are specific limitations on entry fees, plus obligations for lodging and feeding the contestants. Even with sponsors, therefore, the income factor for a World Championships is much less than that for a Nats.

To offset this problem an AMA RC World Championships Fund has been created. Contributions to this fund up to press time were over $1,000. This is expected to be doubled by money collected from the raffle at the annual **Toledo RC Conference** (Feb. 27-28).

This raffle typically produces about $1,000 and the **Toledo Weak Signals RC Club** has announced that proceeds will go to the RC/WC Fund. If this year's raffle is equally successful, the RC/WC Fund will have been helped considerably. Hopefully other RC conferences, trade shows, or expositions will also have such Fund projects. In fact the, **DC/RC Club** kicked off the fund last December by donating $150 initially and then another $55 shortly after—all from enthusiastic responses from two club meetings.

In the end it is expected that the contributions from clubs and individuals will determine the success of the World Championships effort—the basic goal is $1.00 per adult AMA RC member.

Most contributors have expressed similar sentiments: they recognize that a World Championships in the U.S. will be the greatest RC event ever and the best opportunity we've ever had to promote RC and model aviation to the public. They also typically indicate a desire to give something back to a sport and hobby which has provided them with many years of pleasure.

The DC/RC Club goes so far as to challenge all other clubs to match or beat their contribution. Here's what they said in a recent newsletter:

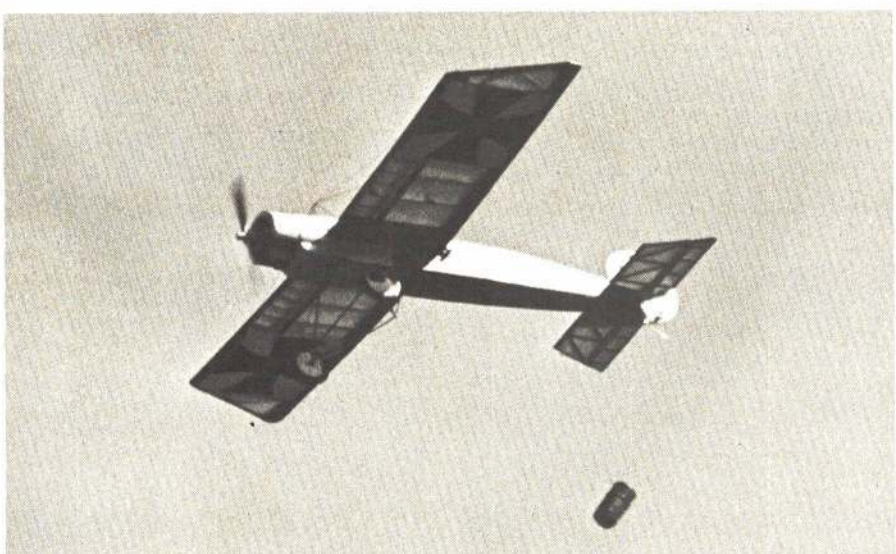
"The Board (DC/RC) has now embarked upon additional plans to provide additional contributions to the AMA World Championship Fund. The Board expects members with ideas for fund raising activities to get in touch with them. In the meantime, the following channels for increasing this fund are under consideration:

1. To encourage members to contribute kits, engines or other substantial articles of new RC gear to the club for raffling at the monthly club raffles. The proceeds therefrom to be given to the fund.

2. To encourage individual members to make direct contributions to the Fund, either direct or through the Club.

3. To commit the proceeds of our annual March AUCTION to this Fund.

4. To form a "WORLD CHAMPS BOOSTER" group. An immediate effect would be to publicize direct contributions to the club for the fund, or equipment donated for raffle—all in the amount of $5.00 or more. (Note: Contributions may also be made anonymously—if desired.)



It's bombs away for Paul Lambert's RC Eindecker in the 1910 Air Races last fall. The event later was a color feature of the St. Louis Globe-Democrat's Sunday Magazine. Bob Mattes photo.

Memo from AMA President John Clemens

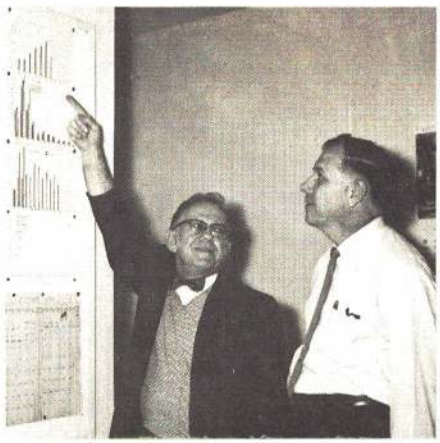
Please know that being elected president of the Academy of Model Aeronautics brings on mixed emotions! Of course the strongest of those emotions, here at the beginning of my term in office, is one of great pride and gratefulness at the endorsement of those who voted for me. Close behind that emotion of prideful delight is the awareness that I shall be on trial in the eyes of those who chose to vote for one of the other worthy candidates. Both of these emotions dictate that I prove myself through performance. I have every intention of doing this. My sincere thanks for your faith.

Looking Ahead: The new AMA Executive Council which will direct the destinies and activities of AMA is made up of a strong, experienced and very aware group of gentlemen; some are "hold-overs" and some eager new office holders. The HQ staff (AMA's "business bunch") are experienced and are in new larger and more convenient quarters.

I have no worry that the membership will be alive and active; The membership (over 32,000 in 1970) has shown their interest and awareness with a whopping 20% total vote in the election. This is the greatest ever, and far ahead of the usual 10% vote realized by organizations of a similar type.

As icing on our usual broad cake of progressive activities, the United States through AMA this year will be proudly hosting the RC World Championships!

For Progress—AMA will need your thinking and doing: To be a good member, learn who your district leaders are, offer suggestions and aid, and be a part of one of the nicest "fun things" that our wonderful country has to offer.



Newly elected AMA President John Clemens, left, reviewed statistical charts with Executive Director John Worth when he visited AMA HQ in January. Interesting chart Clemens is pointing to shows tremendous membership growth, from 16,536 in 1965 to 32,157 in 1970. Another record seems to be in the making, with 22,812 already recorded at the year's start. AMA clubs show big gains, too.

AMA as Seen by John Patton, Outgoing President

I believe our Academy of Model Aeronautics has come a long way toward reaching the status we want it to have. The old image is being replaced by a much more mature one which commands the kind of respect and attention that is due this sport of ours.

During the past two years our membership has grown from 25,000 to 32,000. We've survived several attempts at encroaching on RC frequencies. Our Delta Dart beginner program has been well received, particularly by the U.S. Navy. Our bid for the RC Aerobatic World Championships in 1971 has been accepted by the FAI. Aeromodeling magazines are now filled with constructive information, without the bitter controversial articles that once took up valuable space.

A great measure of this change is due to the efforts of AMA clubs and individual members whose continued display of good sportsmanship steadily builds our image. The unselfish way our members pitch in to help, especially the youngsters who are just being exposed to aeromodeling through the Delta Dart program, is truly inspiring.

There are two groups that I would especially like to commend, as I believe they deserve the most credit for the recognition and respect our AMA is now beginning to enjoy:

First, our own AMA HQ gang headed up by Executive Director John Worth, Technical Director Frank Ehling, Publications Director Carl Wheeley, Office Manager Earl Denny—plus all their assistants. I'm sure we could not find a more sincere, devoted or unselfish group thinking and working AMA 24 hours a day.

The other group is comprised of our elected volunteer national officers and their appointed people—Contest Coordinators, Associate V.P.'s, Contest Board members, etc.—all of whom give so much time and effort. Each of our Vice-Presidents I have found to be a man of outstanding character and sincere devotion to a common cause, the advancement of aeromodeling and our AMA to make our sport more enjoyable and more rewarding for all.

To all of these people I say thanks for making my two years as AMA President most enjoyable. I am sure that our new President, John Clemens, will lead us to even greater accomplishments.

John Patton (right), 1969-70 AMA President, conversing at last year's Nats with Murry Frank (left), former Contest Coordinator, current Dist. VIII AMA Vice-President, and Bob Lopshire, AMA Public Relations Director.

Why Join a Model Club?

Having heard this question many times, Al Culver decided to try to answer by stating what he feels are the advantages and disadvantages. The following is reprinted from The Balsa Sheet, newsletter of the Pocatello Glue Angels (Idaho) of which Culver is Senior Advisor. Read what he says, and if you agree as we think you will, look in the February American Aircraft Modeler for the AMA chartered club nearest you.

First let me say that I started building models in 1942, but it was not until 1951, when a telephone installation brought a man named Fred Foster to our house, that I was introduced to the Boise Balsa Butchers. I can honestly say that I learned more about model airplanes in the next two years, while I was a club member, than I had in the nine before or the sixteen since.

The nicest part was being saved from mistakes that others had made and which, otherwise, I surely would have made. This is probably the greatest advantage club participation has had for me, and I can find no single or cumulative disadvantage to outweigh it.

Now for a disadvantage: contest officiating and club work cuts into building and flying time. I agree that this is so, but every time I look at a kit, or piece of equipment that so many take for granted, I see one of the by-products of contests—you will find very few new innovations being marketed that didn't win or help to win.

How about flying in the contest without belonging to a club and helping to run them? Well, who's going to put them on for you when you wear out the good old workhorses?

Why should you go to the work and expense of belonging to a club if you don't fly in contests? Have you ever lived in a city where the sale of model airplane cement was against a city ordinance, or parks and schools were off limits to models, or no hobby shop could afford to stay in business? Have you tried as an individual to eliminate these problems? Solidarity of the area modelers is the only answer.

Clubs develop "in" and "out" groups that cause internal strife. This does happen when activities drop off and poor leadership is elected, but human nature has a basic cure: just have more fun, and before long everyone will be stampeding to get into the act. Ever watch a bunch of fishermen converge on a hole where you just caught a big one?

A club doesn't have enough to offer you. This is true—a club has nothing to offer anyone. The guy who goes to a club meeting, goes homes, flies in a contest, takes his trophy home, etc., soon loses interest because the challenge is met. But did you ever watch the guy at a club meeting who is trying to promote an event? You can almost bet that he will be made event director. He will go to the contest and run the event to the best of his ability and go home totally beat—but he'll have had the most self-satisfying time of anyone. No, the best you can get out of a club is only a portion of what you put in; the rest is what you get in self satisfaction and self approval.

If there is a club in your area, join, support and participate in its activities. If there is none, find two or three other modelers and start one!

AMA News Bits

CL Scale-Racing Twist

Last September the **AMA chartered South Jersey Aeromodelers** ran a **Control Line Goodyear Challenge Meet** which featured events for standard AMA Scale Racing (Goodyear) and a special race for similar models but with a fuel tank limitation of one ounce, 100-lap heat races and a 200-lap feature—no requirement for pit stops. **Contest Director George Hubschmidt** said that this special race had several diesel-powered entries, indicating that it would be an excellent training ground for U.S. FAI Team Racing if the concept could be widely accepted.

Model of the Month

The award for this popular feature of the **AMA chartered MARKS Club,** Rialto, Calif., was won "hands down" in October by **Bob Kunce,** said the **MARKS Newsletter.** Kunce had a seven-foot (fuselage) radio model of a Russian MIG jet. The newsletter didn't indicate the power source, but the location of the 16-oz. fuel tank at the center of gravity is interesting. If it were placed at the nose of the plane, the C. G. would be moved two feet forward with a full tank! The solution Kunce employed was to transfer the fuel by pressure from the big tank to a much smaller one in the nose. The airplane was very successfully flown on the Saturday morning following the club meeting.

HL Duration Times Three

That's multiplication were's talking about—the formula applied by the **AMA chartered Minneapolis Model Airplane Club** to equate HL Glider with other FF model types (Gas, Rubber and Towline Glider) which typically have longer flights; the purpose was to have a contest for Juniors only with these events combined. We dont know whether the three-to-one ratio was too much for real equalization, or whether there were just some good HL flyers present—first, second, fourth and fifth were taken by HL Glider flyers, while third place went to a Towline Glider pilot.

Keep RC Linkage Free

Shell Portnoy makes an observation in **Glow Plug,** newsletter of the **AMA chartered Middle Tennessee RC Society,** Nashville, worth repeating and which—if his advice is followed—may save many an aircraft from disaster. Shell feels that many modelers, particularly newcomers, are misled into thinking they can get away with a little binding in the linkages between servo and control because of the three to four-pound thrust of most servos—believed to be sufficient to overcome a little drag. "I don't go along with this kind of thinking," Shell said. "A little binding here and a little binding there is all going to add up to completely losing the transmitter's signal, and then you are going to blame the crash on radio failure."

RC Pilot Qualification

The purpose of the October Executive Meeting of the **AMA chartered Valley Forge Signal Seekers** (Pa.) was safety, according to the club's paper, **Hear Ye.** The concern was with improved spectator control, the unknown piloting ability of new club flyers (and visitors) and the sometimes careless habits of experienced flyers. The meeting took action on all of these areas, but the one which particularly attracted our attention was the formation of a **Flight Qualification Committee** responsible for judging the flying ability of members and non-members, rendering all possible assistance to those who need help, and determining when the individual has learned sufficiently to control his aircraft in a safe manner.

The committee will be a large one, made up of the most proficient and active flyers, so that there should always be one or more of its members present at nearly all flying activity. All "qualified" flyers (who observe the club rules and demonstrate controlled takeoff, flight and landing) will be provided with identification which then allows solo flight without a committee member's presence. The club stresses that no aerobatic flying is necessary or wanted for qualifying—only a safe flyer.

HL Glider Finish

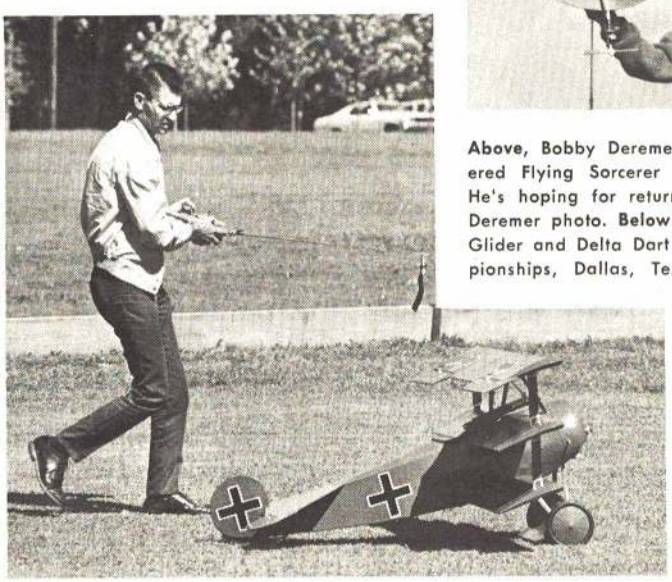
Lots of ordinary household items lend themselves well to model airplane use—aluminum drink cans, wire coat hangers, etc. And we read in **The Satellite,** newsletter of the **AMA chartered San Valeers MAC** (Calif.) that Ajax scouring powder makes an excellent rubbing compound for HL Gider wings. Should give a super slick finish.

Unbelievable!

A zillion to one chance are the odds **Jack Perrilla** gives for a recurrence of the freak, almost hilarious, accident involving well known RC aerobatic flyers **Jim Martin** and **Tony Bonetti** when they were putting in a demonstration flight at the October club contest of the **AMA chartered Rockland County RC Club** (N.J.). We don't glory in reporting airplane fatalities, but this one we couldn't pass up.

The club' paper, **RCRC Flyer,** reports it this way. "Both aircraft were taken out to the runway, fired up, checked, and both rolled away together on takeoff. Bonetti rolled his aircraft to inverted, and you could see his gear retract. Martin remained upright with his gear still down. As they flew away in the distance," reported Perrilla, "it looked as though Bonetti's plane climbed up into Martin's, and would you believe that the planes locked together belly to belly? They tried every trick they knew to get separated, but both ships

Another photo from the St. Louis 1910 Air Races, below, shows test pilot James House taxiing Bob Kurt's big Fokker DR-1. O.S. 80-powered, it is a fourth the size of the prototype. **Globe-Democrat** photo by Dick Weddle.



Above, Bobby Deremer III with Cox .02-powered Flying Sorcerer built from AAM plans. He's hoping for return from OOS flight. Bob Deremer photo. **Below right,** winners in Jr. HL Glider and Delta Dart in the Southwest Championships, Dallas, Tex. Murry Frank photo.

Below, President's Award to the New England RC Modelers was presented to Harvey Thomasian by Stu Richmond, outgoing president, at the club's last meeting for 1970. Thomasian is AMA Dist. I's RC Contest Board member.

plunged to the deck still locked together in a death dive and totaled out."

Think that's bad? How about this: both of the airplanes were beautiful "Eyeballs" owned by Jim Martin—out two models in just one crash!

Don't Demotivate!

When the call goes out for help from the club's Board of Directors, members must respond positively, said **Palmer Cramer,** past president of the **AMA chartered Fresno Radio Modelers** (Calif.) in the **Watts New** monthly paper. He wasn't complaining about the large number of members who have devoted their time to the success of the club; to the contrary he commended them. His main concern was for continued support by the members of programs and activities drawn up by the club's new officers and Board of Directors. The new officers are an enthusiastic bunch, he said. "It's up to us members to insure that their enthusiasm doesn't turn to disenchantment."

Club-Owned Field?

A recent issue of the **Newsletter** of the **AMA chartered Birmingham RC Club** (Alabama) tickles its readers with this possibility. Editor **Jim McNeil** speculates that, presently, 20 to 30 acres could be bought for $10,000 to $15,000. With 50 club members to pay off the debt in a period of 20 years, he figures that the annual payment might not be much more than club members currently are paying for rental property. And if the club owned the land, it could also build a club house—block by block if necessary. McNeil credits **Bill Haywood** with the wisdom and foresight which led to the club's having become incorporated —an important first step in a project such as real estate ownership.

RC Display

Pathfinder Days in Fremont, Calif., provided the setting for acquainting the public with the activities of the **AMA chartered Southern Alameda County Radio Controllers. Steve Horton** directed the setting up of a nice display booth for several typical multi's, a 12-ft. KA6 sailplane and a Sopwith Triplane—a real hit with the crowd. Information brochures were given to the public, directing them to the club's flying field for first-hand viewing of RC flying excitement.

AMA By-Laws Revised

More than one official AMA publication is authorized, and procedures for nomination of AMA officers are to be specified by the Executive Council, according to by-laws revisions ratified by AMA Leader members (including Contest Directors) in late 1970. The revision for official publications received a vote of 658 in favor to 36 against, while the revision for nomination procedures was accepted by a vote of 668 in favor, 24 against.

Publications. The council sought a by-laws revision as a result of a question raised concerning the nature and relationship of various AMA publications now being produced, in contrast with the by-laws which indicated that there was only one "official" publication. The council agreed that the three current monthly publications (**Model Aviation** section of **American Aircraft Modeler, Competition Newsletter** and **AMA Monthly Mailing**) were vital and should be regarded as official. The approved Article XII—Official Publications, as revised:

"There shall be one or more official publications of the AMA to be published regularly as directed by the Executive Council. The role of these publications shall generally be to serve as a vehicle to accomplish the purposes of the AMA. They may offer information of general interest to the AMA membership and shall be among the means by which official information is distributed to the membership. The official AMA publications shall be prepared and distributed under the supervision of the Executive Director. The number and nature of official publications shall be determined by the Executive Council. The Council shall also decide whether any such publication shall be provided as a direct benefit of membership (automatically, via dues payment) or supplementary (at extra charge)."

Nomination Procedures. The AMA Executive Council felt that the by-laws were vague and not very helpful in defining nomination procedure authority even though the current procedures, evolved over many years, were basically sound. A by-laws change was, therefore, approved by the council and ratified by the Leader member vote to note the existence of a procedures document and to require its publication in advance of each election. The revision to be added to Article IX—Nominations and Elections:

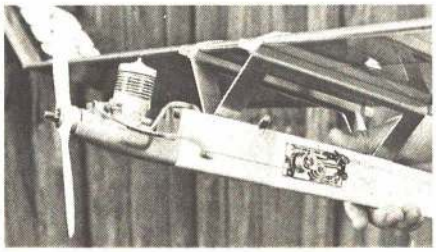
"Section 5. Nomination procedures shall be in accordance with an AMA Executive Council approved Official Nomination Procedures document and this document shall be published in the AMA general membership publication at least 90 days prior to the annual Nominating Committee meeting."

See the May 1970 "AMA News" section of **AAM,** page 62, for current Nomination Procedures.

Quarter Midgets Move West

Popularized by the **MARCS Club** in Ohio with the intent of encouraging newcomers to RC Pylon Racing, the basic concept is gaining a foothold in California, according to **The Modulator,** newsletter of the **AMA chartered Pioneer RC Club.** However, **Lou DeLateur** (new Modulator editor) prefers to call the event "Class A" in keeping with other AMA events using .15 engines, also to eliminate possible confusion by the public with quarter midget auto racing. The California club favors rules with minimum aircraft restrictions: 300 sq. in. minimum wing, .15 cu. in. engine, and required 15-second engine idle. Most of all, they don't want the aircraft re-

Super sleek FAI Power model by Dick Lyons is the fifth modification of his "Strutter" series. Photo below shows aluminum pylon struts, Seelig timer installation for engine shut-off plus auto stab, rudder. Rick Lyons photos.



Above, flex-wing RC model by Lance Patterson said to be fun both to build and fly, but elevators were ineffective. Photo by builder. Right, Bob Peck's Cox .02-powered Longster FF model held by Mrs. Peck. Bill Hannan photo.

Left, Gary Fries, 13, won three trophies with this ½A Galaxie, his first gas model (helper unidentified). Carl Fries photo. Below, a few members of the Muncie Controliners: Dick Ramey, Bill Dutchman, Rob Dutchman, Greg Brausa, John Fisher. Mike Eber photo.

quirements bogged down in "formula" restrictions. Eight entries partcipated in the Pioneer's Quarter Midget race last November, pretty good for a first time.

Hard Working CD

One of the busiest workers in the southwest is **Eddie Thomas** of the **AMA chartered Key City Prop Twisters,** Abilene, Tex. He was Contest Director for the club's approximately 20 meets in 1970 involving all kinds of activity—FF, CL, Indoor and RC. Photo submitted by **Jerry D. Farr** shows Thomas (seated) and **Don Smyth,** club president, during a recent FF contest.

Thomas is an ardent Free Flighter (who wins his share of hardware), but he is also seen at the Rat Race circle and indoors with a Paper Stick model. He's a terrific worker whose enthusiasm rubs off on all modelers he encounters.

Flying Wing Contest

Twenty-eight entries turned out for the **AMA sanctioned Northrop Flying Wing Contest** last November at the Los Angeles Model Airport (Sepulveda Basin). Those 28 entered about 70 models, all of them flying wing types, in four categories: FF gas power, towline glider, FF rubber & Jetex and Radio Control. Contest Director was **Carl Hatrak.**

Junior age flyers **Kelly Pardoe** and **Joel Rieman** outflew all covers to take first places in Towline and Rubber/Jetex. Does this mean that youngsters are better able to give the kind of thinking required for a new (to most modelers) subject? **H. A. Johnson** and **Jim Kelley,** both Open age AMA flyers, won first places in gas power and RC categories.

Delta Darts for Experts

Good gimmick employed by **Dave Linstrum** and the **AMA chartered Chicago Aeronuts Club** last December was a morning contest for "Souped-Up" Delta Darts, by self-proclaimed experts and an afternoon building session and contest for beginners, using the **HIAA Flyer** version of the **Delta Dart.** The morning experts stayed to help beginners build and fly in the afternoon.

The beginners' models were all stock **HIAA Flyers,** but the only requirements for the experts was the use of original covering, original surface outlines and original prop assembly. Use of lightweight wood, long motor sticks, pylons, multiple motors, multiple flying surfaces, sanding, and warping the prop were all permitted as was use of the expert's own Pirelli rubber.

Big Plane Pilots vs RC Pilots

Dale Webb discussed why he feels the full-scale airplane pilot usually doesn't immediately adapt to RC piloting in **Contrails,** newsletter of the **AMA chartered Charleston RC Society** (S.C.), and he's probably right. The important difference, he says, is that the pilot isn't inside the RC airplane to get the "feel" for flight by the "seat of the pants" as he does in the big ones. But with practice the RC modeler gets something akin to this "seat of the pants" method. He learns to feel the attitude, speed and direction of the plane at all times.

To the beginner, pilot of the "big ones" or not, this can take some time. First he has to "see" the attitude change, then determine what happened, which way the plane is going, which wing is down, and decide what corrective action is required. Then chances are he'll over-correct, and the whole process repeats itself. It's sure different from being inside the plane!

Melons at Taft?

Very likely according to a report in the **Satellite,** newsletter of the **AMA chartered San Valeers MAC.** Certain sections of the big field were being prepared for planting. But don't panic. According to **Ralph Prey,** "the City of Taft is very much interested in the modeler, and so we can expect support from the **Taft Chamber of Commerce** to help work out a suitable arrangement to continue flying at Taft."

Throttle without Elevator

That anonymous **Blue Jay** in **Fly Paper,** newsletter of the **AMA chartered Greater Pittsburgh Aero RC Society,** reminds us that elevator control changes only the attitude of the aircraft; thrust determines the rate of climb or descent. Point of this is that Blue Jay has witnessed on more than one occasion the kind of conditions of elevator control failure which resulted in crashes which might have been prevented with judicious use of high and low throttle. Like he says, a hot landing likely would be better than having the plane drop out of the sky.

CONTEST CALENDAR

Official Sanctioned Contest of the Academy of Model Aeronautics

March 7—Los Angeles, Calif. (AA) S.C.I.F.S. Kick-Off FF Meet. Site: Sepulveda Basin. W. Grote CD, 6508 Bobbyboyar Ave., Canoga Park, Calif. 91304. Sponsor: **Southern Calif. Ignition Flyers.**

March 14—Van Nuys, Calif. (AA) Valley Circle Burners FAI CL Meet. Site: L.A. Model Airport. W. Netzeband, Jr. CD, 580 N. Holliston, Pasadena, Calif. 91106.

March 14—Elsinore, Calif. (AA) Orbiteers FAI FF Meet. Site: Lake Elsinore. G. Howard CD, 2801 N. Arroyo Dr., San Diego, Calif. 92103.

March 21—Aurora, Colo. (A) MMM Monthly Indoor Meet. Site: Hinkley High School. G. Batiuk, Jr. CD, 3066 So. Upham St., Denver, Colo. 80227.

April 14—Van Nuys, Calif. (AA) Valley Circle Burners FAI CL Meet. Site: L.A. Model Airport. W. Netzeband, Jr. CD, 580 N. Holliston, Pasadena, Calif. 91106.

April 18—Phoenix, Ariz. (A) Spring FF Contest. Site: Pinnacle Peak. W. Morris CD, 7422 E. McKinley St., Scottsdale, Ariz. 85257.

April 24-25—Daytona Beach, Fla. (AA) Daytona Eagle-Beagle CL Meet. Site: Daytona Beach. H. Lambert CD, 1312 Gulfview Dr., Daytona Beach, Fla. 32014.

May 2—Tucson, Ariz. (AA) CCMAC Spring CL Invitational Meet. Site: Rodeo Park. T. Snow CD, 3408 N. 2nd Ave., Tucson, Ariz. 85704.

May 2—Wichita, Kans. (AA) 4th Annual Wichihawks Spring FF Rally. Site: 13th & Webb Road. M. Tallman CD, 3014 Exchange, Wichita, Kans. 67217. Sponsor: **Wichihawks.**

May 2—Hadley, Mass. (AA) Hampshire Showdown Air RC Races. Site: H.C.R.C. Flying Field. F. Mitchell CD, 290 Notre Dame St., Westfield, Mass. 01085. Sponsor: **Hampshire County RC'ers.**

May 8-9—Huntsville, Ala. (AA) 11th Annual Rocket City RC Meet. Site: Old Huntsville Airport. C. Scholefield CD, 2709 Briarwood Dr., S.E., Huntsville, Ala. 35801. Sponsor: **Rocket City RC Club.**

May 9—Van Nuys, Calif. (AA) Valley Circle Burners FAI CL Meet. Site: L.A. Model Airport. W. Netzeband Jr., CD, 580 N. Holliston, Pasadena, Calif. 91106.

May 15-16—Lafayette, La. (AA) Third Annual CL & RC Model Aviation Day. Site: Stutes Ford. J. Molan CD, P.O. Box 52344, Lafayette, La. 70501. Sponsor: Acadian RC Club.

May 15-16—Jacksonville, Fla. (AAA) Rebel FF, CL & RC Ralley 1971. Site: Imeson Airport. F. Carney CD, 1839 Loyola Dr., Jacksonville, Fla. 32218.

May 16—W. Suffield, Conn. (AA) Nor-East RC Air Races '71. Site: NCRCC Field. A. Simmonds CD, 145 Irene Dr., RFD #4, Vernon, Conn. 06086. Sponsor: **Northern Connecticut Radio Control Club.**

May 22-23—Layayette, La. (AA) Third Annual CL & RC Model Aviation Day. Site: Comeaux High School. J. Molan CD, P.O. Box 52344, Lafayette, La. 70501. Sponsor: **Acadian Radio Control Club.**

May 23—Gainesville, Ga. All South RC Airplane Water Carnival & Picnic. Site: Gainesville. L. Purdy CD, Oakwood, Gainesville, Ga. 30566.

May 29—Union, N.J. (AA) 17th Union Model Airplane CL Invitational. Site: Morrison Field. F. DeCicco CD, 53 Broadview Ave., Maplewood, N.J. 07040.

May 30—Chardon, Ohio (AA) C.R.C. "500" Pylon RC Races. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Ohio 44132.

June 5-6—Spencerport, N.Y. (AA) 12th Annual N.Y. State RC Championships. Site: Spencerport. T. Salvemini, Sr., CD, 6 Valley Ln., Avon, N.Y. 14414. Sponsor: **Radio Control Club of Rochester, Inc.**

June 5-6—Dahlgren, Va. (AA) National Capitol RC Tournament. Site: Naval Weapons Lab. B. Violett CD, 64 B, Rt. 1, Clarksburg, Md. 20754.

June 5-6—Lincoln, Neb. (AA) Lincoln Sky Knights 12th Annual Midwestern Open RC Meet. Site: Arrow Airport. R. Brimhall CD, 630 Broadview Dr., Lincoln, Neb. 68505.

June 5-6—Nashville, Tenn. (AAA) Mid-South 8th Annual RC Championships. Site: Percy Warner Park. B. Reuther CD, 216 Vaughns Gap Rd., Nashville, Tenn. 37205.

June 6—Little Rock, Ark. (A-Entry Restricted) 2nd Annual MARCS Fun-Fli. Site: Little Rock. F. Osborne CD, 18 Mohave, N. Little Rock, Ark. 72216. Sponsor: **Mid-Arkansas Radio Control Society.**

June 6—Hadley, Mass. (AA) Hampshire Showdown RC Air Races. Site: H.C.R.C. Flying Field. R. Barkowski CD, 32 Lyman St., East Hampton, Mass. 01027. Sponsor: **Hampshire County RC'ers.**

June 12-13—Oilville, Va. (AA) R.A.R.C. 11th Annual RC Contest. Site: RARC Field. C. Foreman, Jr. CD, RFD #4, Box 683, Mechanicsville, Va. 23111. Sponsor: **Richmond Area Radio Control Club, Inc.**

July 12-13—Kansas City, Mo. (AA) Kansas City Radio Control Annual Meet. Site: Lake Jacomo. B. Drummond CD, 9115 Charlotte, Kansas City, Mo. 64131. Sponsor: **Kansas City Radio Control Assn.**

June 12-13—Houston, Tex. (AA) Houston RC Club Annual Contest. Site: Mabray Field. B. Striegler CD, 5831 McKnight, Houston, Tex. 77035. Sponsor: **Houston RC Club.**

June 13—Van Nuys, Calif. (AA) Valley Circle Burners FAI CL Meet. Site: L.A. Model Airport. W. Netzeband, Jr. CD, 580 N. Holliston, Pasadena, Calif. 91106.

June 13—Hadley, Mass. (AA) Hampshire County Thermal-Aires Meet. Site: H.C.R.C. Flying Field. J. Papageorge CD, 104 Rocky Hill Rd., Hadley, Mass. 01035. Sponsor: **Hampshire County RC'ers.**

June 13—Lakewood, N.J. Novice Only RC Meet. Site: Lakehurst N.A.S. A. Schroeder CD, 18 Spencer Rd., Glen Ridge, N.J. 07028.

June 19-20—Kent, Wash. (AAA) BMA Model Aeronautics Scholarship FF, Ind., CL & RC Contest. Site: Boeing Space Center. J. Crosetto CD, 14809 SE 54th, Bellevue, Wash. 98006.

June 19-20—Dayton, Ohio (AA) Wright Brothers Memorial Annual RC Meet. Site: Wright Patterson AF Base. D. Lowe CD, 5936 Clar-Von Dr., Dayton, Ohio 45430. Sponsor: **Western Ohio Radio Kontrol Society.**

June 19-20—Greenville, S.C. (AAA) South Eastern RC Championships. Site: WCRC Club Field. T. Neves CD, P.O. Box 10115, Greenville, S.C. 29603.

June 20—W. Suffield, Conn. (AA) Nor-East Air RC Races. Site: NCRCC Field. R. Granville CD, Fernwood Ln., Sonners, Conn. 06071. Sponsor: **Northern Connecticut Radio Control Club.**

June 20—Salem, N.H. (AA) Salem Model Airplane CL Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876. Sponsor: **Lawrence Air-Istocrats.**

June 26-27—Portville, N.Y. Southern Tier RC Fun Fly. Site: Route 305 So. B. Brown CD, 1255 High St., Bradford, Penn. 16701. Sponsor: **Olean Model Airplane Club.**

June 26-27—Wallops Is., Va. (AA) MARKS Annual RC Meet. Site: Wallops Island. H. Jones CD, 59 Algburth Ave., Baltimore, Md. 21204.

AMA News Extra .....

CONTROL LINE WORLD CHAMPIONSHIP TEAM PROGRAM

U.S. teams for the 1972 Control Line World Championships will be selected by means of a Team Finals competition planned for Labor Day Weekend in 1971. Although the Team Finals site had not been definitely fixed when this was written, Cleveland, Ohio, was in strong contention. From the results of the Team Finals three modelers will be chosen for the U.S. FAI Speed Team, three for the FAI Aerobatics Team, and three teams of two modelers each for FAI Team Racing. Twenty-seven flyers (or teams) in each category will be admitted to the Team Finals through qualifying by one of the two means described below. In addition, the three 1970 U.S. CL Teams are automatically qualified to compete in the Team Finals.

1. Qualify by Accumulating Points at AMA Sanctioned Meets (other than the Nats). Twenty flyers (or teams) from throughout the country may qualify in each category by this means. Points are awarded in proportion to the number of program entrants in each category at each contest and in accordance with their placing relative to each other. For example: the top scorers among seven entered in the Speed event of the contest and pre-registered in the program place 3rd, 4th, 6th and 9th. They receive 7, 6, 5 and 4 points, respectively--top scorer receives one point per program entrant who flies in the event. Each lower placed program entrant in the event receives one point less than the program entrant preceding him; no points below 10th. Each program participant may enter and have counted for points as many AMA sanctioned contests as he desires between May 1, 1971, and August 9, 1971.

How to Enter. Entry in the point part of the program as described above is by one-time payment, made only by mailing the proper fee ($5 for Open members, $3 for Senior, $1 for Junior), for each category, to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005, identified as "CL Team Selection, _____ category" (fill in Speed, Stunt or Team Race). Modelers so entered will be sent certification forms which they will need to have signed by Contest Directors of meets in which they enter and place. Only contests after program entry will be considered for points earned. *It will be the contestant's responsibility to obtain certification for meets he has entered and to submit same to AMA HQ.*

Exceptions, Special Procedures. (1) Irrespective of whether an event is run with combined or separate age classes, team program entries are combined in that event without regard to age for determining number of entries on which to base points as well as place position. (2) With the CD's permission a Speed flyer may post a score and earn points even if no FAI Speed event is scheduled; however, the CD must certify that FAI rules were observed (except that FAI-type pylon fork is not required). (3) FAI Team Race flyers may likewise use a Scale Racing (Goodyear) event, provided models are to FAI rules and a 100-lap time is recorded (with at least one other contestant in the race at 50 laps). (4) Stunt scores may be earned in either AMA events of FAI events. If in an AMA-rule event, the appearance score is not to be considered in determining place position for program entrants (for team program purposes only). Mufflers (required by FAI Stunt rules) will not be required in the qualifying part of the program; *will* be required at the Team Finals.

2. Qualify by National Contest Performance. To be qualified for the Team Finals will be the top seven 1971 Nats CL flyers (or teams) in FAI Speed, Stunt and FAI Team Racing who have paid *prior to flying* a special FAI Team Program Fee for each event of interest ($5 for Open, $3 for Senior, $1 for Junior). Such special fee is in addition to regular Nats entry fees; does not apply to the point system part of the program, nor will point system fees apply towards the Nats special fee. Nats placing will not count toward the point accumulation part of the program. Nats FAI Speed and FAI Team Race events are run by FAI rules; Nats Stunt is run by AMA rules, but scores, for the Team Program only, will be computed without appearance points.

General. All program participants must have a 1971 AMA license with FAI stamp affixed or paid for prior to flying; must also be at least 14 years of age by June 1, 1972. Program entry fees go to the eventual team members to help offset travel costs. FAI model specifications are in the 1970 AMA rule book, page 66-70. Stunt models built for AMA normally will conform to FAI rules. FAI Speed models require a larger surface area (projected wing plus stab) than normal for AMA Class A Speed, and a two-line control system is required as is fuel to one of two FAI formulas. FAI Team Race models have restrictions on surface area, fuselage cross-section, landing gear, etc.

CONTROL LINE CARRIER AND COMBAT SAFETY RULINGS

Effective immediately the minimum control wire sizes for Navy Carrier Classes I and II are revised, dependent upon the number and type of control lines; and Combat control wires must be of the multi-strand type only. This emergency action, authorized by new CL Contest Board Chairman Jean Pailet and AMA President John Clemens, supersedes respective information contained in the March "AMA News Extra". The following minimums will be applied until such time as the Contest Board may reconsider the matter.

Carrier I: .024" for single-strand line; .021" each for two lines, either single- or multi-strand; .018" each for three lines, either single- or multi-strand. Carrier II: .028" for one single-strand line; .027" each for two lines, either single- or multi-strand; .021" each for three lines, either single- or multi-strand. Profile Carrier: same as for 1970 (no change). Each of the lines must bear equal load. (Note that single-strand and multi-strand sizes are the same to eliminate speed advantage of one type over the other which, to do otherwise, would effectively eliminate the use of one type.)

Combat. Previously permissible minimum lines were .014" single-strand and .018" multi-strand. Now, only .018" (minimum) multi-strand lines are permitted--solid lines no longer may be used.

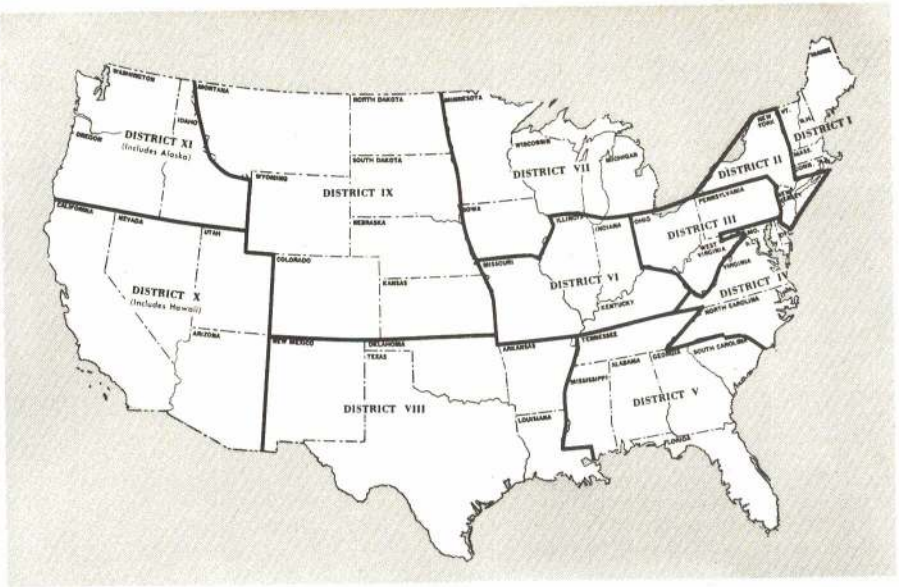
By special arrangement with the publisher this page is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance.

DIRECTORY OF AMA OFFICERS

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

HOW TO USE

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



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Correspondence for the committees, representatives and administrators which follow should be addressed to the proper committee or individual and sent c/o AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Upon receipt of such mail HQ will resend it to the proper individual and/or send copies to the entire committee if the response required needs to be representative of the entire group.

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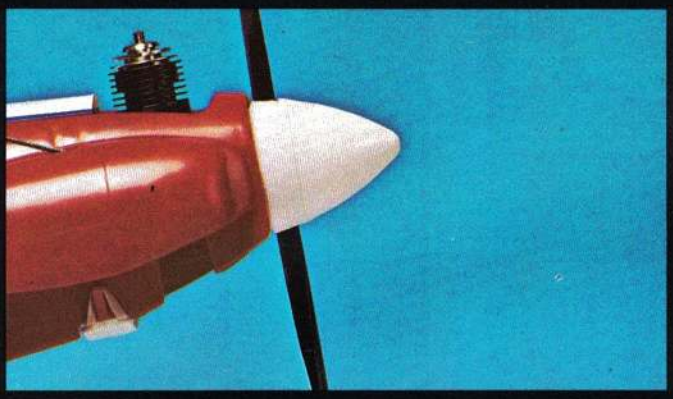
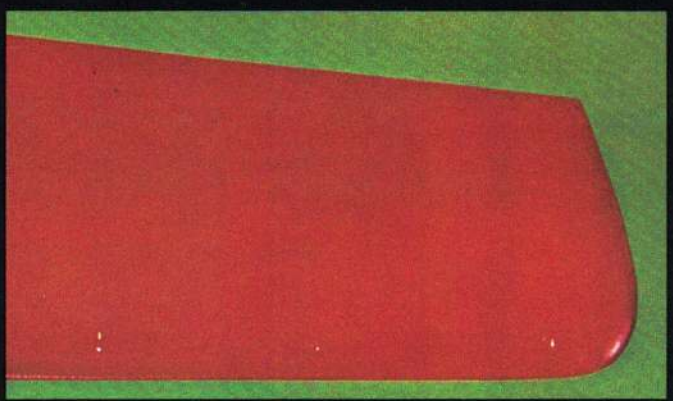
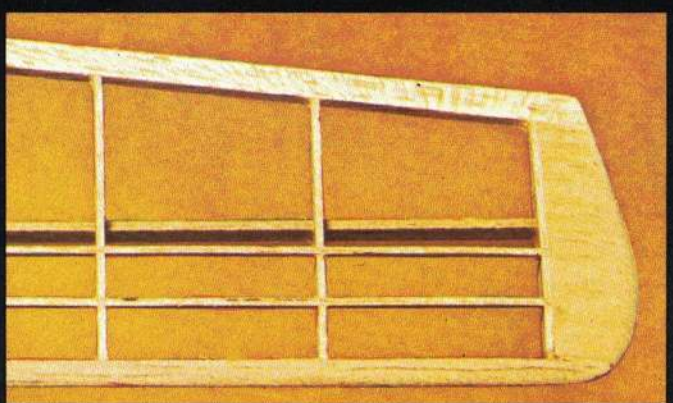
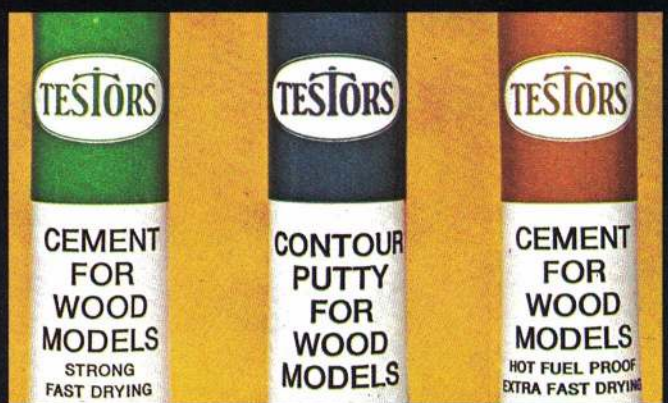
FROM START... TO FINISH... AND EVERYWHERE IN BETWEEN









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P-38—Best of Twins

(Continued from page 29)

washed out when it hit a ditch on landing at the end of its sensational speed run, 13 YP-38's were ordered for tests. Before that order had been completed, the situation in Europe had become so serious that 66 more were ordered and the P-38 was on its way. Its competitors in the USAAC competition for a fast interceptor had flopped. The runner-up Grumman XP-50 (similar to the F5F Skyrocket) crashed on its first flight, while Bell's radical twin-pusher FM-1 Airacuda lacked all sorts of important qualifications.

The P-38, the first really modern fighter ordered by the Army, featured efficient turbosuperchargers buried in the tail booms, opposite-rotating propellers to counteract torque and P-effect (a technique first used in the Wright Flyer, but somehow forgotten), and generally superb streamlining. More important was its so-far-unrealized potential to accept an amazing variety of modifications without slowing down. The interceptor was about to become a fighter, a bomber, a photoplane, a cargo and troop transport, an air ambulance and a glider tug.

When the U.S. entered the war, fewer than 75 P-38's were on hand, but at least they were in production, while the other types which were to play such important roles—the P-47 and P-51 in particular—were still being tested. The only other fighters then being built for the Army were the Bell P-39 and the Curtiss P-40, neither of which was up to the standards of performance being set in Europe by the Messerschmitt and Focke-Wulf, or in the Pacific by the Zero.

The first really combat-ready P-38 to be delivered was the P-38D, the first of which appeared in August, 1941, with four .50 cal. machine guns and a huge 37 mm. cannon in the sleek nose. This model was quickly followed by the P-38E which carried a smaller 20 mm. cannon and thus set the pace for all those which were to follow. A low point in the history of the Lightning was reached when the first one ordered by the RAF arived in England. Lacking the turbosuperchargers and the opposite rotations of the propellers, its performance was understandably poor, and the airplane was rejected and sent home.

Not until late 1942 did the airplane hits its stride with the P-38F, first model to see action in quantity. Power of its Allison engines had been increased from 1150 hp to 1325 hp, raising the top speed firmly over the 400 mph mark. Versatility now came into the picture. With drop tanks, its range stretched well over 2000 miles. With the streamlined tanks removed, it could carry 2000 lbs. of bombs. With all armament removed and cameras installed, it became the world's fastest, longest ranging reconnaisance airplane.

Dog-fighting was not the Lightning's specialty, yet it had its greatest success in the Pacific against the light, maneuverable Japanese aircraft. Its concentrated guns simply overwhelmed the lightly built and poorly protected Japanese fighters and bombers, and its great ability to climb and dive enabled it to break off the battle whenever it was in danger of being outmaneuvered. Its finest hours came in

MORE ABOUT THE LIGHTNING

Lockheed's P-38, as author Berliner brings out, was a most versatile aircraft. It looked different, but it looked "right." Its wing configuration, in fact, was good enough to be scaled up for use on the Constellation—or "Connie"—airliner. And, as scale modelers known, both the Lightning and the Connie make effective flying models. For a four-engined craft, the Connie flies with amazing ease. It is that versatility which makes the Lightning so fascinating. It is not merely a matter of being able to take varied combinations of stores, or to fly low or high. There was a global versatility as well or, one might say, that tactical versatility was so great that strategic versatility was inevitable.

The P-38 got to escort bombers in Europe—thanks to its range—at a time when long-ranged escort was a desperate need, when the scale of German fighter/antiaircraft versus Allied bombers was ready to tip. The P-38—and of course the remarkable Mustang—helped break the back of resistance in Europe.

And then the P-38 raised havoc in the North African desert, where enemy fighter pilots, and the guys on the ground who took the strafing, called it aptly the "Twin tailed devil." It fought valiantly in the Southwest Pacific—where Charles Lindbergh had his famous go at the Nipponese. In short, it was just about everywhere and into everything. As one lady aircraft spotter was reported to have called in: "There are two airplanes overhead with their arms wrapped around each other."

service with the 5th Air Force during the island-hopping campaign to clear out the strings of enemy bases. The two top American aces of the war—Richard Bong with 40 kills and Thomas McGuire with 38—both flew P-38s with the 5th AF.

As long-range P-47's and P-51's gradually took over the escort duties of the P-38, other tasks were created for it. The graceful curves of the fighter nose were replaced by the awkward lines of the hastily created "droop snoot" versions which carried a navigator on special long distance missions, or a bombardier to do the precision work for a large formation of standard P-38's. Others carried special large tank-like containers under the wings, in which not only spare parts but ground crews were transported. Similar pods were used to carry a pair of stretcher cases, each, in the ambulance version.

As radar became more effective, the night fighter grew in importance and all sorts of modifications to standard types were hurried along. One of these was the two-seat night-fighting P-38M, with a bulge in the rear part of the canopy to clear the head of the radar operator, and a bomb-like radar device hanging under the nose. It looked awful, but worked well and flew almost as fast as the clean versions. This was the final modification of the P-38 to see action.

When the war ended, the P-38 continued on, though in a somewhat what changed role. Hundreds were placed on sale as surplus for the disgustingly low price of $1500 for a low-time, late-model Lightning. More were sold to returning GIs than any other type of fighter because of their reputation for doing so many things well. No fewer than 19 showed up for the 1946 Cleveland Air Races, 15 of them starting in the Bendix Transcontinental Race from Los Angeles, and four entered in the pylon events. They were expected to shine in the 2000-mile Bendix, but Mustangs took the first four places. They weren't expected to do much around the pylons, because of their size, but Lockheed test pilot and pre-war racer Tony LeVier beat all the Mustangs to finish second in the classic Thompson Trophy Race. He was at Cleveland mainly to do a sensational aerobatic routine in his P-38L which foreshadowed by many years Bob Hoover's great single-engined and dead-stick work in the Shrike Commander.

Others bought P-38's for more practical reasons, and the type was common for many years throughout the Americas as a high-altitude photo-mapping aircraft. One occasionally still sees them in the classified ads of Trade-A-Plane, but time has a way with old airplanes, and the newest P-38 is now more than 25 years old. Still, there are a few in the air. Two showed up in the September, 1970, Reno Air Races (N25Y and N38LL) and a third in the California 1000 race at Mojave in November, and there is one up around Seattle which flies in shows.

If you want to take a close look at a Lightning, there are P-38L's in the USAF Museum in Dayton, Ohio; Harrah's Museum in Reno, Nev., and Ed Maloney's Museum in Ontario, Calif. The Confederate Air Force has a P-38L with P-38H nacelles, while the Smithsonian has a P-38J in storage.

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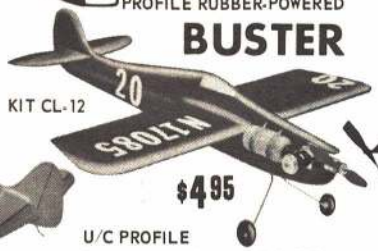

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Straight and Level

(Continued from page 6)

we'll all know if he made it. If you are going by, the location is one mile east of the old store on Route 46. Saved by the bell, Rich thinks.

TWO BROTHERS in New York, Irwin and Nat Polk, are celebrating this year their 35th anniversary as Polk's Hobby Department Store. And that's another heart warmer. In 1933, the "brothers" were advisors to the old Bamberger Model Aero Club, in that well-known Newark, N. J., department store. Old-timers remember the second-floor walk-up hobby shop the forward-looking brothers started about 1937 on the corner of 34th Street, near Penn Station in New York. Then, about the time of WW II's beginning, they expanded into the present five-floor operation on Fifth Avenue–a floor for each hobby yet! Many a contest they sponsored in the old days and, when gas jobs came in, they threw in with Charlie Grant, then MAN's ramrod, who began the International Gas Model Association. Eventually, IGMA was turned over to the NAA–before AMA was born.

From experience we know what, and how very much, the Polk brothers did for model aviation. For example, when Irwing directed the Nationals in Detroit before the war, it was still customary for the entrants to expect a victory banquet, followed by trophy awards. That year in Detroit there were 1700 entrants. Banquets cost dough.

Distraught the afternoon of the anticipated banquet, no money in the till, Irwin bumped into Roy Howard of the Scripps-Howard Newspapers, who lent a sympathethic ear. That night, a bagpiper band awakened the dead in the Hotel Fort Shelby, then led the procession down to a lake steamer where a banquet was held in the parking hold. The logistics are still a mystery.

And Nat, at the time the HIAA-AMA Air Youth program was envisoned, when told at a small lunch of powers-that-be that funding was out of the question and that money could not possibly be raised, said he'd do it. And he did–for several years. By phone he reached to every nook and cranny of the country and into allied industries. He had a little help. But he gave of himself as nobody has done before–or since. Happy anniversary, "boys!"

Owl Racer

(Continued from page 24)

a steep angle of airflow without stalling, thus producing maximum cowl thrust, similar to wing lift.

The original exhaust and cooling systems were worth note, with both exiting on the bottom of the airplane, just ahead of the firewall. The stacks were located at either side of a cowl flap in a very clean arrangement. After the 1969 season, the exhaust system was lightened and simplified by switching to individual stacks cut off flush with ports on either side of the cowl. Other changes, mainly aimed at reducing weight, are to include elimination of the oil radiator, replacement of the thick galvanized firewall with aluminum and asbestos, and switching from copper pitot and static lines to plastic or aluminum.

Construction is straightforward. The wing has a one-piece laminated spruce main spar, half-inch thick spruce ribs and plywood covering. Aileron control is via a one-inch torque tube which can be disconnected for easy wing removal by pulling a single bolt in the cockpit without affecting aileron rigging. The fuselage is welded chrome-moly steel tubing with metal covering to the front of the cockpit and fabric aft. The tail has a spruce frame covered with plywood. The canopy is a single piece of molded plexiglass with a composite wood/foam/fiberglass frame and rear fairing.

Power is supplied by the typical stock Continental 0-200, properly balanced and with a racing prop which enables it to turn about 3750 rpm and develop about 125 hp.

One season of racing, even when it is as successful as the Owl's in 1969, still doesn't prove a design. At best, it can only indicate potential. The Owl Racer unquestionably has speed and good flying characteristics, which is about all that should be asked of a racer. Its future is bright but completely uncharted. Plans, available from John Alford (291 Beech Ave., Santa Rosa, Calif.) for $125 a set, consist of 56 individual drawings including all structure, primary controls, fuel tank and canopy, as well as full-size ribs and fairing contours. Their acceptance by builders could make the Owl Racer one of the truly significant racer designs. In the meantime, #87 will be busy trying to win races.

Color Scheme

Basic airplane is white with metallic olive green striping and numbers.

Black pilot name, airplane name and emblem on vertical stabilizer, wing-walk and footprint on upper surface of left wing, and cowling anti-glare panel.

Specifications

Wing
- Span—16′ 0″
- Area—66 sq. ft.
- Airfoil—63 A 210
- Dihedral—1 degree
- Aspect ratio—3.88:1
- Incidence—0 degrees
- Twist—0 degrees

Stabilizer/elevator
- Span—5′ 11″
- Area—8.5 sq. ft.
- Aspect ratio—4.12:1

Stabilizer/rudder
- Area (projected to fuselage reference line)—5.10 sq. ft.

Fuselage
Length—17′ 5″
Cockpit height—3′ 2″
Cockpit width—1′ 8″
Empty weight—550 lb. (design)
602 lb. (prototype)
Cruise speed—185 mph at 2800 rpm
Top speed—est. 230 mph at 3750 rpm
Limit load factor—6.7 g
Ultimate load factor—10.0 g

Mustang

(Continued from page 17)

full span spar uses 3/16″ square spruce. Sheet top and bottom with 3/32″ soft balsa and keep flat until completely dry. Vertical stabilizer, rudder, and elevator are cut from soft ¼″. Taper these with the plane to about ⅛″. Install a Top Flite elevator horn, and glue both horizontal and vertical stabilizers onto the fuselage. Make fillets from balsa or leather to add strength.

A standard Lanier wing or a home-cut wing may be used. Strip ailerons were used, but some faking is done after painting. Gear mounting blocks centerline is located 2½″ back from the leading edge as measured at the wing root. I prefer 4 to 6 degree dihedral. Main gears use 3/16″ diameter wire and are 5¼ to 5½″ long from wing to axle. The axle bends inward, allowing wheels to be on the inside of the pants. Use 3/32″ plywood for pants and mount to the gear with brass strips screwed into spruce blocks. When correctly positioned, tack solder the brass to the wire gear.

The familiar torsion type gear is used. Bend the wire so that the wheel axle is directly under the leading edge of the wing when the wing is in its flat flying angle (see plans). This location is important because takeoff and landing qualities are determined by location of wheels.

Finishing Details and Painting

An engine mounting backplate may be made of 1/16″ copperclad epoxy p.c. material; 6-32 nuts are then sol-

(Continued on page 72)

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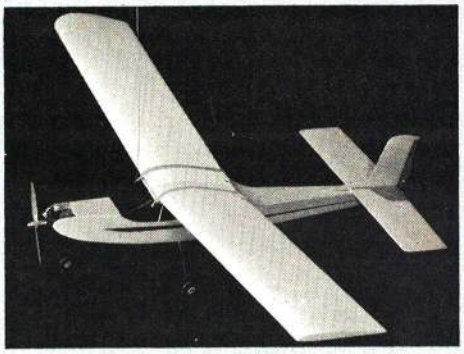

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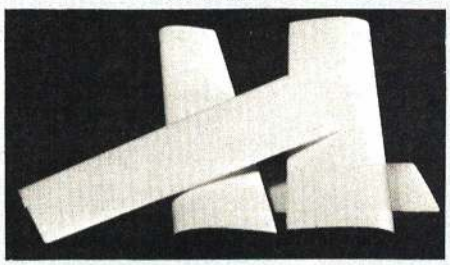

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Build small with foam. Makes planes which are ideal for the Cox Pee Wee or TD .020 engines, and the Commander R/O Baby or Baby Twin units.

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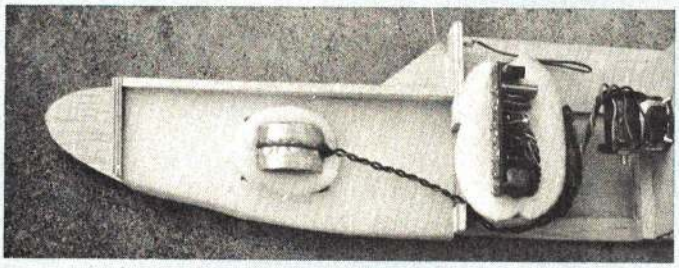

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** New, smaller transmitter case
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If you are going the routine way, and want to get started with what we recommend for all ordinary applications, this is the way for you. Here you have the Basic R/O Pack (A) and the suggested B-C matched.

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Please Specify
WITH ALL BATTERIES AND CHARGER

COMMANDER BASIC R/O PULSE PACKS

Available in Four Sizes

We are offering our Commander Rudder Only series in both "Choose-Yourself" style, and in the same combos as last year. This offers you greater choice and therefore more versatility.

Our Basic Pack (A) comes less batteries and charger. You select the size of the battery pack and charger kit (BC) you want, and this ABC makes it YOUR combo. (If for instance, you have a glider in which you want to use just the Baby or Baby Twin Pack, BUT need 500 ma nicads instead of the usual 225 ma, you can get this combo by just ordering the right choice of A and BC units.

To help the beginners, we also offer the usual combos which contain the Basic Pack (A) plus the Battery & Charger Kit (B-C) which have proven to be the best all-around combinations.

The Basic Packs contain the new improved Dickerson Designed Rudder Only Pulse Transmitter, the Commander DE 2.4 v superhet receiver, and four choices of size on the more powerful Adams actuator.

The Baby and Baby Twin are ideally suited for the new Ace Mini Foam Wings, and the Mini Foam Wing plane kits, while the Standard and Stomper will handle larger jobs--even up to .19-23 size and Motor Control may be added.

The Baby is for .010 to .020 jobs. Airborne weight 2.5 oz. (If you use 225 ma nicads).

The Baby Twin is for hot .020 to .049 ships. Airborne weight 2.9 oz. (If you use 225 ma nicads).

Use the Standard for more power for hot .049 to .09 power. Airborne weight 4.5 oz. (If you use 500 ma nicads).

The Stomper is the workhorse and will be useable in ships from .049 to .19-23. Weight 4.9 oz. (If you use 500 ma nicads).

ALL UNITS ARE COMPLETELY WIRED, TESTED, GUARANTEED

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The two kits you need to make up any of the four R/O Packs to come up with the Combo of your choice. Consist of 2.4 Nicad Battery Pack in either of two sizes (you CAN use pen cells, but we don't recommend it), Mallory M1603 Transmitter Battery, and Deluxe Charger complete with submini jack and plug. Charger is transformer isolated for your protection.

The B-C (Batteries & Charger) Kits are available in two sizes. For ordinary use we recommend the 225 ma size for the Baby and Baby Twin. The 500 ma unit is generally used for the Standard or Stomper units. (You can switch either way, depending on your requirements.)

Completely assembled.

No. 10K35—B-C 225 Kit for Baby or Baby Twin	$10.75
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DE MICRO GEM RECEIVER AVAILABLE

Our smaller Commander Micro Gem DE receiver is available for any of the foregoing or Basic Pack Combos. The Gem Superhet measures only 1 1/16 x 1 1/2 x 1/2 and weighs less than 1 oz. This a DE (double ended) version exclusively for Adams actuator use. If you wish this receiver with your Basic Pack or your Combo, simply specify "With Gem"--and add $5.00 to the price.

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Full-Size Plans — Shipped First Class Mail Within 48 Hours — No Extra Charge

No. 0101, Undone I — R/C Pattern plane for 60 engine for new maneuvers and lightweight equipment. Wing span 59". **$3.50**

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No. 1193, Mig 21d — 40-powered C/L version of Russian fighter is fast, stable flyer. By Roland Baltes. **$2.50**

No. 1194, 1937 Gas Model — Half-size 049 copy of great old-timer. Has durability and easy-to-fly characteristics. Frank Ehling. **$2**

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No. 0794, Skimmer Airboat — Sled-type fun watercraft by Paul Hook. .09 engine, R/C rudder, throttle. **$2**

No. 0991, Flashby I — Rakish-looking all-balsa ROG by Wayne Brown. For the Tenderfoot. Tricycle gear. **$1**

No. 0992, Fouga Cyclone — Scale model of jet-assisted French sailplane, by Nick Ziroli. Gains altitude easily on 09 engine. A two-piece 7-ft. wing. For R/C. **$3.50**

No. 0993, La Jollita — Profile 15-powered Goodyear C/L racer by James Kloth, fast, groovy. On mild fuel and engine does 85 mph. **$1.25**

No. 0892, Taylor Cub F-2 — Sport, F/F, scale, .020. Stick-and-tissue. By Schreyer. **$1.75**

No. 0893, Martin MO-1 — Rare WW-1 era monoplane, carrier fighter ideal for Class 1 Carrier. Ailerons keep lines tight at low speed. By Reeves. **$1.50**

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No. 0692, ½A Sky Squire — Small version famous Sky Squire. 1 ch. rudder-only, or rudder, elevator and motor on Galloping Ghost. Only 22-28 oz. **$2**

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No. A693, Sweeper — Windy Urtnowsky's giant, C/L stunter, 78" span. .60 up front. Many trim adjustment features. **$2.75**

No. A695, Lady Maxley — Brian Donn's A/2 Nordic towline. Davis 3 foil. Ritz construction. **$1.50**

No. A697, Dwarf Dip III — Easy to fly, rubber Coupe de Hiver by Charles Sotich, a winner! For small fields. Warp-resistant. **$1.50**

No. A691, E A A Biplane — Nick Ziroli's scale R/C uses .40 engine, full house gear. 38" wings, semi-symmetrical foil, box-and-stringer fuselage. Two sheets. **$2.50**

No. A692, Miracle Worker — John Blum's C/L trainer. Combat, carrier, stunt. Easy-to-build profile. .35 engine. **$1.50**

No. 1291, Demon Delta — Fast, mild-stunting C/L for 35-45. Looks like modern fighter. Attract attention for demonstrations. By Jerry Farr. **$2.50**

No. 1292, Dolphin II — Czechoslovakian R/C for pusher, 09-15 mounted at rear under T-tail. Rudder/motor, good slope soarer. **$1.75**

No. 1293, A/Wonder — Simple all-balsa A-1 towliner by Bob Stalick. Ideal for beginners at towline events. **$1.50**

No. 0201, Cardboard Cutie — Inexpensive all cardboard C/L for Tenderfoot. 049. Two sheets. **$1.25**

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No. 0402, Lively Lady — World Championships winning Nordic by Elton Drew. Well detailed plan. All weather flyer. **$3.75**

No. 0404, Sweapea — C/L Goodyear by Williamson for club project also is tough trainer. For 35 engine. Balsa cutting guide incl. **$2.50**

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No. 0503, Royal Marine — By Yuji Oki of Japan, magnificent seaplane with 6' wing. Two 40's or one 60. Graceful lines, smooth flyer, handles easily on water. Two huge plan sheets, every part shown in detail. **$8.00**

No. 0601, Flower Power — Sport/stunt full-house RC with a 40 engine. All-balsa, simplified structure. Plugs generation gap. **$2.50**

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No. 0801, Winnie Mae — Spectacular RC Vega for strong 60 engine in 2"-1' scale, foam and balsa, lots of details. By Monty Groves. Two big sheets. **$4.50**

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No. 0804, BV-141 B — Asymmetrical WW II fighter bomber in profile for 049 engine by Terry Aldrich. Easy to make, good flyer. **$2.00**

No. 0901, Sorcerer — Pee Wee 02-powered, free-flight flying saucer uses sheet wing, easy to make by Tenderfoot builder. **$1.00**

No. 0902, Cloud 9 — Intricate contest winning Wakefield by Roger Gregory. Plan shows streamlined prop/hub design. **$3.50**

No. 0904, Antoinette — Signorino/Zundel RC. 98" wing, nearly scale, flies well on .36, like powered glider. Plans 3 huge detailed sheets. **$9.00**

No. 0905, Mini Cat — Bud Atkinson scaled down the Cat series, for pulse or light digital and up to 19 engines. Easy to make RC sport flyer. **$2.75**

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Please send the following plans by First Class mail, at no extra charge. I enclose $_____ for payment.

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No. 1001, Phantom — Well-engineered RC Dyna-Jet-powered scale fighter by Ralph Saldivar is practical but noisy model. Highly detailed plane. Jet installation shown. **$4.00**

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

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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**

THIS MONTH'S PLANS

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**

No. 0412, Grouper—Unique in appearance, oval balsa fuselage hides a big 60 engine. Easy-to-make stunter for commercial ARF wings. **$3.25**

No. 0413, Dauntless—Low-wing scale profile FF model for sport flying on inexpensive 020 engine. **$1.50**

No. 0414, Nesmith Cougar—Accurate scale CL model of boxy homebuilt. Fine beginner's scale model using 19. A winner with detail. **$3.50**

(Continued from page 67)

dered to the copper. If elastic stop nuts can be found, use these instead to prevent the screw vibrating loose. Tail wheel linkage is somewhat unique since the wheel is located under the leading edge of the stabilizer and not at the tail post. Spread the stress of the nylon wing bolts on the wing by gluing a ⅝ x 1 x 1/16" piece of plywood over the ¼" hole in the wing. It acts as a large washer.

Paint as desired. However, silver paint and military decals make the airplane look more majestic. After painting, I drew a 1/16" black outline of the scale elevators, rudder, ailerons, flaps and trim tabs with India ink and a regular drafting pen. This ink is easy to work with since mistakes wipe off easily with a damp rag.

When finished, spray the entire aircraft with a light coat of clear Hobbypoxy to protect the India ink and to keep the silver from smearing. Use decal proof over the ink instead of spraying with clear.

A standard Sig 16-in. canopy is trimmed to the proper outline. Black paint around the canopy helps give it a Mustang bubble appearance. Place a pilot in the cockpit and epoxy the canopy in place.

There's plenty of room for fuel tank, batteries, receiver, and servos, just keep in mind CG location (which is measured with an empty tank). It is just under 30% but can be moved. However, I have no trouble dropping the ship into a spin, and the elevators are very relaxing yet effective. The antenna wire is taped along the fuselage and exits via a nylon tube behind the pilot.

Flying

Some effects which occur on takeoff are similar to those on the full-size ship. I refer to the prop pitch differential before the tail comes up and torque. The tail dragging effect is great on the Mustang because of those long gears.

Takeoffs are not difficult. Handle the rudder and throttle just right and the ship will track right down the centerline. Try holding about 10 degrees right rudder, ease in some power, and the tail will pop up. Back off a little on the rudder and come up to full power. Stay off that elevator during the above sequence, keep right pressure on the rudder until the plane is eased off. There is no nose wheel to break loose; when ready to pull, just a little elevator will start it flying.

Landings also use a little different technique. Don't drag it as with a trike gear. Just line the ship up, let it come. Ease it onto the deck and get off the elevator as soon as it is down. If it seems the plane is running out of strip, slowly pull the tail down and ground speed will drop fast. On a touch and go, hold a light rudder before punching the throttle. With plenty of side area, the ship will hold the 90-degree points with ease; the same is true with slow rolls. A knife edge uses only 50% rudder; full rudder will start it climbing until speed drops off.

Fly Safely!

Stringless Wonder

(Continued from page 44)

ner, the substitution of other propellers will require adding nose weight, such as modeling clay. Regardless of the type of propeller, spend a few extra minutes checking its balance. A little sanding of the heavy blade will reduce vibration and improve performance. Also, several tiny brass thrust washers and a drop of oil will do wonders. Without them, the plastic prop will gradually wear down against the plastic bearing assembly and won't turn as freely.

Flying

Make up a single loop of ⅛" brown rubber, allowing a little slack between the hooks. With the motor in place, the aircraft should balance at about the point indicated on the plan. If not, add a small amount of modeling clay to the nose or tail, as required. Next try a gentle glide (do not throw). The model should float to the ground with perhaps a slight mushing effect. If it dives, add a little up elevator or subtract some nose weight. If it stalls (noses up suddenly, then dives) add clay to the nose.

Wind in 75-100 turns and launch the model gently, parallel with the ground. It should exhibit a natural tendency to climb in a shallow turn. If it turns too tightly, compensate with a slight bending of the rudder in the direction opposite to the turn. If the model falls off on one wing repeatedly, add a small lump of clay to the opposite wing tip. Gradually increase the number of turns and readjust, as required.

If very high power is used, it may be necessary to increase the downthrust of the propeller. A fair amount is built into the North Pacific thrust bearing assembly. It is also easy to add right or left thrust adjustments by bending bearing assembly slightly.

In spite of its kite motif, this model should be flown in calm weather, at least until familiar with its performance and adjustments. When all is satisfactory, lube the motor and pack in the turns with a geared winder for best performance.

This craft is also known as Ben Franklin's Revenge. Because of an archaic law, of obscure political origin, kite flying is illegal in Washington, D.C. Since model airplanes are (apparently) allowed, it would seem that string is the real offender. We wonder if America's most celebrated kite flyer, Ben Franklin, might consider Stringless Wonder a possible "key" to this problem!

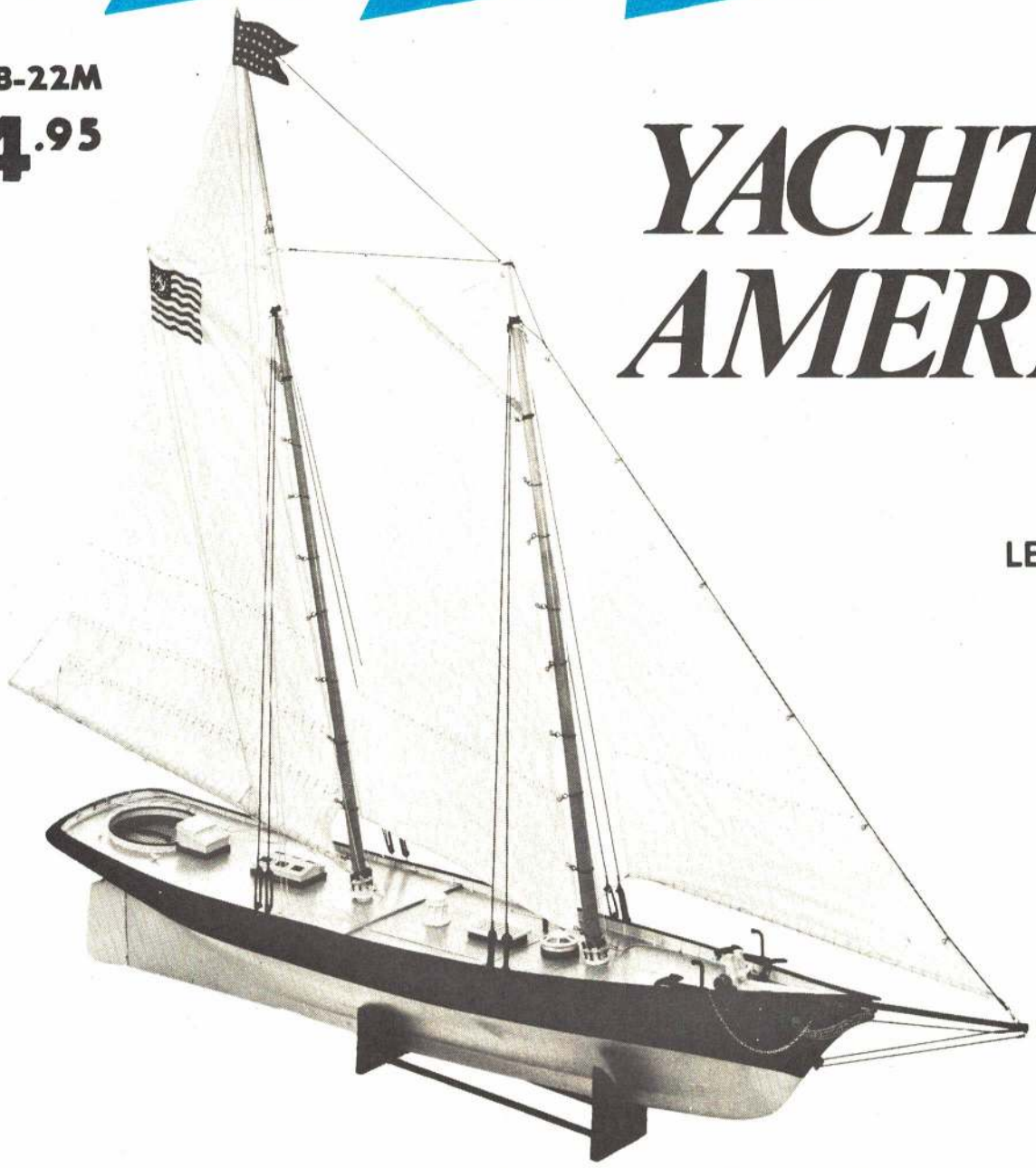
Editor's Note: Happily, the law against kites has been revoked, thanks to appropriate lobbying of Congress. So, come to Washington and join us, flying kites on the Mall!

IN THE WATER!

KIT B-22M

34.95

YACHT AMERICA



LENGTH: 51½"
HEIGHT: 41"
BEAM: 8½"

Single Channel Rudder Control Full to House Rudder & Sail, etc. Operation

A FINE OPERATING SAILING MODEL . . .

This magnificent model is a true scale replica of the YACHT AMERICA as it was rigged between 1851 and 1859. Designed by George Steers, and built by W. H. Brown of New York, it was launched May 3, 1851. At 170 tons, it was 95'6" long, 23' beam and had an 11'6" draught. In June, the AMERICA sailed across the Atlantic to accept the challenge of the British Royal Yacht Club to a race around the Isle of Wight. The victor would win the Hundred Guinea Cup, which is now known as The America's Cup. The win of the race around the Isle of Wight started The America's Cup Races which has been successfully defended by American vessels for over 100 years. The AMERICA served both sides with distinction in the Civil War. It was destroyed in a collapse of a protective shed in 1944. Kit features accurately die cut Balsa and imported Birch plywood that makes assembly relatively easy for most anyone. Other features are: • Die-Cut Birch Plywood Decks with planking grooves printed in • Tapered Masts, Booms, Spars, etc. • Miniature Rope in scale size and color • Fine quality Sail Cloth • Chain • Dozens of exquisitely detailed Cast Metal Fittings, as well as Hardware and Special Metal Fittings for rigging • Simple step-by-step Plans showing all phases of construction and operation.

. . . MAGNIFICENT IN THE WATER OR ON THE MANTEL

IN THE AIR!

Rimfire

KIT FS-27
27.95

High Performance
Radio Control Model

SPAN: 56" AREA: 525 sq. in. WEIGHT: 2½ lbs. (Less R/C) ENGINE: .29 to .45

ASSEMBLES QUICKLY AND EASILY . . .

Years of design refinements and flight testing have gone into this superb flying machine. Beautifully engineered in its classic simplicity, RIMFIRE builds fast with its "Table-Top" Warp-Free construction, into a rugged and exceptionally attractive ship. And fly! . . . Well, as good as you are, is the RIMFIRE! If you're a contest performer, so's the RIMFIRE. Kit contents: • Full Length One-Piece Die-Cut Fuselage Sides • Full Length Carved and Hollowed Fuselage Top • Formed Gear includes Steerable Nose Gear assembly • Hardware includes all special Nylon R/C fittings, Threaded Rods, as required for COMPLETE LINKAGE • ALUMINUM ENGINE MOUNTS • Canopy • Decals • Wood-Nut & Nylon-Screw Wing Mounting • Shaped Ailerons • Simple step-by-step Plans, etc., etc.

. . . SUPERBLY RESPONSIVE IN FLIGHT

SPAN: 70" AREA: 500 sq. in.
WEIGHT: 1¼ lb. (Less R/C)
SCALE: 1¾ in. 1 ft.

KIT FS-28
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Tenny on FF

(Continued from page 42)

Mad Modelers Strike Again!: In 1969, the Mesquite Mad Modelers (suburban Dallas, Tex.) held an indoor contest and introduced their matchbox model concept (see "Where The Action Is," April 1970 AAM). This year they repeated both the contest and the matchbox event. Most of last year's entrants flew the same models to higher scores, but to no avail. Mike Fedor and two friends showed up with matchbox helicopters. Mike won the event in Open handily with a 25-sec. flight, and Jim Haught won Junior with a slightly lower score. Mike's helicopter snuggles neatly into the standard kitchen matchbox with room to spare. It easily could have had a one-quarter inch greater rotor span, and thus might have done even better . . .

Thirty-Minute Glider?: The Mad Modelers have another unique event which also may become an interesting challenge. The rules are simple and ingenious. Each entrant is furnished two pieces of balsa and allowed only 30 min. to build a glider, using no other material except his own choice of adhesive. Even the nose weight has to be made from balsa and/or adhesive. One piece of 1/16 x ⅛ x 6" and one piece of 1/32" sheet, 2" wide and 6" long were furnished. Sound like fun?

Meuser on FF

(Continued from page 42)

and measure off the lengths L1 and L2. A convenient way to draw the diagonal line is to coat a piece of string with chalk, stretch the line between the two end points, and snap the line. Then cut along the chalked line.

Tape the wide end of the paper to the rod. Support the rod in wooden V-blocks clamped to the workbench. Have a helper maintain tension on the paper as it is wrapped up by rotating the rod. Glue down the last part of the wrapping paper, then give the whole form a half-dozen coats of dope, sanding between coats to feather the edges of the paper. Finish with a final coat of dope and wax the form or cover it with a wrap of Saran Wrap to prevent glue from sticking.

To make the tailboom, select A-grain wood —the kind with the annual rings parallel to the sheet. C-grain or quarter-sawn wood, having a speckled appearance, will make a stiffer boom, but it is difficult to roll without splitting. Wrap a sample piece of wood around the large end of the boom, and trim it to make a butt joint, do the same at the small end. Use these samples to lay out the boom blank for cutting the taper. Dope one side of the blank with several coats, then soak it in the bathtub. The blank will curl up with the doped surface on the inside. Then wrap it around the form, using an Ace bandage to hold it in place. When it dries, glue the seam.

If a barrel shape is preferred, rather than a straight taper, make the diagonal line curved instead of straight.

Allen's Citadel Wake: At the Albuquerque FAI Finals (Feb. AAM) John Allen was "the man" in Wakefield, holding first place in the first eight rounds and never dropping below second place. His Citadel has superior still-air time, but John usually flew his square-tipped Apogee windy-weather model in the hair-raising winds prevalent at the Finals. The winding technique used by Allen, and the other Albuquerqueites, was more hair-raising than the wind. The model is anchored to a stooge in the trunk of the family chariot—no people-type stooge could do the job unless he weighed 936 pounds. The 40 grams of rubber is stretched until John is leaning back at about 20 degrees from the vertical, and that angle is maintained throughout the wind-

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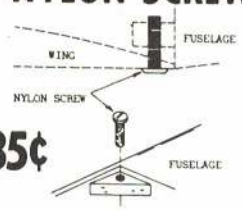

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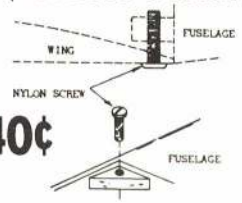

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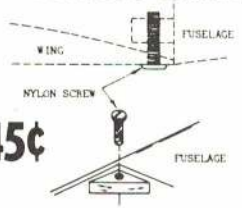

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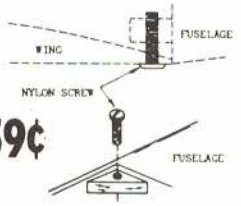

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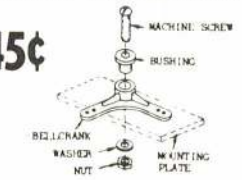

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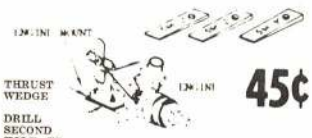

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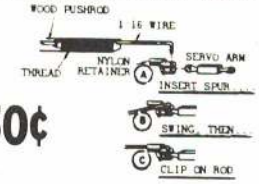

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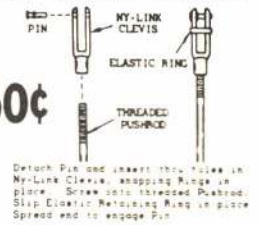

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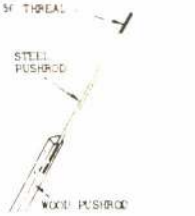

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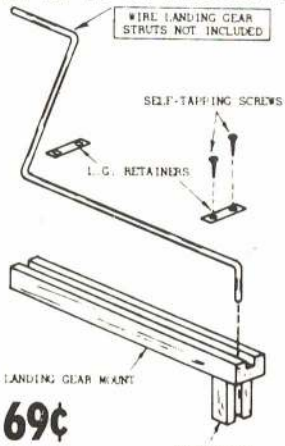

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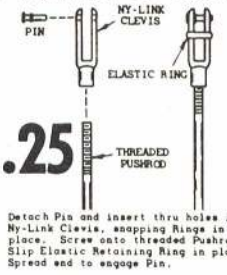

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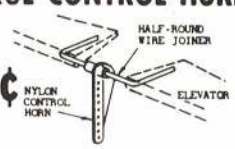

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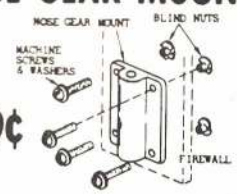

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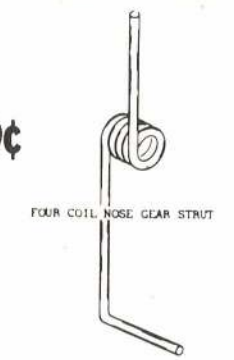

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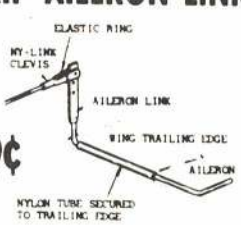

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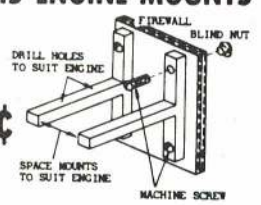

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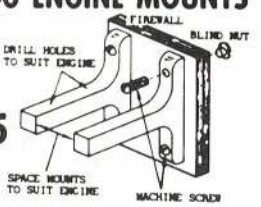

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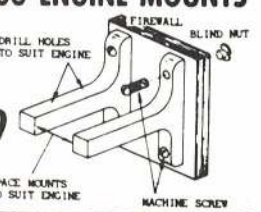

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ing process. The aluminum-tube fuselage can stand the blast of a broken motor. John relied strongly on his prettied-up version of Xenakis's recording air-temperature indicator—the temperature sensor is placed some distance upwind of the recorder.

A complete prop hub similar to John Allen's can be obtained for $7.50 from James P. Taylor, 9608 Parsifal Pl., N.E.; Albuquerque, N.M. 87111.

Stalick on FF

(Continued from page 43)

else could you see rolled tube fuselages, like this month's feature, or flimsy looking 3/32 sq. in. stringer structure approaches? Or Coupe sizes, or six-ft. long fuselage designs? Unlimited Rubber is not in a design rut when Ken Johnson can have his canard pusher unlimited, The Companard, published and reproduced by many.

It would seem that the various proposals to limit Unlimited Rubber would discourage inventiveness. As an example, limiting motor size would develop smaller, higher wing-loading models, similar to lightweight Wakefields or Coupes.

Limiting propeller diameters to a percentage of the wing span would develop either higher aspect wings or complicated prop gadgetry—perhaps inordinately high prop pitches, etc.

Limitations as to weight or area or a combination could result in the stereotyping that is typical of the Wakefields being flown today. Other suggestions for limitations ignore the basic tenet of Unlimited Rubber—that it should be unlimited. But the problem of the three-min. max still remains. Any good Unlimited model should continue to make three-min. maximums in practically any condition.

The next step to be considered, if limiting the model is an idea to be discarded—which it is—is in contest organization. John O'Donnell, in **Aeromodeller**, has been commenting on similar Open Rubber concerns in England for several years now. His recommendations have produced two approaches:

(1) The Knock-Out Formula. Two contestants fly against each other until one wins and moves up to compete against another, similar, winner. This is not too different from any eliminations-type contest. However, it doesn't do away with the need to fly 10 or 12 three-min. maxes. In fact, the eventual winner could very easily—more so than at present in the USA—fly more.

(2) The Variable-Max/Round system. O'Donnell's suggestion is that short rounds (one hour or less) be employed, with retrieval time allowed between, and that the max time be set at the beginning of each round depending on anticipating flying conditions during that round.

Max times could be as high as six or seven minutes for dead air or calm early rounds or decreased to a minimum of three minutes for windier times. Of the two suggestions, both of which have been tried in England, the second seems most workable and manageable. National records would not be possible in a Variable Max/Round system, but they are not possible for Nats contestants at present anyhow, so I charge the Nats 1971 FF organizers to seriously consider approaching Unlimited Rubber as follows:

(1) Establish a five- to eight-round Unlimited Rubber program at this year's Nats.

(2) Organize each round for a maximum of one hour in length, beginning at contest starting time, with a half-hour retrieval period at the end of each round.

(3) Max times per round are to be posted and announced for the ensuing round during the retrieval period and again at the beginning of the next round. No maxes should exceed six minutes or be under three minutes, whatever the conditions. All contest director's decisions are final and irreversible.

(4) Fly-offs, if any, will be reserved for the last hour of the contest and could continue as per the round formula. The max time of the flyoff will be at the discretion of the contest director as before, but could be progressive as stated in the AMA rules book.

Finally, I charge the Free Flight Contest Board with the responsibility to truly open up Unlimited Rubber by removing the 300-sq.-in. wing area restriction completely, thus allowing further experimental development and design in this fascinating and creative event.

All comments pro and con, as well as details of alternative suggestions or examples of actual contests using these or other innovative changes, will be answered either in this column or by private correspondence. Please send to the author in care of **American Aircraft Modeler.**

Mooney on FF

(Continued from page 43)

Open class was won by Hal Cover, flying a Lanzo-designed DH Puss Moth, which outflew everything else. First in Junior was taken by Douglas Mooney flying a Porterfield Collegiate. Doug's pilot faced any way but forward, but he couldn't get out of the cockpit. . . .

San Diego Scale Contest: Attendance at the San Diego Orbiteers Annual scale contest was not as great as expected, because no contingent came from Los Angeles, but they did have more than twenty entries. The weather was completely calm during the flying hours. Several gas-powered models climbed until they were mere specks in the blue and then glided down to land in the takeoff area. The longest chase of the day was made after Walt Mooney's rubber-powered Mr. Mulligan, which flew in a straight line for about 40 sec.

Bob Peck brought out a nice gas-powered Longster, with a scale pilot. The pilot, in the interest of retaining his non-fuelproof complexion, flew with his head in a tight-fitting plastic bag. Good thing he didn't have to breathe!

Dick Castle's DH-4 gassie sported not only a pilot but also a rear gunner manning his gun. Howard Harvey's red Cessna 170 managed to win the gas event with the aid of several high climbing flights—and one spectacular spiral dive into the parking area from high up. Surprisingly, little damage was apparent at the scale judging after the flying.

Open rubber was won by Bill Pardoe flying a pontoon-equipped Taylorcraft. Open Peanut was taken by Bob Peck's Pietenpol, Junior rubber by Kel Pardoe's Cirrus Fairchild 24; and Junior Peanut by Jill Peck's Miles M-18. . . .

Neat Lube Job: Rubber-powered scale models are great. They are quiet, clean, start easily, and don't pollute the atmosphere. However, for maximum duration the rubber motor must be lubricated, and that little operation almost always results in lubricated hands—and trousers too, especially for juniors.

Fudo Takagi has several suggestions for making the lub job quicker, easier, and neater. "Plastic Murine (eye drops) bottles or similar ½- or one-oz. bottles come equipped with a removable nozzle. Wash the bottle out and let dry, then fill with rubber lube. Replace the nozzle and screw on the cap. The result is an unbreakable lube dispenser capable of depositing one drop at a time on small indoor motors or a complete squirt on larger ones. It's not nearly as messy as pouring the lube out of the bottle into a cupped hand.

To be neater still, put the motor into a small plastic bag, squirt in sufficient lube, twist the end of the bag to seal it and knead the motor until its well gooped up. This really minimizes the mess. Save the bag until the end of the flying session in case a new motor must be made up." . . .

Bill Warner: One of the nicest, most creative guys in model aviation and a really fine scale modeler and teacher is Bill Warner. In addition to his regular classes, he teaches model airplane construction for beginners and has quite a following. Particularly impressive is seeing his group of youngsters, who fly things like Rogallo wing stick jobs with Sleek Streek propellers, and watching the look of delight on their faces as their models really do fly—and the look of amazement on the faces of Open-class types when a ship catches a thermal and does over three minutes.

Broadhurst on FF

(Continued from page 43)

vertically into the hard, dry ground. One, if not both, of the propeller blades were thrown from the model while it was in the air!

Doug says the prop had been used about 25 times previous to that flight and was checked for any cracks or dings each time. On the ground it tached 23,000 rpm's. In the air, he said, it comes on strong, hitting maybe 24,000 or more. "But although it's a great prop," he said, "there just isn't enough strength at the point where the blade blends into the hub (for use on a high-rev 15—Editor). Somebody might have been hurt, if I had held onto that model for another three seconds before launching it." Doug has been named the West Coast distributor for Rossi engines. . . .

Heat Flying: One doesn't have to be the dedicated contest type to appreciate the fun and thrills of a flyoff between fliers who have maxed out. Most activity on crowded flying fields comes to an awed, silent halt as the

finalists crank up and launch their birds almost simultaneously. It doesn't take an expert free-flighter to follow the action.

It's fairly easy to distinguish which model has the best power pattern, which one gets the highest, and which one glides the best. Flyoffs are pretty much sudden death affairs where the flier either gets his max or he doesn't. If he doesn't (and somebody else does) he is eliminated. The winner is simply the guy who gets the best time.

Why not experiment with this technique? It could be just the thing for revitalizing competition flying. Entries in an event could fly in heats, with the number of heats determined by the number of entries. (An event with 20 entries might be divided into four heats, with five fliers in each heat.) The winners of each heat could compete in the flyoff or, perhaps even better, the team in each heat could be required to fly two or three times, with the ultimate winner determined by the best total individual time.

The idea is promising but needs thought and experimentation. Its best feature is introducing spectator interest—something we do not have in our "everybody for himself" type of contests. . . .

West Coast Nationals: Plans are well underway for the first all-FF meet in the Far West. It will be held at Gardner Field, Taft, Calif., over Memorial Day weekend, May 29-31, 1971. Southern California's hobby industry has pledged to support the big three-day affair. There's even a five-foot Grand Championship trophy donated by Japan's hobby industry! Seventeen events are scheduled with trophies, in most of them, to fifth place. There will be night flying, FF Scale, Old Timers and Rocket events along with other traditional AMA and international (FAI) classes. Nearly all of California's free flight clubs will share the responsibilities for running the meet. Those interested in attending this contest, no matter where they live, write Chuck Broadhurst, 3818 El Ricon Way, Sacramento, Calif., for details. . . .

Free Flight Directory: One AMA'er deserving of our plaudits is Lee Polansky, president of the Free Flight Model Airplane Association of Southern California. For the second straight year, Lee has published a roster of the members of all the FF clubs in his part of the state. The roster is a handsome little booklet and includes wives' names, AMA numbers, telephone numbers and even zip codes of the members of twelve clubs. Lee even lists association officers, AMA officers, and club officers in the Southern California region. Thanks to you, Lee (and to your wife, Suzanne), as well as to the FFMAASC, for spearheading this worthwhile effort!

McEntee on RC

(Continued from page 41)

South Challenge Meet to be held near Taft, Calif. Three glider clubs will sponsor the affair, each hosting separate events—with even a Scale glider category. This is the first such multi-club event we've heard of in the States and it might start an interesting trend. HSSS rules will be used. . . .

Glider Fliers Wanted. We've been able to scare up some company for glider loners at times in the past, so let's try again. Phil Milam (2174 Blvd. Granada, Atlanta, Ga. 30311) writes that he is the only really avid glider pilot in his area. Others do fly occasionally but are really more interested in multi-power planes. Phil says he became interested in this field after he took a full-scale glider flight in Calif. some years ago. He yearned to keep on with the big ones but decided RC gliders fitted his budget much better! . . .

Miskeet Mk 1 Plans: Avid glider designer Harley Michaelis tells us his 150-in. span

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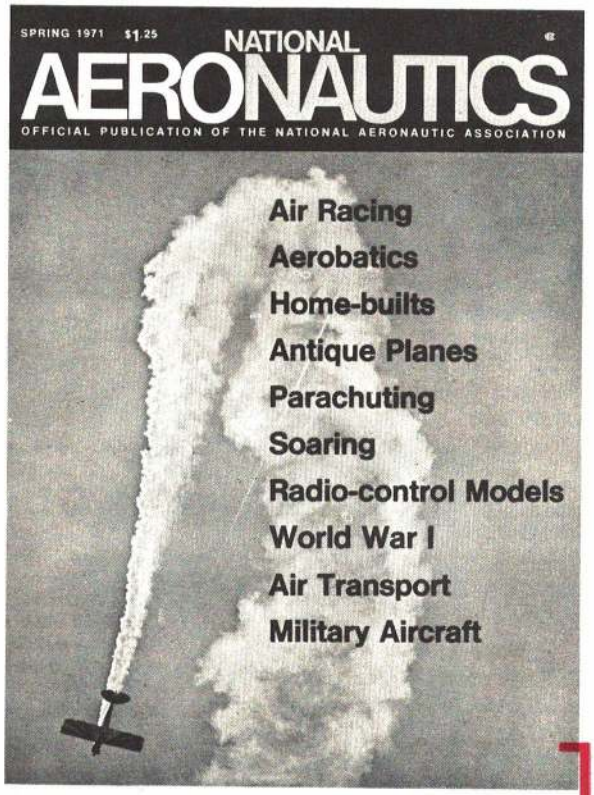

DECISION AT HULLAVINGTON by Don Berliner. On-the-spot writer/photographer team covers the world aerobatic championships as seen through the eyes of U.S. team member Art Scholl. A comprehensive and thoroughly illustrated coverage.

AGE OF THE WIDE-BODIED AIRLINERS by Doug Ingells. Outstanding author discusses not only the wide-bodied transports, but the 1970 generation of aircraft through the supersonic. As part of his research, he flew in the cockpit of a 747 to Paris and return. Noted for his books on such "new generation" craft as the DC-3, Connie, 707—and now the 747.

MILITARY AIRCRAFT—THE YEARS AHEAD by Donald Gilleland and Gerald Holland. A readable run-down of hardware and the military aircraft picture for the next decade. Many surprises. Our writing team coordinated a massive effort over many months. Don't miss this significant and forward-looking coverage.

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WORLD'S SMALLEST DROP ZONE by Bill Ottley. A sky-diver himself, he describes a fantastic regular exhibit, locale, an incredible adventure, which must be seen to be believed. This informative piece weaves in the state of the art and the parameters of conduct.

THE WIZARD OF SYCAMORE by Dick Stouffer. An enchanting article and photo journalistic report about one of the most unusual home-builders in the nation—a man who has built thoroughly accurate WW I aircraft in true colors of the aces who flew them. Story-book planes and projects. Camels, Sopwith Tripes, Nieuports—and fabled crates of another day. Antiquers and home-builders will love it—who wouldn't?

ERECTOR SET AIRPLANE by Don Pratt. A home-builder's gem—about Bede and his throw-away-the-book approach to design, construction, and performance. Drawings and color, too. This talked-about ship is test flown and commented upon by a pilot who knows how to talk to pilots, the insiders—and the multitude of fringe people who want in.

WHEN THE WORLD SHRANK by C. H. McKennon. The best-ever historical piece on a great event—the 1924 round-the-world flight. Fascinating facts and tidbits—the things you don't get in run-of-the-mill monthlies.

GREATER THAN GOLF by John Worth. Tells why doctors, lawyers, airline pilots and other professional people are turning to radio control model flying as a fast-growing sport and hobby.

WHITHER GENERAL AVIATION? by William T. Piper. For business or sport, there are big things brewing for the 70s—an authoritative prognosis with many fascinating and exciting facets.

E.A.A. NUMBER ONE by Don Pratt. Sparkplug of the 30,000-member Experimental Aircraft Association and the homebuilt movement is Paul Poberezny. His achievements in sport aviation are legendary. How does he do it? Friend and co-worker Don Pratt tells how in a great personality piece with the E.A.A. Fly-In for background.

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NATIONAL**AERO** NAUTICS speaks for itself.
It's one magazine you'll never throw away.

Miskeet Mk 1 will be offered in semi-kit form. Two-piece fiberglass fuselage, canopy, fiberglass and aluminum support tubing and assembly instructions will come from Fliteglas Models (Box 98851, Des Moines, Wash. 98188) for about $40. Harley says it takes about $25 to buy the necessary wood, hardware and MonoKote.

A fine set of plans drawn by Bud Faulkner (DC/RC member) will come with the kit. The wing area is 1008 sq. in., and wings are attached by the much-improved version of the tubing system recently presented in this column. The craft has spoilers, which are a real help in bringing it down and for spot landings. Harley claims this latest Miskeet is not difficult to build. He omitted the wheel and brake, RC towhook release and other complications. The redesigned craft is viewed as the next step beyond such gliders as the Cirrus. Several Miskeets will probably be on hand for the RC glider event expected to be held at the 1971 Nats. No word yet on whether this event will be official, but it will doubtless be held in some form. . . .

World's Largest Glider Meet?: For many years an annual fall RC glider meet has been sponsored by the German Graupner concern near the town of Kirchheim/Teck. Its fine site offers beautiful slope soaring conditions almost irrespective of wind direction. This year, 160 glider pilots flew! The meet draws hot pilots from many countries, and the top three fliers were separated in scores by only a single point each. Glider flying in the U.S. is growing fast, but we haven't reached this huge entry yet!

Blum on CL

(Continued from page 37)

A piece of 5/8-in. dia. dowel and a coat hanger are the only materials needed. The dowel's length is determined by the width of the hand, allowing for the wire bend at both ends of the handle.

Notch the dowel at each end, bend a 90-degree angle in the wire to accommodate the dowel, insert the dowel and then finish bends. The loops are made by bending around a nail held in a vise or driven into a board. Experience determines the distance between the loops to which the control lines are attached: the closer together, the less amount of control movement; the farther apart, the greater the control movement. Care should be taken to maintain an equal distance from the end of the handle to the loop for both up and down control . . .

And Then the Bearcat: Although Guardians swamp almost every Nats, a model of the fascinating Bearcat always appears. Edwin Sensebaugh's was built from scratch, using 3-views from a plastic kit. These are an excellent reference for exquisite detail and multiple views.

As a model subject, even in Navy Carrier, the Bearcat has presented some problems, particularly in balance. Many feel the fuselage restricts speed potential. Edwin's model has the advantage of a side-mounted K&B 40 RR, equipped with an exhaust throttle and fuel meter. (See January 1971 **AAM** for a Bearcat 3-view) . . .

Word From The West: Bill Noyes reports a capacity crowd at the Annual SCCA (Southern California Controline Association) Contest, Nov. 8, 1970. Twenty-one entries in Stunt flew two classes: Advanced and Expert. Because of the number of entries, only one flight was allowed per contestant. Bill boasts of four new youngsters in stunt, one only ten years old.

He also says Combat flyaways are a thing of the past, thanks to use of safety-cables from the bellcrank to the engine, as well as stringent line checks and pull-tests. Bill suggests that the slow-combat flier use clunk tanks to prevent the over-lean run at the top of the circle as is the case with the conventional wedge tank . . .

Rules Potluck: A lot has been said here and elsewhere about stunt rules, and the big issue over appearance points seems to be a 50-50 proposition. Bill Noyes' comments about the West Coast method of categorizing the event through Novice, Advanced and Expert, as compared to the AMA setup of Junior, Senior, Open presents interesting food for thought.

Grumman F7F Tigercat: The Tigercat is the raciest of twin-engine planes and a favorite of many Navy Carrier modelers. Prototype features are 455 sq. ft. wing area, 51 1/2 ft. wing span, 45 ft. fuselage length, 108 1/2 sq. ft. tail area, and a top speed of 425 mph.

The design is a good subject for a twin-engine Carrier model, but present rules hamper its successful competition. As a Carrier competitor, Virginian and Ray Randall's Tigercat gained fame at the 1959 and 1960 Nats. (The 1962 **American Modeler Annual** has the details.) . . .

Reference Library: "Adjusting the Exhaust-Intake Throttle," 1965 **American Modeler Annual**; "Retracting Gear Stunter," Jan./Feb. 1964 **American Modeler**.

Smith on CL

(Continued from page 36)

test, first place is worth five points, second three, and third two points.

FAI meets also can be held by interested fliers as long as ten contestants are registered and a CD runs the meet. The point schedule is the same as above. Points also can be picked up by individual flying as long as a CD times it. However, only one-half point per flying session will be given. In all cases, a five dollar fee will be charged for each flying session and the FAI poop sheet must be filled out each time. An FAI stamp is required on the flier's AMA card. FAI Team race contestants can pick up points in a like manner and by being timed the required number of laps for FAI during AMA team race competition.

CL finals will be held in Cleveland during Labor Day weekend. Plans underway now should make this the greatest Finals yet. More details will be reported in future issues . . .

Carving Aid: The next time you carve a wing, try this method. Cut the wing blank to outline and lay a strip of 1 1/2-in. masking tape on the bottom surface. Next, find a block of wood as long as the wing blank, and three in. wide and one in. thick. Use white glue to fasten the block to the tape, making sure the glue does not get on the wing blank. (Glue on the one-in. edge.) When dry, use the attached block for a handle to hold wing blank in a vise so carving will be easier. When the wing top is carved, sand to finish, gently remove block, put new tape on upper surface, glue block to wing, turn over and carve bottom surface.

I have been using this method for years; it certainly saves time and cut fingers. With a belt sander or disk sander, hold the block in your hand and, by using common sense, an airfoil can be blanked out to within finishing distance in minutes . . .

April Fool Four Months Early: The picture of the piped ST 60 in December's column, along with Doc Jackson's explanation of its operation, really brought 'em out of the woodwork. One letter had four pages of formulae and drawings! Thanks to all of you, but I thought everybody knew Doc and his wild sense of humor. Some of his photo captions could land him a job as TV comedy writer. So, c'mon guys, give him a chance. Who knows, if medicine ever becomes unpopular, he may need other work . . .

SBD Dauntless

(Continued from page 20)

model's wing was covered with silk for strength. Silkspan also is good but it will require a bit more patching.

The 1/16" dia. landing gear wire is bent as illustrated and mounted to a ⅛" plywood panel with fine wire or thread securely cemented. The wheels are 1⅜" dia. streamline.

Finishing: Round all external edges first, then sand all balsa elements smooth with 300 grit paper. Give the plane two coats of clear dope, sanding between the coats. (I don't sand the wing since I have gone through the covering in the past.) Over the clear dope, give the model one coat of light gray color. The canopy is painted white and has the painted tape cut and assembled to simulate the framework. The wheel section only is painted black.

Add the stars, numbers, rudder decoration and black dope wing walks, as well as the aerial and gun sight, to give the plane a realistic look. These extra details add considerably to the plane's appearance.

Engine Power: The plans show a Cox 020 Pee Wee powering the model, which uses a 6-3 propeller. This engine is mounted on a second firewall in front of the first. It is made of ⅛" plywood backed up with a ¼" balsa spacer and is cemented or screwed to the main one.

This design permits the second firewall to be removed and an 049 Cox Baby Bee substituted. As the flier gains experience, power can be jazzed up. For an 049 engine, add ⅛" stock above the wing trailing edge for more wing incidence, if needed.

The 020 handles the plane well, although somewhat tamely. A definite right and downthrust must be built into the firewall or obtained by adding a 1/32" washer or two under the upper right engine mount (as viewed from front). If right thrust is built into the firewall, add washers under both upper engine mountings to give downthrust.

Flying: Balance the model where CG is noted (adding weight to the front or rear as required), with all flying surfaces warp-free and in alignment. The wing should have about a two-degree incidence. With a firm push, launch the model over soft terrain. The ship should glide level and land on its wheels. If it dives, add 1/16" balsa on top of the trailing edge to increase incidence. If it zooms, add a 1/16" balsa spacer to the top of the leading edge.

When trim and glide are satisfactory, try a short power flight. Time the engine run first and then, on the next run, hold plane until about 10 to 15 sec. of engine run remain. Launch with a steady push into the wind and note the model's reaction. It should angle to the right in a climbing turn. Gradually add more power and alter the engine offsets as required to achieve this climbing right turn. The engine run should not be too long, unless lots of open space is available. The Dauntless doesn't take long to get out of sight, and who wants an audience to jump with glee, shouting, "Look, it's going into orbit!"

Cougar

(Continued from page 26)

these are fitted and work freely without binding, glue the wing in position. Be generous with the glue, some of the pull tests at certain contests are unbelievable! While the glue is drying, make the wing struts. They can be made from a solid strip of wood, but I prefer to use a laminated strut of two pieces. This permits an easier installation of the fittings, which are made from brass, aluminum, or any available scrap metal.

Attach overflow and refill fuel lines to the fuel tank. A realistic refill tube can be made from the upper portion of an exhausted Pactra Plastic Balsa tube. The refill fuel line is brought from the fuel tank, and through the threaded portion of the Plastic Balsa tube. Allow only several threads to project beyond the 1/16" sheet balsa cowl covering. After refueling, merely screw the cap back on. This should bring a few extra scale points. Use hard 1/16" sheet balsa to cover the cowl section, top and bottom. These sections may be hinged to allow access to the engine. The air scoop is built up from 1/16" balsa.

The interior may be simple or plush, but it is the interior detailing which often makes or breaks a scale ship. Plans show a typical interior. Seats may be carved from balsa and covered with vinyl, corduroy, thin leather or just about any realistic material. Small diameter aluminum tubing or dowel may be used for the seat framing. Build a floor from hard 1/16" balsa. The pedal tubing can be made in the same manner as the seat frame.

I used Tatone's instrument gauges which make a handsome instrument panel. The panel is made from 1/16" plywood with holes drilled to accept Tatone instruments. The instrument deck covering is made from 1/32" balsa can be covered to match the interior. I used black #400 wet or dry sandpaper.

Glue the 3/16" sq. hardwood windshield frame posts in place. These posts and other bare wood areas in the cabin should be painted. Put in floor carpeting if desired and mount the control sticks. Seat belts and a map or two on the seat add a touch of realism.

Complete the framework by gluing FC1 and FC2 into position. Carefully sand the entire framework. The smoother the framework, the better the covering job will be.

The model is now ready for its skin. I completed my Cougars' framework only one week before the Nationals. Since it was impossible to cover the ship with Silkspan and dope in that amount of time, I decided to try the new Super MonoKote. I was well pleased with the results and the entire ship was covered in two evenings. Metallic Green MonoKote was used and the tail surfaces and ailerons were painted white with matching interior. Side trim was cut from silver decal sheet and red craft tape used for trim.

Other details to be added now are the aluminum tubing used for the windshield braces which are glued in the correct position, directly behind the windshield. Mount the leadout eyelets, three on the left fuselage and three on the leadout guide. These are cut down from Perfect No. 214 leadout eyelets. Bring the leadout wires through the eyelets.

Cut windshield and side windows oversize and trim to fit. Contact cement may be used to attach these in place. I used red and white tape for the window trim. The windshield center post is glued on the outside of the windshield and may be made from thin scrap aluminum.

The registration numbers on my model's wing are incomplete because the set was incomplete. This error wasn't detected until 1:30 a.m., as I added details on the deadline day for judging (sound familiar?). The color scheme is left entirely to the builder. A quick glance through any aviation magazine provides many ideas. A back issue of *Air Progress* has an excellent set of plans for the Cougar by Triggs.

Complete the ship by mounting ailerons and pitot tube. Offset the rudder and mount the wing struts.

The finished Cougar will practically fly itself. Allow the model at least half a lap to gain flying speed before applying a small amount of up elevator to move the model from the ground.

Getting Started in RC

(Continued from page 50)

terbug, etc. All have 45-in foam wings and are quite bouncable. The first three mentioned are especially suitable, as they are high-wing types and thus are more stable and quicker to right themselves if the novice makes an error. These planes can be built in three or four evenings, so the almost inevitable crashes most novices suffer aren't completely disastrous.

Glen feels that if the beginner can afford full-house propo equipment right at the start, he can probably learn faster. Several of the Sig foam-wing planes (Fleet bipe, Flutterbug, Relic and Aero Sportster) are fully stuntable with such equipment, but none of the foam-wing line become high speed bombs. Glen offers one more suggestion for the RC newcomer—start out with a powered sailplane. The slow flight and gentle response of such craft are perfect for

the beginner who has trouble thinking ahead of the airplane. Glen also claims this is one of the most relaxing phases of the hobby!

A letter from John and Norma Kelly, both avid RCers who run a fine hobbyshop in Denver, has some worthwhile suggestions. They try to determine whether a newcomer is really deeply interested in RC or if it is just a passing fancy. Then they guide him toward buying the best radio he can afford and a suitable training plane to carry it. An occasional beginner has his own ideas as to what he wants and won't change. The Kelly's sell it to him but feel their responsibility ends right there!

The truly interested modeler is offered a high-wing cabin plane (best for the Denver area's high altitude) such as deBolt Champ, Goldberg Falcon 56, Midwest TriSquire. If the modeler has neither aptitude nor desire to build a complete kit model, he is steered to a suitable high-wing ARF (Almost Ready to Fly plastic job). Superfine finishes are discouraged, good workmanship and acceptable appearance are stressed. The Kelly's feel too much labor on a beautiful finish job makes for nerves on test-hop day!

For the radio, they feel a beginner will have fewer problems if he purchases a four- or six-control propo outfit immediately. This is the sort of equipment he eventually will want, as he gains experience. Here good used propo equipment can be an excellent buy. The Kelly's point out that in their area, where winds are often strong and the air is thin, ½A planes are not too good, especially for the less experienced. They have not had good results from selling Galloping Ghost equipment to beginners, although such apparatus is often favored by the newcomer with limited cash.

For the beginner who they feel is not apt to stay in RC too long—or who has his mind made up to start with single-channel equipment—they suggest a relay-type receiver, a motor-driven sequence actuator and a 15-19 engine, again with a plane like the Champ.

Grouper

(Continued from page 16)

surface. Sand an angle at the top of the windscreen support and blend downward to the contour of the windscreen. Glue the acetate in place with Duco, Testors or Aero-Gloss.

When dry, mask the canopy to the edge of the wood underneath it. Leave about ⅛ in. around the windscreen-fuselage joint. Mix some Hobbypoxy II and coat the canopy joints. The epoxy will hold, fill and smooth the joints and make a built-in rather than a built-on installation. Remove the masking tape before the epoxy is thoroughly cured. Sand, scrape and fill to blend with the fuselage. Mask again, leaving about 1/32 in. of acetate sheet exposed for the finish coats of paint.

Purchase a Lanier foam wing and cut off the tips to make each panel 29 in. long. Join them in the normal manner. Add one-in. thick tips and round them, letting the tips come straight back. Make the ailerons and hinge in place. Check wing alignment on the fuselage. Drill and tap the wing holddown block for ¼-20 nylon screws.

For finishing, simply fill with sealer and clear dope. Wet sand until the

surface is satisfactory. Avoid weight buildup.

The Grouper was painted Aero-Gloss Candy Apple Red with New Curtis Blue and White trim. Spray the entire fuselage, including the canopy, with at least two coats of clear.

The wing was finished with Aero-Gloss to match the fuselage. The dope does not dissolve the Aero-Skin covering. However, spray light coats of dope and allow each to dry thoroughly if the entire wing is painted. The dope shrinks and tends to pull the wing covering, tearing the finish at the overlaps. Coat the wing tips with Hobbypoxy II and scrape smooth before painting the wing.

The Grouper is clean, fast and responsive. It flies at a more constant speed than most. Rolls are almost axial, with just a touch of down elevator required. I have a little trouble in getting it to spin. It recovers immediately from a spin when the controls are neutralized. Loops are sheer majesty. They are easy to make large and the model tracks easily through consecutive loops. Landings are smooth. The ship tracks well and can be slowed down without fear of snap rolling.

The straightback wing tips aid in low-speed handling. By keeping the air from spilling, the effect is much like that achieved with vortex tips, but without the resultant problems of tip scrape. (I fly from blacktop).

The Grouper was not intended to be a competition model, although it was entered in some contests. Rather, it is for that vast majority of modelers who love to build and fly radio controlled model airplanes.

MRC-MCE

(Continued from page 49)

oval, and the road course, are necessary for proper evaluation. A 20-ft. radius circle course determines the characteristic handling of the car. It reveals the amount of understeer or oversteer and shows what will happen when the car is pushed to its limit. The oval course determines what driving techniques are required for maximum performance. The road course is run with other cars to provide a comparative analysis of the car's competitive potential.

The car is driven for at least an hour on each type of surface and each type of course. Testing is begun with all adjustments as recommended by the manufacturer. Changes then are made during the testing. Only if they have significant effect on the handling are the changes described.

The car was tested with the MRC two-channel radio provided; however, any two-channel radio can be used. The transmitter is small and light and quite comfortable to use after the short readjustment period required when using any new equipment. As a matter of preference, the throttle/brake control was spring-loaded to the center position. In this configuration, the forward half of the stick's movement takes the engine from idle to full throttle. The backward half of the stick's motion allows considerable control over the braking action while keeping the engine at idle. One advantage is a much faster throttle response because only half the travel of the servo is required to go from idle to full throttle. Another advantage is that more control can be maintained over the amount of braking done prior to entering a corner.

Initial track testing was done on a 500-ft. oval with an S bend on one straightaway. The surface was very clean and had some ripples at one end. With the front suspension geometry adjusted as recommended by the manufacturer, the car tracked true down the straights under power and cornered with very little muss or fuss. This car's very quick steering response required some adjustments on the driver's part!

The seven degree toe-in recommended by MCE may sound excessive, but a reduction in toe-in causes considerable wandering when the car is under power in a straight line. The spring-loaded tie-rod steering connection acts as servo protection and gives a slightly soft center which helps prevent jerky steering. The rippled portion of this particular course caused considerable bounce, due primarily to the rubber compound used in the rear tires.

The second testing session took place on a very smooth but none too clean parking lot, where the 200-ft. oval and 20-ft. radius circle were set up. The 20-ft. radius circle was driven first to the right with increasing throttle. The car exhibited considerable understeer, and it was quite easy to maintain a true track around the circle. The car could be driven around this circle at almost full throttle.

Just prior to spinning out, the engine rpm's increased suddenly and the

car's cornering attitude changed drastically. The rear end would slip out and the car would then spin. This indicated that the spinout was initiated by a loss of traction at the rear wheels. The front suspension was readjusted, changing the toe-in, camber, and the caster in an attempt to alter this characteristic, without much success. Around the 20-ft. radius circle, the car was most stable and fastest when the front end was adjusted according to the data sheet which comes with the car.

When the runs around the circle were repeated to the left, handling characteristics were identical. During one of these runs, the car hit a rock about the size of a pecan, flipped end over end at least twice and landed on its wheels with the engine running. One of the ball joint tie-rod ends came loose but there was no apparent damage to the car. The tie-rod end was popped back in place without stopping the engine and, with no other adjustments, the runs around the circle to the right and to the left were repeated. After this crack-up, no apparent difference was noticed in the handling characteristics of the car. The MCE is indeed rugged.

Each car has its unique handling characteristics which are inherent in its design. A 200-ft. oval was run to determine what the MCE's specific handling characteristics are and how they could be used to get around an oval in the quickest possible time. With this car, the go-in slow and power-through technique resulted in a large number of spinouts and some fairly slow lap times. On the other hand, the go-in fast, brake hard, coast-through, and then poke-it-when-you-get-it-straight technique seemed best.

The oval was run both clockwise and counterclockwise for a considerable period of time. It became quite apparent that this car will go around an oval fastest when driven deep into the turn, the brakes applied, a slight amount of throttle used through the turn and, then, when the car is pointed down the straightaway, the throttle is opened.

After an hour of running the oval, a strange thing happened. The car did not respond to the stick and hit the curb at about 60 degrees. The post-mortem revealed that both tie-rod ends had popped loose and in doing so prevented servo damage. The chassis was not bent, the suspension carriers were not bent, and re-assembly and realignment were all that were required to get running again. Such an impact would have demolished many cars. However, the engine did not shift, so gear mesh was not affected. Steering loss was caused by the receiver in its foam protection sleeve working forward and restricting steering action. A worthwhile modification would be installation of a bulkhead to separate the radio compartment and the steering gear.

The MCE's clutch engages at a relatively high rpm, which is convenient for the car's handling characteristics. Fastest cornering is accomplished without excessive power, so the high rpm engagement speed of the clutch prevents breaking the rear end loose with too much power too soon in the corner. This setting is adjustable, however to suit any individual preference.

The third session, on a large smooth, clean parking lot around a road-type course, was driven with the MCE and some contemporary lightweight cars equipped with sponge tires. Obviously, this car is quite competitive. Driving techniques differed but lap times were comparable to the other cars'. Top speed is computed to be 23 mph at 10,000 rpm. The 6 to 1 gear ratio supplied seems to be good all-around. The Enya engine was capable of producing top speed and its acceleration was comparable to other production cars.

The car as delivered was not equipped with an air filter, a fuel filter or an engine heat sink, which are absolutely necessary for a reliable engine in the rough environment of an RC car. The bull gear is close to the ground and did get some nicks during the testing period. The front suspension pillars did not slide freely on the uprights, which occasionally provided some weird cornering attitudes.

Addition of sponge tires to the rear should be considered for serious competition on some surfaces. With a strong engine, the car is competitively fast and certainly is durable enough to be running when the checkered flag falls.

The MRC

An MRC two-channel digital design (manufactured in Japan) was the radio used. This system is simple and inexpensive. Dry cells are used for power and no charges are required.

The transmitter utilizes a two-axis single stick with electromechanical trim on both functions. A single phenolic printed circuit board carries all the electronics. A free-running multi vibrator sets the repetition rate at about 30 frames per second. This is followed by two half-shots controlled by the stick pots and with tiny trim pots to set function sensitivity. The three control pulses are squared and modulate a simple two-transistor RF stage. RF tuning and filtering is somewhat complex, with four tunable inductors involved. The first tunes the crystal-controlled oscillator, a second provides interstage tuning, and two provide output tuning for the base loaded antenna. All components in the transmitter are discrete. The attractive and comfortable brown vinyl-covered aluminum case measures 4 x 2 x 6¾".

The transmitter is powered by eight 1.5V dry cells. The system does not come equipped with batteries, and of the 12 batteries purchased, eight were bad. Cells should be checked, if possible, at time of purchase, if not, as soon as you can unload and return the bad ones.

The system features changeable crystals, which accounts for the careful filtering in the RF section to remove undesirable harmonics. The transmitter crystal is easily accessible by removing the transmitter back. The receiver crystal is a tight fit, has no tab to permit a grasp, and can be reached only by partial removal of the receiver from the case. However, we are since advised that production units will be tabbed to facilitate changing.

The receiver is housed in a ¾ x 1½ x 2" plastic case. Electronically, it features a single tuned front end followed by a three-stage IF. Diode detection is used. The detected signal is amplified and squared to provide decoder clocking pulses. The clock pulses are coupled to a synchronization stage which stretches the pulses to provide a square synchronization pulse whose

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duration equals that of the entire frame of pulses. A 14-pin flat pack integrated circuit dual J-K flip-flop is used for decoding.

This flip-flop would be set for clocking during the synchronization pause (no pulse). Upon receipt of the first pulse, the first flip-flop presents a logical one (positive pulse) and is then inhibited by the sync stage from being turned on again. It is turned off by the second pulse. The second flip-flop is set by the first control pulse and is turned on by the second clock pulse which also turned off the first flip-flop. The second flip-flop is turned off by the third clock pulse to form the second control pulse, ending the frame.

All the wiring emerges from the receiver via p.c. lands used for common connection. One plug is used for power and one for each servo. These plugs are coded to prevent inadvertent reversal.

Four dry cells power the receiver and servos. The plastic battery holder is not particularly sturdy and, while adequate, it could be improved.

Two servos are provided with the system. Those tested had rack (push-pull) outputs and measured 13/16 x 1½ x 2". A servo with a rotary output also is available. The servo design is the same as that used in the MRC F-710 system. A transit time of around 0.6 sec. end-to-end is achieved while retaining very little overshoot and no undesirable oscillation. Car drivers find high servo speed quite desirable, since a fast car may travel 20 or so feet during the servo transit required to throttle back and apply brakes.

Servo amplifier design is all discrete components and the fifth wire, used on the F710 system, is retained for the noise rejection circuit. The servo is tightly packed and care must be exercised in removal and replacement of the amplifier to avoid component damage. In keeping with their normal practice, the system uses lengths of spaghetti over each bent-over component lead, and components mounted on end are protected from vibration by a rubbery substance similar to Pliabond.

Two observations on operating were made during testing. The first is strictly a matter of preference. As received, the transmitter stick for throttle control is spring-loaded to the extreme low position. The intrepid test car operators preferred to have thottle range utilize only half of servo travel for even shorter transit time (i.e. about 0.3 sec.). Thus, the stick was modified to spring load it to center just as for a normal elevator function. Idle occurs at the center position and, as the stick is retarded further, brakes are applied. The excess travel in the throttle linkage is absorbed by a music wire scissors spring.

The second note is that the drivers had mounted the servos rather solidly with 1/16" servo mount tape, rather than with the 3/16" tape provided in the car kit. Now a car is a pretty solid object, the engine is mounted directly to the chassis, and the car absorbs a lot of road shock, thus better shock mounting is in order. I have observed several servos (other than the system under test) after prolonged use in cars and wouldn't consider them for use in an airplane after that treatment. I suggest the use of ⅛" servo mount

(Continued on next page)

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MRC-MCE

(Continued from previous page)

tape or normal grommet mounting of the servos.

In summary, the radio performs quite satisfactorily and should be servicable. The use of dry batteries eliminates the need for nickel-cadmium batteries and a charger. The operator would be wise to carry a spare set of pre-checked batteries in the field box and to check the voltage of installed batteries before and after each running session.

You Said It!

(Continued from page 10)

I've just completed flight tests of a model which I designed to meet the specifications which came out of a reader survey. One of the specs: "Should fly hands-off and recover from any flight attitude." It means, basically, a sport free flight design with full stability. It'll never win any contests for precision flying, but it will save a lot of beginners a great deal of repair work.

Another plane I've been working on—an amphib—has introduced me to the limitations and advantages of plastic models. And when the kit comes out, the guys who fly it won't have to worry about the dihedral and fin relationship—I've had the fun of doing all that!

Let's just enjoy watching the newcomers enjoying themselves as they develop their pilot skills. We can still get our kicks by designing something for them to fly.

Ken Willard, Los Altos, Calif.

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