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JULY 1970

AMERICAN aircraft modeler



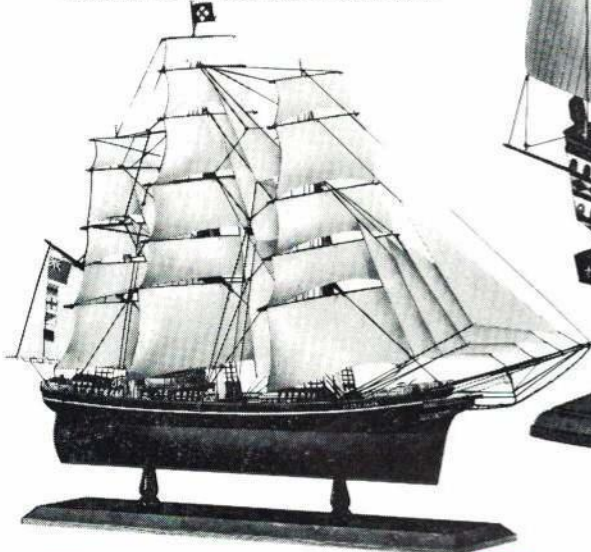
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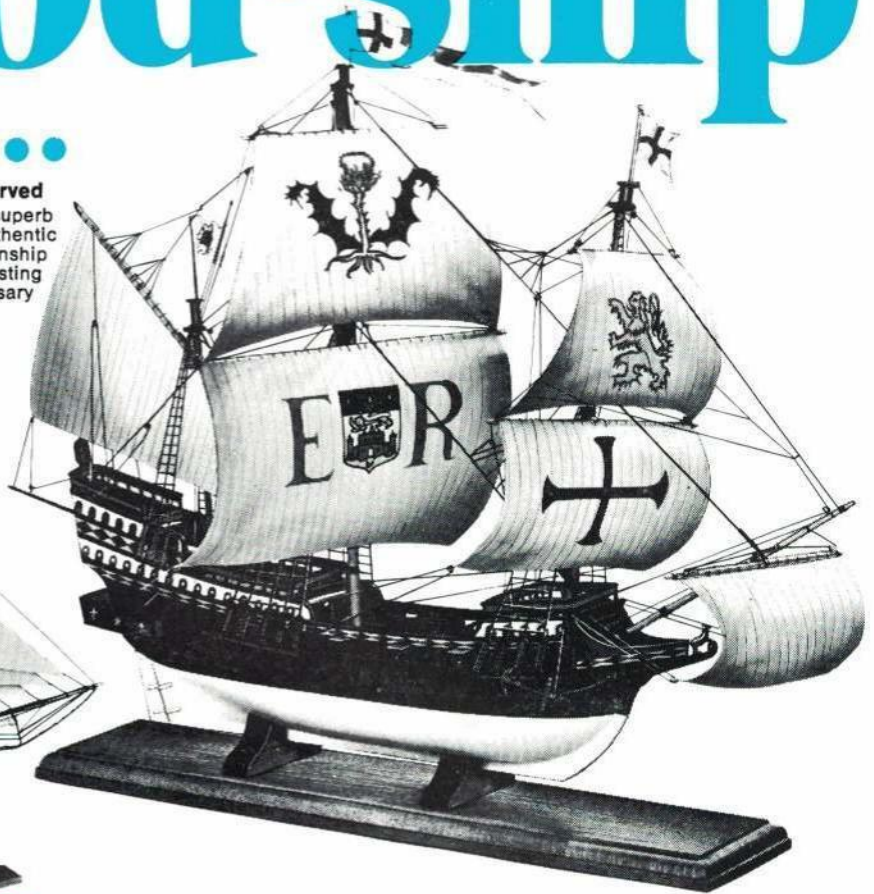
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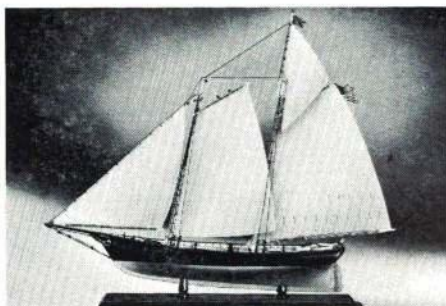
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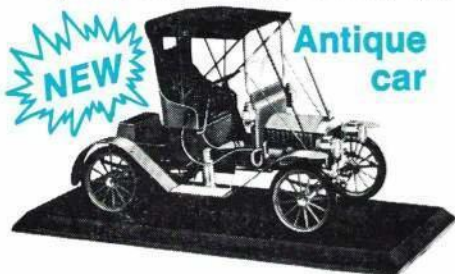
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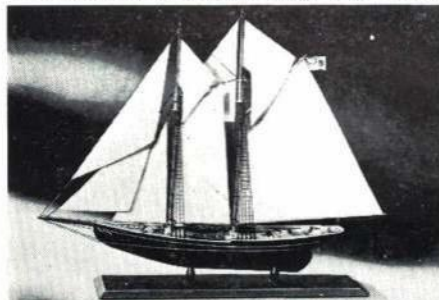
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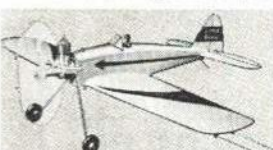
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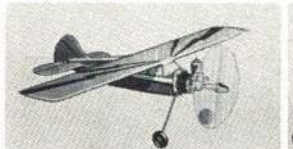
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COVER PHOTO: Michelle Dolan admires her father's colorful RC sport/stunt model the Suds, presented in this issue. Sixty-powered version is fast responsive flyer. Transparency by the author Joe Dolan.

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Kathryn Conover, Editorial Assistant

EDWARD C. SWEENEY, JR. — EDITOR
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JULY 1970

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Between the kid who buys a simple ready-to-fly and the expert's complex design is an aeronautical generation gap.

THERE are increasing signs that many hobbyists are puzzled, if not lost, by the continuing trend toward ever greater design complexity in aircraft of all types and accessories. Merely to fly gets more difficult and costly all the time. For the comparative few who have a half-a-thousand clams required to fly a dwarf real airplane at near-transonic scale speeds, or those who drive 70 miles because no reasonable flying site can accommodate the cloud-piercing free flight, dissent is not recognized as part of the beginner problem.

There comes to mind the recollection of a Detroit Nationals the year the Comet Zipper (designed by Goldberg) appeared. Over 700 entrants flew Zippers. Its pylon design and power control put life into free flight, a year after the same site was littered with crashes. One literally had to watch where he stepped because engine fragments were scattered about like so many moon rocks. Now they play with tuned pipes. The high-performance airplane in any category is the bit for the hard-core hobbyist—the more skilled, the more fortunate—who makes up a large segment of the conglomerate magazine audiences, and for the bulk of advertising which affects policies as tracks affect a train.

There must always be competition. But competition decrees endless refinements which weed out people who cannot find other identification. What they need, they have never seen. The great pool of design talent is locked into the assumed tradition that the other guy must be defeated in battle. Or in merely out-wowing the other guy, even if there is not a contest. Great challenges—the small field design, the parking lot crate, the respectable, parlor and gym fun stuff—go unmet. Modeling is a spectator sport, they say, but we provide too many spectators from our own ranks.

Contrails (Charleston, S.C. RC Society) asked in an article about RC equipment kits—which subject we won't pursue—"Has our hobby grown so technical that there is no room for the novice or the individual?" Ed Packard, whose Cleveland Model and Supply Company was the biggest in the world when rubber-scale was the thing, remarks, "Many hobby shop owners are finding that men who just cannot keep up with RC or cannot afford to get into it at all, are beginning to look at smaller models. . . to build as they did when boys, both (scale) rubber-driven and converted to small gassies." Among the customers for his plans offered today, he estimates only one in six could be made into a radio job.

Writes reader Gabe Bedish, "I think we have apexed free flight. . . We are winding the top off a lot of modeling with over-sophistication of expensive commodities

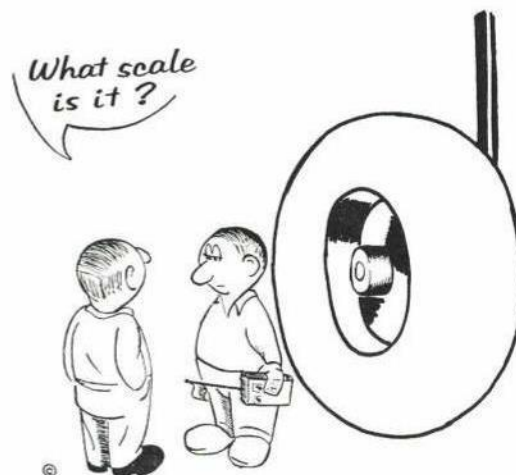
so that the "country kid" and the average young American miss the dream of love of flight. I am not looking down my nose. We are cornered with gadgetry to the point where we are at grips with loss of interest. In the Forties I knew hundreds of outstanding modelers around my home town. Now I don't know one.

"In ten years, two-thirds of America will be under 25," he continues. "You have a gigantic task who boost aeromodeling. I hope to see you live through it. . . Modeling was the boy's vision. Complicated gadgetry is what someone required he do, and many boys lost out on their dream." And so it goes.

Meanwhile simple, ready-to-fly stuff is being sold at myriad outlets, by hundreds of thousands—probably by millions. An industry pool now shares production of 100,000 Delta Darts (more than that already had been kitted) to be given away in an HIAA-AMA program.

Kids are interested. But they don't, for the most part, stay interested. There is no place for them to go. Step by step, or exciting things they can fly near home. That is an aeronautical generation gap, lost future demand.

There is a population explosion. Millions of additional possible customers. Yet magazine newsstand audiences are roughly one third of what they were a quarter century ago. All have costly subscription promotion, and very expensive mail-order promotion will someday be inevitable. What shall we offer these new customers? Who among you will design models which the young will love to fly? The effort must be ever-renewing. Alas, experts design simple "expert" models. — The Publisher.





Warm memories of 'Icy' legend

Normally, I read the magazine from cover to cover, including the "You Said It" department, studying the issues and reading the "feedback" from around the country. However, in the April issue I find something that brings back memories!

Clyde Ice was a flying legend when I was on a farm N.E. of Rapid City, S. D., in the early 30's. My parents knew him quite well, and since they had never been in a plane, Mr. Ice promised to come to the farm and take us all for a ride.

When he arrived, and I believe it was probably in one of the Eaglerocks, he came so low over the house that everyone still swears he knocked a brick loose in the chimney. I don't believe he ever got anyone into the plane that day because anyone who came that close to the ground was not safe!

For years I occasionally heard of Mr. Ice and finally met him in Casper, at the local airport — naturally — about five years ago. I mentioned the trip to the farm, and he recalled the incident and the details vividly.

This gentleman is truly "Mr. Aviation," and a real nice guy to boot! Thanks for rolling back the years. I enjoyed it, and he truly deserves it!

To bring things up to date: at Casper we have a small but active group. We're well-represented in R/C Sunday fliers, B-Pattern, Slope/Thermal soaring, and C/L. We are in the formation stages of a club — feel we need the extra benefits of group insurance. And we have the finest flying site in Wyoming, an abandoned commercial field. Runways all directions, and fields with no trees or power lines for a half-mile.

We do fight the winds at times, and the cold — but we have only missed flying two weekends this winter. If it's above zero and under 25 mph wind — we fly. Excellent delivery on orders out of Royal Products in Denver, and good stock locally with two hobby dealers. Lots of "friendly" (?) competition between the local group and the Riverton, Big Horn Basin, Rawlins groups — and even into Billings and Denver.

There's a lot of clean air out here at Casper — come and fly with us!

Duane L. Williams, Casper, Wyo.

'Twin' triumphant

I should like to congratulate you on your wonderful magazine. It inspired me to build what I call "twin tail" — similar to the P38. It is powered by a Cox .049.

Well, my friends and I went to fly one day. I brought my twin tail. They liked it so much that they bought the materials to build it. That made me feel kind of proud, and it wouldn't have happened if it wasn't for your magazine. And I'm only thirteen. Thank-fully...

Joe Kaiser, Silver Spring, Md.

Daily double

My brother and I started building and flying control-line last summer. Now, a year older — 10 and 13 — and a stack of empty kit boxes later, we think we have something to share with beginners.

Those first few flights are plane- and heart-breakers. Like my brother said, "It doesn't hurt like a booster shot, but it sure brings tears to your eyes."

Lots of kids ask what they should build first, and we say, "Ringmaster... but build it like this."

I have supplied a sketch and picture of this design. The planes have been driven straight down, fueled up and flown again (it grabs the spectators). We scratch-build our planes now.

We got our father interested in model airplanes last summer and he built a Champ, Tri-Squire and a Heathkit proportional. Man, when this snow melts we're going to tear a few holes in that sky — and wipe a few tears, I guess.

Oscar Neal Strieby III, LaVale, Md.

Fearsome contribution?

Your "cover girl" on the March issue has nothing to do with models. There is so much talk of the Junior division and how they might stop the Nationals altogether if some more interest is not forthcoming. What mother in her right mind wants to encourage her son to go into a hobby which has as its constant companion this business of half-clad women on the covers of their magazines?

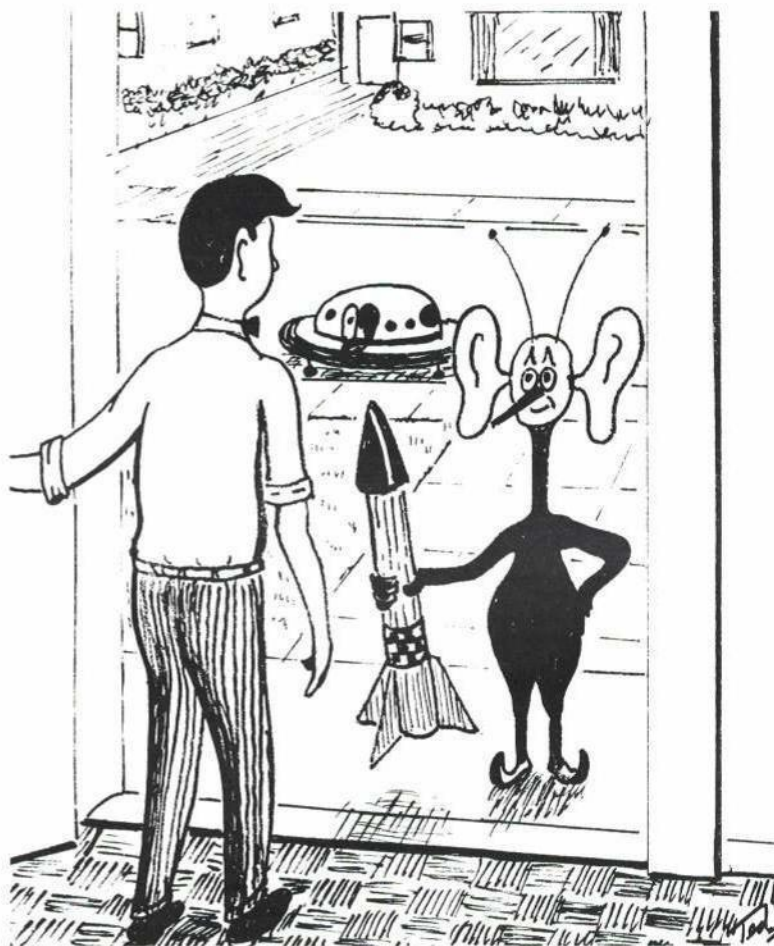
When you list the increase in cost of modeling as "fearsome" think of the fearsome cost to our nerves and the havoc it creates in our homes. Consider your own contribution to the "fearsome cost."

You could get enough outstanding pictures at the Nationals each year for hundreds of magazine covers.

Modeler's Wife

Having built perhaps 1000 model airplanes while raising nine children who are raising 17 grandchildren — and that may easily go to 30 or 40 — your publisher doesn't view the situation with alarm. The young lady was not a model, but somebody's very nice daughter — the contributor's, in fact — and we would have been more distressed had she been wearing an evening gown when assisting Dad with his seaplane. The publisher does object to gals on the cover — simply because the constant repetition by so many mags overdoes a good thing. In fact, AAM has run so few girls on the cover that many of our readers have asked what we had against womanhood. We do respect "modeler's wife" for her forthrightly expressed opinion.

— The Publisher



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YOU said it!

Continued from page 6

Juniors do get help

I am a 17-year-old boy who has been crazy over model airplanes for as long as I can remember. I flew U-control for three years with the help of my father. However, last summer I stepped up to R/C. I joined the Greater Pittsburgh Aero Radio Control Society.

Before joining this fine club, I had read all the articles in the "You Said It" column about the way senior modelers often ignore us junior members. I knew that I would need a lot of help to get my first ship into the air and was very worried about where the help would come from.

Boy, was I *wrong*! From the start, the men helped me to get the plane trimmed out and flying. Before too long they all came to know me, and I them. During the course of the summer, several other junior members joined the club and got the same help that I had received.

I don't know about any other clubs; but in mine, there isn't one member who wouldn't give up a day's flying to help a younger member get his plane in the air.

John Jarvis, Aliquippa, Pa.

Way-out department

In the February issue, you mentioned the *Pitdown man* in an editorial, "Straight and Level."

Since you are making an analogy between the hiatus in model plane history and anthropology, I thought a correction on the generic term in order.

Pitdown man was supposed to have been a link in the evolutionary stage of homo sapiens. The term was derived from the locale of the supposed habitat of ancient man in Pitdown, Sussex, England, in 1911. In 1953 these remains were exposed as a hoax.

Here's hoping the Modeler's Hall of Fame makes the Big League!

Thomas H. Sears, Cherryfield, Maine

Note: Our reference books (copyright 1966) still credit the remains found near Pitdown as being those of an extinct predecessor to man. Characterized by a retreating, apelike chin and thick cranial bones, but having a humanlike cranium, the Pitdown man—or *Eoanthropus dawsoni*—has similar anthropological significance to the Peking man, Heidelberg man or Cro-Magnon. Whether calcium or plaster-of-Paris—fiberglass and epoxy, maybe?—we did misspell Mr. Pitdown's moniker. —Publisher

Storch rides again

Thanks for the fine story on the Fieseler Storch. It may interest you that the designer of the Storch wasn't really Fieseler.

Prof. Dr. Ing Winter is responsible for it. He was head of the Department for Aircraft Design and Construction at the Institute for Technology at Braunschweig.

Since you mention the gift to Gen. Spatz, it may interest you also that Göring sent a Storch to Marshall Balbo in 1939. The ship was flown over the Alps into Italy; they made a story about it because in those days it was considered difficult to cross mountains in such a ship.

"Fi 156 Storch" (the official German designation); not just designed for the Luftwaffe.

Continued on page 10



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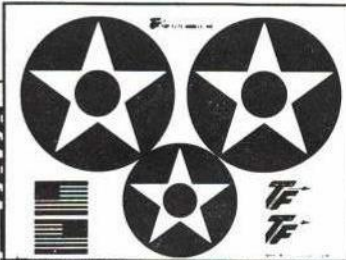
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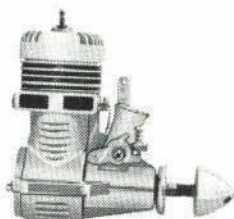
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SPIRIT OF '70

Fox Motors



FOX 15x RC

Bore .590
Stroke .540
Wt. 4½ oz.

\$14.95



FOX 36x RC

Bore .800
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And here is the spirited Fox 15x RC... possibly the only 15 size engine featuring a controlled fuel flow at idle. This means you can make touch and go's — prolonged dives — spins, etc., at idle without the danger of the engine flooding out. The Fox 15RC features new rotary type exhaust valve and a new finned crankcase. Try this one.

More power than any similar size RC engine... better fuel suction at all speeds. Every engine is test run and adjusted. Parts are readily available. In case of trouble, help is a phone call away. A Ferrari is a fascinating piece of machinery, but for dependable, trouble-free transportation Chevy has it. So does Fox.



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Fieseler was thinking about the civilian market, too! For pilots with little flying experience, as all-weather aircraft, for research, photography, police.

Note: Today our press makes a big story about our police helicopters, but the Germans did that already — using aircraft for police work.

Guenter Steuer, Huntington Beach, Cal.

Worthwhile journey

First, a compliment to the personnel behind AAM. It is informative, businesslike and entertaining.

I would like to commend the folks that organized the World War I Jamboree at Cole Palen's Old Rhinebeck Aerodrome. It was a most rewarding something-for-everybody show.

My son Robert, his uncle Jake Christman and I made the trip, 250 miles one way, and found it more than worthwhile. We three are new members of the AMA and have been feeling our way around at hobby shops, areas of model airplane activities, and have been to several large AMA-sponsored events.

We have found that on the whole folks, young and old, taking part are a "pretty good bunch," willing to talk about the sport and offering to help in whatever way they can.

We were delighted at the way we were received at the Rhinebeck event. We were signed in at the entrance gate with a cheery "Hello there, welcome Stoughton, Mass.," and much to our surprise and pleasure were shown to an area reserved for AMA members. Terrific!

Steve Bellay, Stoughton, Mass.

Blacklines vs. blueprints

I am quite disturbed that you have taken to the practice of your blueprint style of drawings. I believe that the black lines on white are easier on the eyes. There is not enough contrast in the blueprint style, as used in the April issue instead of the four-color spread.

I subscribed because of the color center-spread and rare aircraft scale drawings and I hope you return to this practice. Remember how the other pulp hobby magazines died out?

John Blaho, Chicago, Ill.

Finding that expensive four-color center-spreads didn't increase readership — competition take note — we've added instead 12 more pages of modeling info. And one of these days we'll return the center-spreads as well. As to white lines on blue, we agree. We'll give thought to how to use color with plans — which makes things look so nice — in some better way. If there is one. Oh, woe. . . — Publisher.

That gap again . . .

I am 13, a member of the younger generation and a model club. I fly control line; to me it's not a cheap hobby, but I have a job and will work for money just to "invest" in my hobby, which many guys won't do.

The real reasons why the younger generation doesn't fly: most guys my age don't have patience with sanding, getting parts to fit and other things which take time they don't want to spend. They want to hurry to the flying field with their models. The biggest drawback is money, and inflation doesn't help any; another problem is lack of instruction — they need someone to show them the right and wrong way of doing things, and why it should be done the right way.

As far as your magazine is concerned, it is the best on the market, BUT! It annoys

Continued on page 76

Jetco
MODELS

takes pride . . .

Flying...at its very finest!



\$13.95
Kit #CL-6

Low McFarland's
"DOLPHIN"
For 29 to 33 Engines, 49" Wingspan, 516 Sq. in.



Three-Time Nationals Control Line Scale Winner

MUSTANG "F-51H"

For .19 to .35 Engines, 30 1/4" Wingspan Kit #S-1 \$14.95



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15 1/2" Wingspan, Plastic Prop

15 1/2" Wingspan, Plastic Prop



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1965 NATIONAL CHAMPION

80" Wing 42" Length

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Amphibious Flying Boat
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Just Add R/C Electronics And Go

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Kit GD-101, R/C car only, 8 lbs.....\$49.95*
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only \$129⁹⁵*



"In the driver's seat"... that's where the new Heathkit 3-channel R/C system will put you... with total control thanks to reliable digital circuitry, interference-free operation and dependable servos. The powerful transmitter has a factory assembled RF circuit. Trim controls leave the sticks always centered for better control. The receiver in nylon case weighs only 2 oz. and measures only 2-9/32" L x 1-3/16" W x 1-5/32" D. Ceramic IF filters assure sharp selectivity. Its double-tuned front end, RF amplifier and dual AGC give interference-free reception. Rechargeable nickel-cadmium batteries in new flat packs power both the receiver and transmitter for up to 4 full hours. Servos have 2 shafts that travel

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- Measures RPM at any rotating device... propellers, gears, flywheels, shafts etc.
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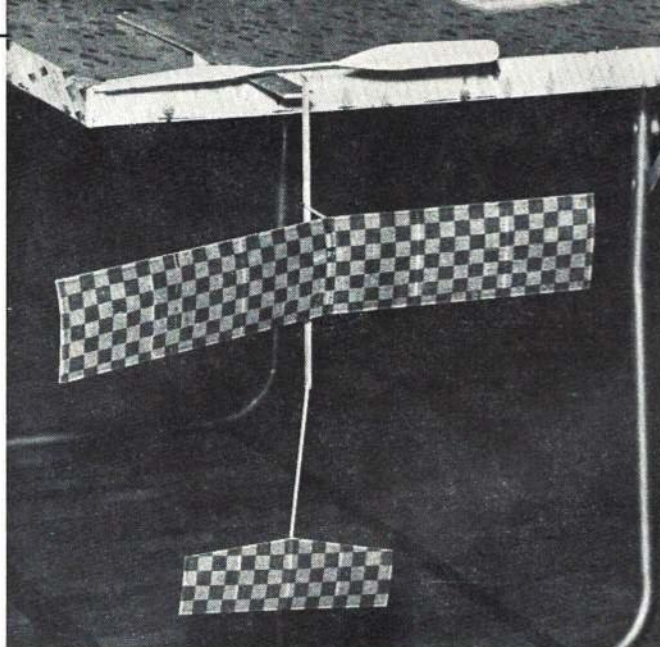
GX-208



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All photos: Erwin Rodemsky

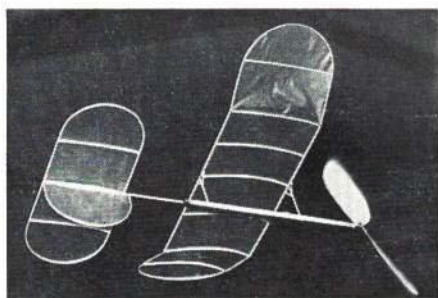
At far end of weighing stick is a copper penny. This model needs a dab of weight to be legal. Appeal of the weight rule is that it eliminates expert-only building and overly delicate structures.



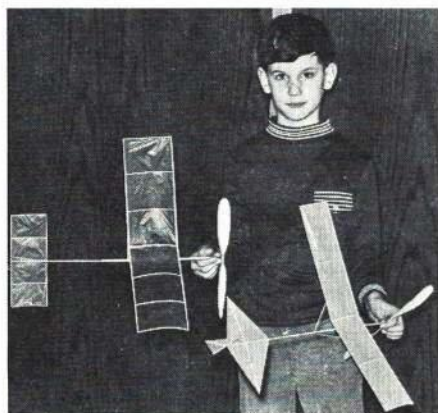
Erwin Rodemsky is man behind Pennyplane event. His model needed weight too. He launches low to have plenty of height for climb. Note that the wings cannot be braced and must use tissue.

ON THE SCENE *Pennyplane Event*

Chicago Aeronuts try unique beginner's event in which key factor is model must outweigh new copper penny. Easier for novice and challenge for the expert.



First place winner in Chicago contest is this fairly large job by Chuck Markos.



Third place Junior flyer, Tim Noonan shows both a Pennyplane and modified Easy B.

BUD TENNY

The Chicago Aeronuts, with many top-level modelers, is a well-known free flight club. It also has ties with the past — NAA record listings for 1938 show that all indoor HLG records were held by Aeronuts: Milt Hugelot, Robert Gelbard, Wally Simmers and Carl Goldberg.

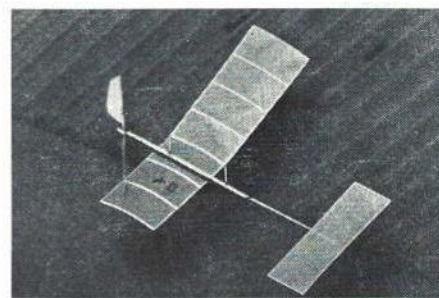
With this background, the club isn't resting on its laurels and instead is developing a unique beginner event — the Pennyplane. This experiment is best illustrated by looking at the rules. The model (less rubber motor) must weigh as much as a new copper penny, and neither the model length nor the wing span may exceed 18 inches. The rubber motor may not be enclosed, the motor stick may not exceed ten inches, and the model must use a single motor and propeller. No other restrictions are placed on model design and construction.

Flight rules are the same as for AMA except that timing stops when the model touches any object except another model. In case of a collision, each flier may elect to take another flight or accept the time at the collision.

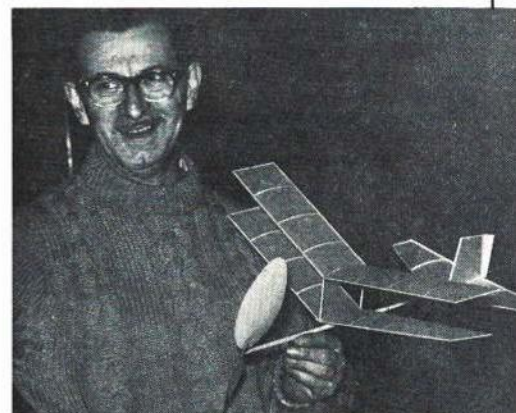
The Aeronuts introduced the Pennyplane event at their February contest, substituting it for the Easy B event held in January. Pennyplane entry was 50% higher than in Easy B. The winning time was 4:17.8, compared to 7:27 in the previous month's Easy B. Chuck Markos, with about six months' experience building indoor models, beat out top-notch modelers Jim Richmond and Charlie Sotich.

The models are a real challenge, yet

Continued on page 78



Charlie Sotich proudly displays NFFS decal on his entry. All models have undercamber.



Biplane conversion of standard Easy B type by Bill Gough makes interesting entry.



CARL GOLDBERG

New! RANGER 42

The Versatile Almost-Ready-To-Fly Fun Model

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Span 42"
Length 31"
Area 240 sq. in.
Weight 26-36 oz.

Can be flown 6 ways:

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Full explanation of each method given on plan.

FEATURES:

- One-piece molded Wing, high-lift
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For .049 to .10 Engines

Only **\$17⁹⁵** PRC1

Radio Control Flying is Fun! You can actually feel the thrill of controlling an airplane in flight—doing stunts, loops and rolls—and making it come back to you and land where you want. And the shortest way to success is with the unique new RANGER 42. This model has been carefully engineered, leaving only the simplest final assembly steps, all clearly illustrated. Flight stability is exceptional, as well as response to control. All you have to do is add your engine, wheels, and radio control—only 6 to 8 hours work—and you're ready to go FLYING! Just ask your hobby dealer—he'll be glad to show you the features.

SKYLANE 62

Semi-Scale Beauty in A
Great Flying Model!

DELUXE — Includes New Fittings

1/2 A SKYLANE \$9⁹⁵

For Single Channel —
Escapement, Servo or Pulse
Span 42" Area 244 sq. in.
Length 35" Weight 22 oz.
For .049 Engines

Tough, roomy cabin and front end, takes single
to 10 channels or proportional.
Steerable nose gear.
SPAN 62" AREA 540 sq. in.
LENGTH 50" WEIGHT 4 1/2 - 5 lbs.
FOR ENGINES FROM .19 to .35

\$34⁹⁵

The Design That
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Simplest, Sound,
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THE FAMOUS FALCON

SR. FALCON \$34⁹⁵

DELUXE — Includes New Fittings.
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Proportional

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Length 53" Weight 6 1/4 Lbs.
For .35 to .45 Engines

FALCON 56 \$18⁹⁵

DELUXE — Includes New Fittings.
Takes Single to 10 Channels or
Proportional

Rudder-Only or Multi-Training
Span 56" Area 558 sq. in.
Length 43" Weight 3 1/2 lbs.
For .09-.15-.19 Engines

Junior FALCON \$6⁹⁵

DELUXE — Includes New Fittings.
For Single Channel —
Escapement, Servo or Pulse
Span 37" Area 250 sq. in.
Length 28" Weight 16 oz.
For .049 Engines

World's FIRST
Single or
Twin Engine
R/C Models

SKYLARK

DELUXE — Includes New Fittings

Skylark 56 Shown

SKYLARK 56 \$21⁵⁰

Takes Single to 10 Channels
or Proportional
Span 56" Area 528 sq. in.
Length 44" Weight 3 1/2 - 4 1/2 lbs.
For Single Eng. .09, .15, or .19
For Twin Eng. Use Two .09's or .15's

JR. SKYLARK \$7⁹⁵

For Single Channel —
Escapement, Servo or Pulse
Span 37" Area 235 sq. in.
Length 29" Weight 18 oz.
For Single Engine Use .049
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The Goodyear Racer with
Enough Wing Area and
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Can Fly It!

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FOR 6, 8, 10 CHANNELS OR PROPORTIONAL

SPAN 54" AREA 540 Sq. in.
LENGTH 44" WEIGHT 4 1/2 - 5 Lbs.

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I am sending 10c for 4 pg. Illustrated Catalog with "Recommendations on Starting in R/C," Basic Explanation of R/C Equipment, and Radio Control Definitions.

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Whip-powered with up-and-down control

JOE WAGNER

MOTORLESS control line models are inexpensive, large enough to be interesting, yet small enough to be convenient to build, carry and fly. They don't make any noise, so they can be operated almost anywhere: in the backyard, in a school playground, or in a vacant lot.

The pilot has more control over a whip-powered model than a powered job, has complete command of speed, and can stop any time. With the whip pole in the left hand and the control handle in the right, control lines can be run in or out as much as five

F-84G Thunderjet

is quite a way to try control line modeling. Sharp-looking model is also a mild stunter.

feet while flying. This allows some stunts with the whip-powered plane that are impossible for an ordinary model.

My six sons and I fly constantly in our front yard. We have flown big models and small ones, monoplanes and biplanes, trainers and stunt ships. The Thunderjet is one of the best-flying and best-looking whip-powered models. The Republic F-84G Thunderjet once was standard in 14 different air forces. In the Korean war it flew over 140,000 combat missions. The model can be made into either a highly-maneuverable but touchy airplane that can do nearly anything in the book except the overhead maneuvers—or a steady-as-a-rock ship that forgives some uncertainty on the controls.

CONSTRUCTION

Cut out all parts before gluing anything together. The plans show the required materials. One possible change is thickness of the wing. It can be made out of either $\frac{1}{8}$ -in. or $\frac{3}{16}$ -in. balsa. With $\frac{1}{8}$ -in. wood the airplane will fly faster; with $\frac{3}{16}$ -in. it will loop tighter. The thicker wing is also more durable.

Trace the outlines of the parts onto paper, then cut out these tracings to use for patterns. Trace the insignia and markings that appear on each part. These patterns are used later to locate details properly. Sand the major pieces. Round off the outer edges of the fuselage, the wingtip tanks, and the stabilizer. Glue the wing leading edge pieces on the front of the wing, and the under-fin to the bottom of the rear fuselage before sanding these parts. Assemble the elevators together with their little popsicle-stick join-

er and control horn. If inexperienced with control line models, make the control horn twice the length shown on the plan. This reduces the control sensitivity.

Another way of reducing sensitivity is to add weight to the nose. A lump of modeling clay on the nose tames the ship considerably. To do loops and figure eights, peel off the clay again. The more nose-heavy a U-control model is, the less touchy and, of course, the less maneuverable.

When sanding the wing, elevators, vertical tail, and the two small fins for the wingtip tanks, round off their front edges and sand the rear portions to a tapered shape. Don't make the back edges thin as a knife. Sand the wing to fit as accurately as possible into its cutout in the fuselage. Cut the wing in half on its centerline; glue it back together again with the dihedral angle bend in the middle. (See front view on plan.) Lay one half of the wing down flat on the workbench and raise the other tip $1\frac{1}{2}$ in. off the surface. Sand the two edges to fit together neatly.

While waiting for the wing center joint to set, cement the stabilizer onto the fuselage, making sure it is straight, looking both from the top and the rear. Set the elevator assembly loosely in place; next cement the vertical tail. A whip-powered airplane doesn't pull heavily on the control lines, so the controls must work freely. Hinge elevator when the model is practically finished, using figure 8 stitches of nylon thread. Don't do it now.

Install the bellcrank so that it moves freely. Be careful not to get glue between

the bellcrank and the wooden dowel it pivots on. (Sketch shows how parts fit together.) The four little scrap-balsa pieces are used to fill up the slots over the dowel ends. This part of the model has to stand a lot of strain!

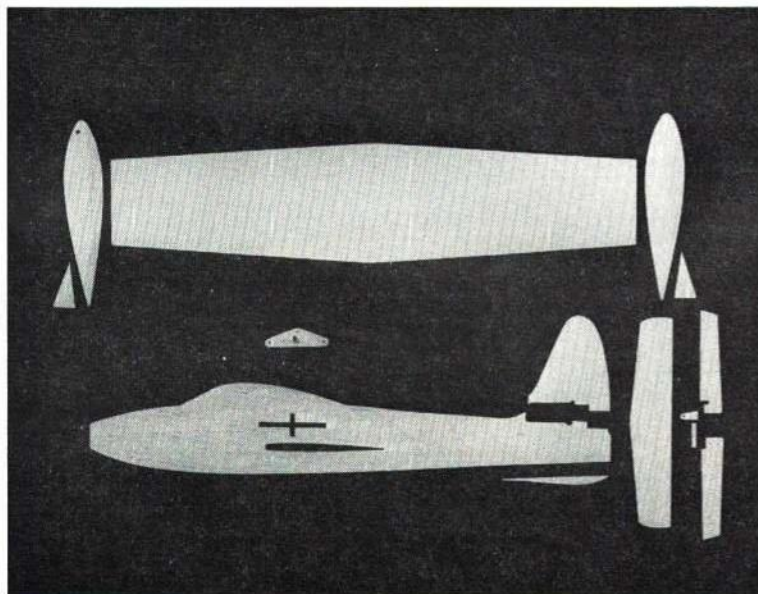
Put the wing in place. Make sure it isn't crooked, either from the top or from the front. Then cement the wing and fuselage joint all around on both sides. After it has dried, put a double coat of glue along joint. Add the wingtip tanks and their little fins.

The nose weight may be entirely concealed; here's how. Hollow out the front of the nose, then pack the hole with birdshot. Dump the birdshot into a small paper cup, mix thoroughly with glue, then pack the sticky mass back into the nose cavity. Or, glue a nickel or penny to side at nose. After painting, put a turn or two of tape around the nose over the coin.

Brush an even coat of clear dope over the whole model, but don't gum up the bellcrank. The balsa will feel fuzzy when dry, so sand off the fuzz with some very fine, nearly worn-out sandpaper. Then brush on one more coat of clear dope. Always dope both sides of balsa wings and tail parts at the same time to reduce warping.

Cut-out colored tissue paper is used for the USAF, the star-in-circle insignia, the red arrows on the tip tanks, and the red warning line around the fuselage. Since all these items are in pairs (except the line around the fuselage), two pieces of the proper color of tissue are cut for each detail, a little bigger all around than the finished in-

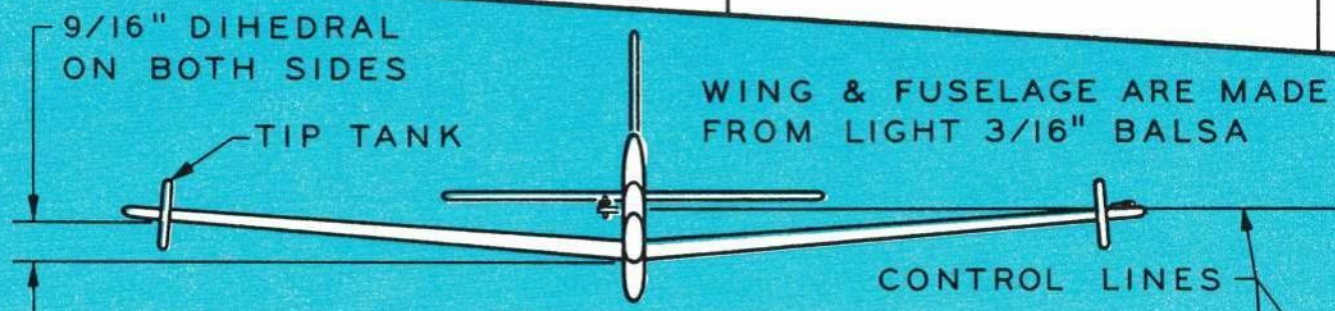
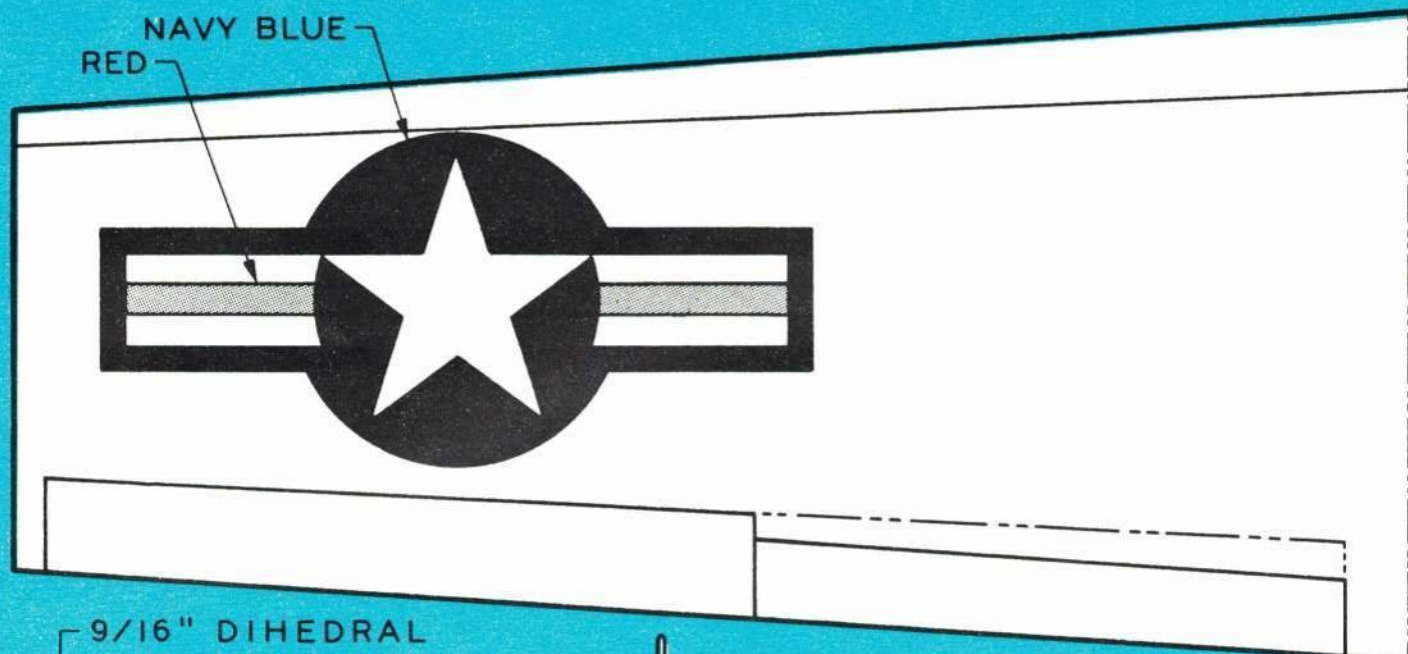
Continued on page 76



Cut out all parts before building. The inexpensive $\frac{1}{2}$ A Top Flite bellcrank and $\frac{1}{2}$ A Goldberg control horn can be used instead of plywood parts shown.



It is the nifty doped-on tissue markings and decals which make model look so real. Felt-tipped or ball-point pens may also be used.



FRONT VIEW -
1/3 SIZE

1/8" DOWEL FOR BELLCRANK PIVOT

FULL-SIZE PLANS FOR
A WHIP-POWERED MODEL OF
THE REPUBLIC F-84G

THUNDERJET

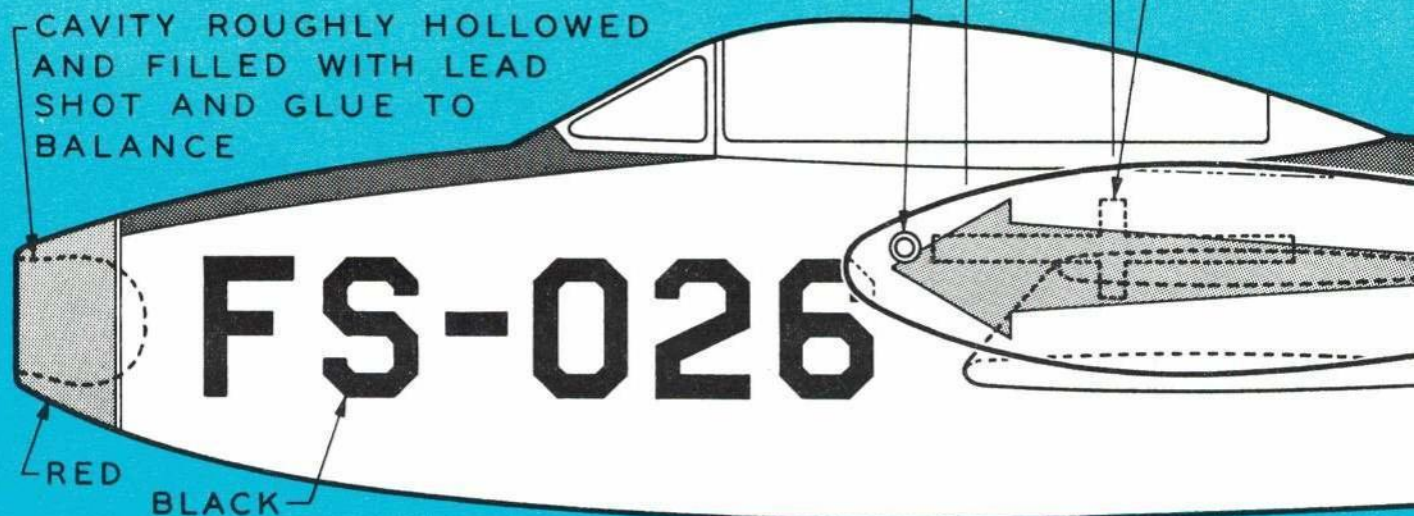
PUSHROD

SCRAP
BALSA
ON BOTH
SIDES

MODEL MUST BALANCE WITHIN THIS RANGE

HOLE IN TIP TANK FOR CONTROL LINES

CAVITY ROUGHLY HOLLOWED
AND FILLED WITH LEAD
SHOT AND GLUE TO
BALANCE



FS

CUTOUT FOR
BELLCRANK

FS-026

RED

BLACK

HARD BALSA LEADING EDGE

BLACK

USAF

FLAP OUTLINE ON BOTTOM

NYLON THREAD
BASEBALL STITCH

CONTROL
OUTLINES
DRAWN ON
OR MADE
FROM THIN
STRIPS OF
BLACK
TISSUE

CONTROL HORN
GLUED INTO SLOT

ELEVATOR JOINER AND CONTROL HORN
MADE FROM A POPSICLE STICK

BELLCRANK
3/32" PLYWOOD

DARK GREEN
ANTI-GLARE
PANELS
FORE &
AFT

ALL TAIL SURFACES,
WINGTIP TANKS, AND
FINS ARE LIGHT
3/32" SHEET BALSA

DESIGNED & DRAWN BY

Joe Wagner

BLACK

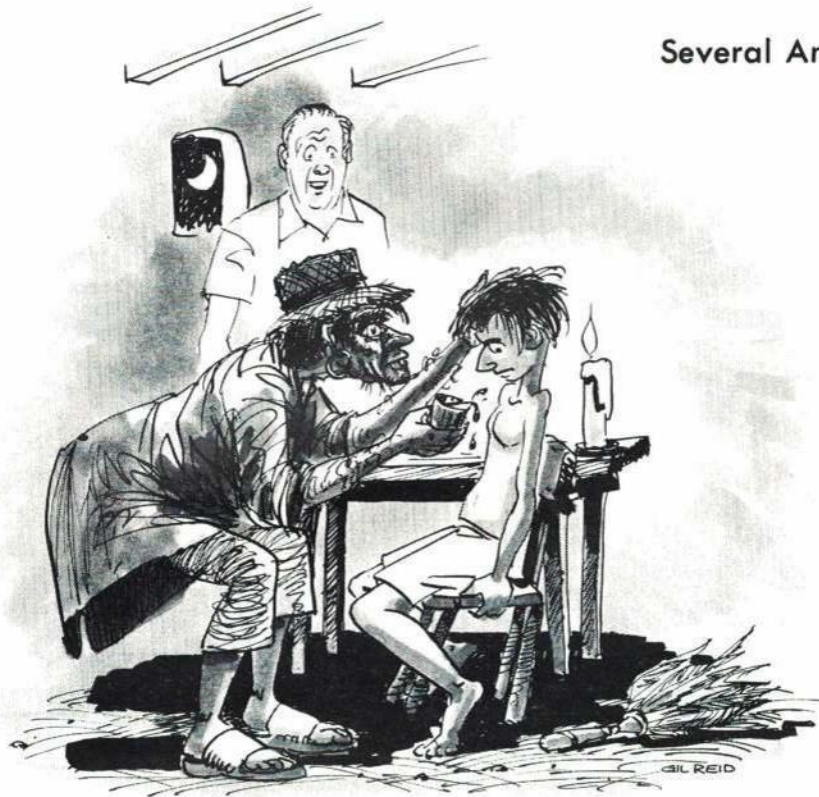
U.S. AIR FORCE
92026

PUSHROD — .045
DIA. MUSIC WIRE



RED

NAVY BLUE



Mr. 'G' Goes to Ecuador

FRANK GARCHER

AFTER 20 years of waiting, the day, July 20, finally arrived to leave for Ecuador. Sam Grober was to be my traveling companion for the next seven days on a most fantastic trip. Sam speaks Spanish and German, and I constantly called upon him to let me know what was going on.

We flew to Miami and picked up a Braniff International jet for Guayaquil, Ecuador. Making a short stop at Panama to change pilots and crew, we arrived at Guayaquil at 8:00 p.m. and met Jean and Jacques Kohn, owners of Balsa Ecuador Lumber Corp.

At 7:00 a.m., the bellboy brought essence of coffee, a black syrup that you pour cold in your coffee cup, about $\frac{1}{2}$ inch deep. Add hot water and you have the greatest wake-up stimulus. Our day ran from 7:00 until midnight, but the next morning I was sure to be wide awake after that first cup. Breakfast usually was fresh pineapple slices, with pieces of lime that you squeezed over them—a new taste sensation. We then ate ham and eggs (at least that's what they said on the menu) and this started our day.

Jean and Jacques Kohn, the two brothers who own Balsa Ecuador Corp., were to be our hosts for the next five days. The trip from the hotel to the mill is about a 10-minute ride—if you keep your eyes closed and don't watch the driving. With your eyes wide open it is a laugh a minute. I think the driving motto down in Ecuador is "keep 'em between the buildings."

At the mill, we spent two days going over all the specs for the balsa shipments to Midwest. We covered all the mill operations, from the logs coming down the river to the mill, forming huge rafts, to the final shipments to our plant. The logs at the mill were 9 to 12 feet long, very green and wet. Also very heavy. The logs were then cut on a head saw and are very wet to the touch. After the log is cut to $3\frac{1}{4}$ to $3\frac{1}{2}$ in. thickness, the wood must be hand-stacked in uniform stacks on flat rail cars to be rolled into the

kilns. The kilns are really giant steam heated ovens that bake out the water to dry out the wood. If this is done too fast, the logs come out of the kilns with internal checks and splits that can be spotted only when cut. The amount of hourly records kept on each load of wood and the consistent checking to insure quality amazed me.

The logs cut yield only about 10 to 15% usable wood for model airplanes. Eighty-five percent of the log must be put into the industrial grade. Without this amount being used by industries other than model people, the price of balsa wood would be prohibitive.

At the airport on Wednesday, we waited over an hour for our pilot to arrive in a Piper Cherokee. I wasn't sure it could handle all the weight, but the pilot and Sam, through translation, convinced me that we should go. The flight into the jungle was like a ride over a solid green carpet. You see nothing but banana and balsawood trees. We landed at the airport, an oily strip just wide enough to get down and get off again. A banana plantation owner gave us a tour, showing us how bananas are processed for shipment to the United States.

During dinner Wednesday night at a motel, the only one for 300 to 400 miles in the middle of the jungle, Jean asked us if we would like to take a ride into the jungle to see the Colorado Indian medicine man perform the rites on a sick person. So Jean informed one of the boys that he would have to be sick and go through the ritual with the medicine man! I knew it was going to be wild, for a light rain was beginning to fall. We drove out of town for about 11 miles, then stopped by the roadside. Walking through hilly terrain, we started down into

a valley 100 to 150 feet below. Steps were carved into the hillside.

By this time it was 11:00 p.m. and with only one flashlight, getting dimmer by the minute, I heard a roar that indicated water was rushing by. When I asked one of the fellows how we proposed to get across this roaring torrent, he pointed to two logs, side by side, flatted on the top, approximately 10 to 15 feet above the water.

Before utter panic hit me, I started across, reaching the center before the logs started to vibrate like a tuning fork, as the second man started to cross behind me. I was ready to return home—right now! Still vibrating at the same frequency as the logs, we made our way up the other side of the hill to the medicine man's hut. After conferring with him and having to take a drink of his white lightning, he sent us back across the stream to his friend. The trip back across the logs was something to remember as I fell when I reached the other side. I was safe and almost dry.

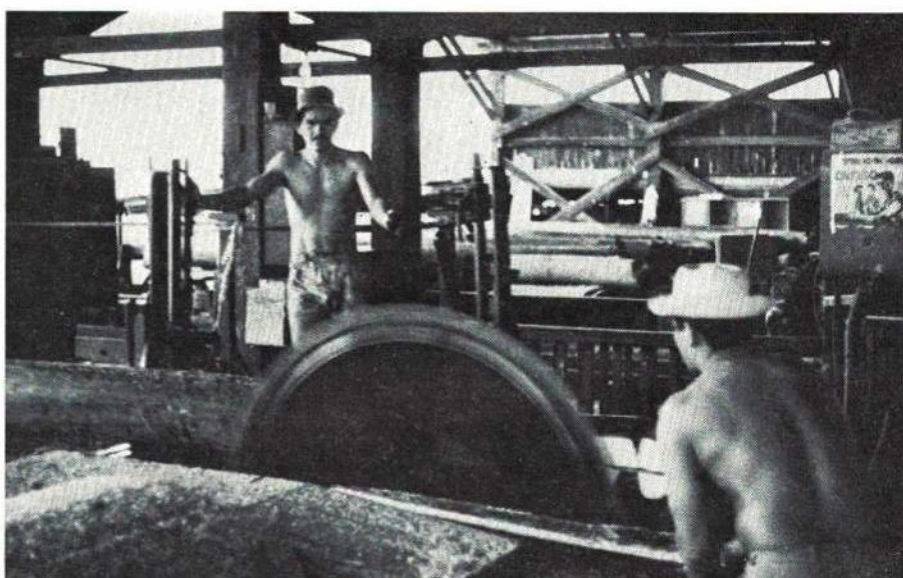
It now was 12:15 and we had to wake up the medicine man and his family. This didn't set too well with them, but the sight of Jean's money brought a sparkle to his eye and he brought out his family from the hut. Inside the hut, which was approximately ten feet square, there was a small table in the far corner. Two candles and some wild looking feathers made into a duster lay on one corner of the table. Toward the front of the table were two bottles of a vile looking liquid and a wooden cup. Our boy who pretended to be sick, was instructed to take off his shirt and relax as the medicine man rubbed his chest with the oily liquid.

Mumbling a few words in a chantlike tone, he proceeded to beat the feather duster vigorously on the boy's chest and back. The medicine man then poured a brown looking liquid into the cup and gave it to the boy to drink. If anyone who was not sick drank out of this cup, he'd be sure to catch some-

import balsa, and visit the mills, but only 'Big Stoop' met the witch doctor—



Opposite: Deep in the jungle at midnight a boy pretended to be sick, and there was a ritual of wild-looking feathers, evil brown liquid, and weird incantations. Above: Frank and a mill hand. Top, right: The Balsa Ecuador's mill. Logs float down river as rafts.



thing when he left. It was like going back to the 16th century.

The following morning we drove further into the jungle, on dirt roads. We visited a school built by two Catholic priests who process balsa wood, having constructed eight classrooms and a small church from the proceeds, right in the middle of the jungle.

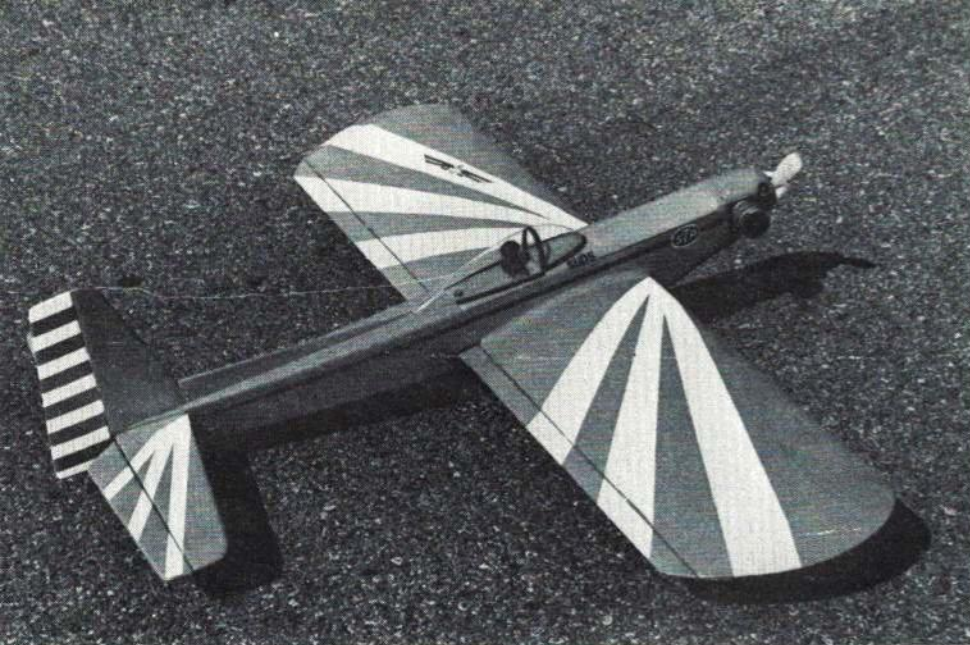
After touring the different balsa areas we drove back to Guayaquil on a new four-lane highway. Upon completion, this road will run from Quito, the capitol, to the port city of Guayaquil. Jacques had made arrangements for our flight to Quito on Tame Airlines. Quito, about 9000 feet above sea level, is located on a mountain top and must qualify for the title of Las Vegas of South America. Needless to say, a few hours on Saturday night were spent at the tables.

Sunday was spent going to the monument that shows where the equator is, taking pictures and visiting the numerous tourist shops and old churches. Sam and I met a small Franciscan friar who gave us a tour of the oldest cathedral in Quito. Putting my 14-size foot in my mouth as usual I said I would like to go to the top of the bell tower to look out over the city. I thought we would climb the steps inside the cathedral, but the other two had different ideas. We started up the outside of the building and over the roof tops to wind up some 80 feet above the ground. I am at home behind the stick of a Schweitzer I-26 at 5000 feet, but swaying in the breeze 80 feet above the ground is for the birds! After turning in my mountain-climbing equipment, we boarded a jet for home.

I would like to express my gratitude to Balsa Ecuador Lumber Corp., Jacques and Jean Kohn, and especially to Mr. Sam Grober who made this trip one of the highlights of my 24 years in the balsa wood business. Their patience and fortitude showing me around was a great benefit.



Middle, above: Saw blades are two to three feet in diameter. Above: It takes only 90 seconds to fell a balsa tree as big as this one. Right: Bark is removed by machete.



Compact one-piece plane looks like a home-built with mid-wing glued in place. With 60 it has won FAI and AMA style contests in mile-high Denver. Use 35's for sport.

SUDS

Suds and Contender are SPORT/STUNT designs whose different aerodynamic, structural, and aesthetic features achieve similar goals. Easily built from scratch in one week, they are suitable for novice or expert flyers.

CONTENDER

Contender photos / BILL COONS



JOE DOLAN

SUDS is easy and fast to build. Its small size permits the use of standard wood sizes wherever possible, and its strong airframe has a minimum of plywood or doublers. Its design objectives are the capabilities to use smaller proportional sets, to hold its own in any AMA pattern event, and to perform well in Open Pylon with a good 60 engine, as well as to be a fine sport flyer with 29-through 40-size engines. Weight is 4 to 5 lbs. complete.

Materials, excluding hardware and covering, should retail at less than ten dollars. Any engine from the inexpensive RC 29's through the hottest high-rpm 60's may be used. The model is quite strong and, when flown with a big motor, provides plenty of thrills.

Several departures from the normal Pattern plane are evident. Suds is a tail-sitter using conventional landing gear, but it handles as easily as a tricycle gear plane. Suds has no dihedral and is neutrally stable in the roll axis, which prevents rolling out of knife-edge flight. Absence of dihedral also simplifies construction, as all wood is continuous through the center section.

The wing span is relatively short, but the chord is wide enough to provide for adequate wing area. Because of the small span, the wing is glued to the fuselage permanently and causes no transportation problems. Suds will fit in the trunk of the average American car — although the landing gear may be removed. A further advantage is the increased strength of the fuselage because of the glued-in wing. Access to the internal components — tank, radio, servos and linkages — is through a full-length hatch.

DAVE PLATT

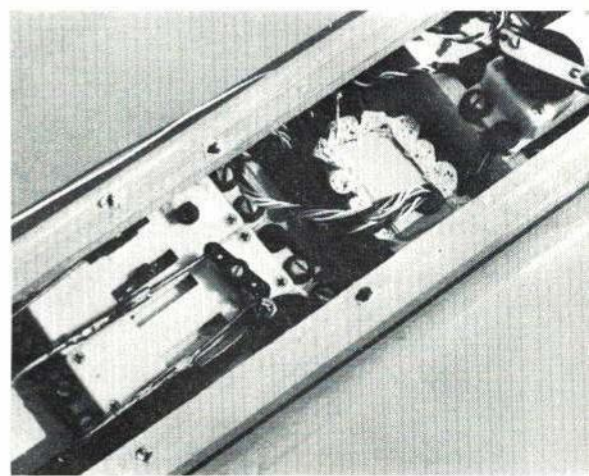
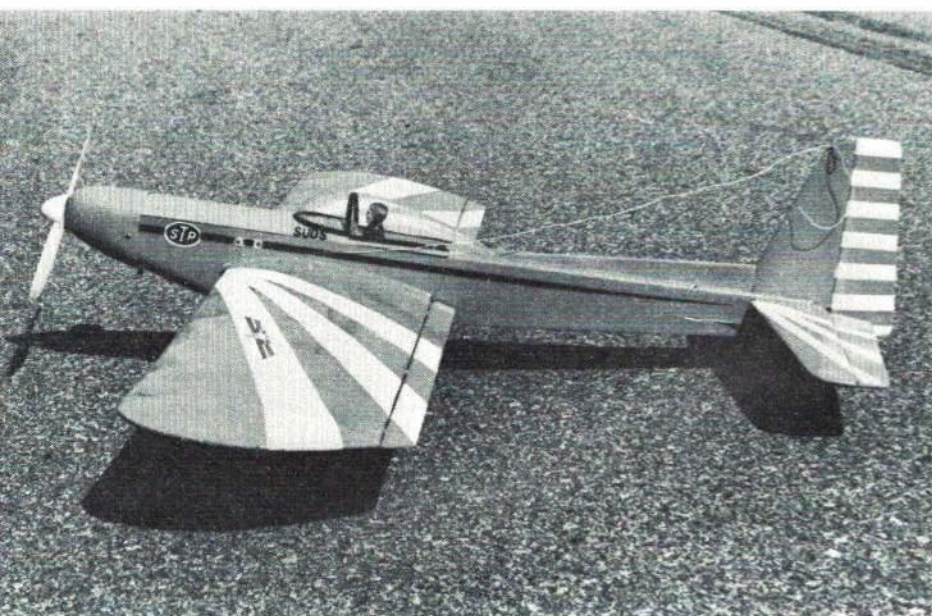
THE Contender is unusual because it was not intended solely to fill its designer's needs, as is usually the case, but it was also aimed at the sport flyer and occasional competitor.

Only one overriding difference exists between today's radio control models and those of a few years ago. It is not the aerodynamic improvement of design. It is not the advancements achieved in equipment, engines and, above all, piloting ability, which have made aerodynamic refinement unnecessary for all except the real pattern experts. Some new designs are labeled best because of some "latest" aerodynamic discovery, but any improvement may be due more to faith than to measurable results. Is it possible that these super-new creations would not be beaten by, say, an Orion in slightly more expert hands?

What, then, is this big difference? In a word, time. The Orion and its contemporaries took six to eight weeks, or more, to get ready to fly. Today, even two weeks is considered too much time spent to reap the reward of a season's flying. Those of us old enough to remember modeling with cranky engines and crankier radios may feel a bit wistful about it all. But who wants that kind of trouble again?

The Contender is built quickly because, above all else, that's what it was designed

Dave's personal model looks like a fighter with an inverted engine. Airfoil gives docile handling but large controls make it quite maneuverable for the expert.



There is lots of room even for fairly large servos side-by-side. Note position of receiver in wing.

Radial mounted engine on its side neatly hidden by fiberglass cowl. Ground handling is tri-gear easy.

Suds Continued

Use of a radial engine mount simplifies nose construction and allows a 10-oz. fuel tank to be fitted into the compartment directly behind the firewall, thus eliminating the need for an extra-long nose. This fuel capacity is necessary to supply the bigger engines. I prefer the BK radial engine mount which fastens directly to the crankcase by means of the bolts which hold the backplate on the engine. These can be ordered from BK Model Products, 4765 East Iliff St.,

Denver, Colo. However, any beam-radial mount, such as the Tatone, also will do fine. For flying the Suds in both Pattern and Open Pylon with an engine change for each event, the motor mount must be redrilled so that the same bolts work for each installation.

I live in Denver where we take off at 5400 feet, and the difference in model performance at this altitude is quite noticeable. To compensate, our planes are fitted with engines one size larger than those that would be used at sea level. We also use a coarser pitch propeller. However, at any altitude

and with any engine, Suds is a pleasure to fly. It has no bad habits such as tip stalls in slow landing approaches or snapping out of high-speed turns.

Controls are light, responsive and smooth. Spins are sure with positive start and stop. Aileron rolls are axial and yaw-free. Because of the flat dihedral, inverted flight characteristics are no different than when upright. I used an old K&B 35 in the first Suds. With this engine the model flew a presentable AMA Class C Pattern. However, with the powerful 45's, 50's, and mild



Although scale-like, it uses fewest possible parts and simplest assembly of any modern RC design. Its design and maneuverability also suitable for CL Stunt.

Contender Continued

for. It can be flown by the average pilot as well or better than a model requiring expert handling for top results. Designed into the Contender are certain helpful aerodynamic features. Actually, these are not innovations. They are, instead, long-known but seldom-used methods of creating a stable and predictable airplane. Reasonably good appearance, but not without sacrificing ease of construction and stability, was a

final design goal. If not radical, at least the Contender looks individual.

These three elementary considerations — construction, aerodynamics, and appearance — dovetailed naturally. For example, it was decided to eliminate dihedral. This enables the LE, TE, spars, landing gear mount, etc., to be one-piece parts. This saves much time and improves the strength/weight ratio of the wing. Unfortunately, a flat wing usually looks drooped, making the model ugly. To retain good appearance, it was necessary to

angle the basic lines of the airplane so that this flat wing appeared aesthetically suited to the design. The strange shape of the wing, up-front canopy and unusual length (nearly equal to wing span) have created an optical illusion akin to a modern swept-wing jet fighter. In these circumstances, a flat wing appears correct and dihedral would be incongruous.

All other parts were given the severest "do-we-need-it?" tests. All non-vital pieces were thrown out; vital ones made simpler. The one-piece wing-parts hold the basic span to under 48 in., although the tips increase this to 54 in. Area is 650 sq. in., so aspect ratio is very low. This makes a compact model which, when assembled, will fit in most cars.

Aerodynamically, the model incorporates many variations from the norm. There are no absolutes in model design so one man's approach represents only his opinion. Mine is that the "drive-the-CG-back-as-far-as-you-can" philosophy is bad for the average pilot, because it leads to a touchy model with a razor-edged margin of stability. Instead, I place the CG well forward and achieve the maneuvers by sufficiently large and far-moving control surfaces to overpower the inherent stability of the model. This idea works well, because the model does nothing on its own — a clear intent by the pilot is necessary. This makes for straighter maneuvers which do not require the expert touch. The ship can now be likened aerodynamically to an arrow in flight, with a heavy weight forward and tail feathers aft.

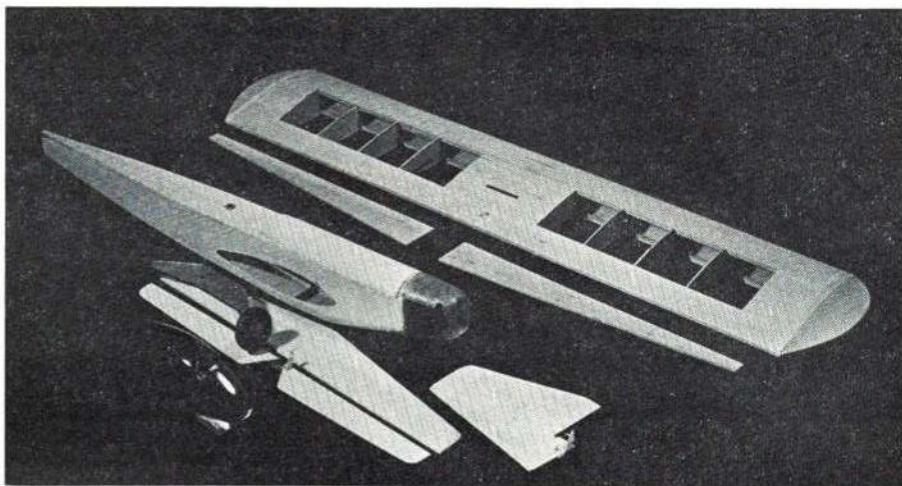
This forward CG, coupled with a thick symmetrical section whose camber point is well forward and radius abnormally large, results in a virtually stall-proof airplane. Landing characteristics are delight-

60's performance was noticeably improved since speed variations in loops and any vertical maneuvers were eliminated. This makes flying the pattern easier and faster.

The airfoil used is thick with a long chord and a sharp leading edge. It is, of course, a compromise. Thickness provides adequate lift at slow speeds and acts as a speed brake during maneuvers. Symmetrical section ensures equal performance upright and inverted. The sharp leading edge allows positive spin entry when desired. Taken altogether, the foil enables the Suds to operate within the confines of small fields where quick turns and high-sink-rate landing approaches are necessary.

Construction: Before beginning to build, read through the instructions completely for familiarity with the sequence of assembly. First, several general suggestions. Where 2"-wide balsa sheeting is called for, buy half the required length in 4"-wide sheets and split them. This saves many nickels. Do not cover tail surfaces with silk or you will have warps. If you like wheel pants, the Gee Bee brand is sturdy and easy to mount. A Goldberg Shoestring landing gear is wide and stiff. Use regular model airplane glue throughout except for white glue on fuselage and contact cement for doublers.

Wings are often considered the most difficult part of model building so this section may be built first. It is quite easy. Lay down rear $\frac{1}{16} \times 2 \times 48$ " trailing-edge plank. Pin rear $\frac{1}{4} \times 48$ " spar and $\frac{1}{8} \times \frac{3}{8}$ " stringer in place. Block up front of $\frac{1}{4}$ "-sq. bottom spar $\frac{3}{4}$ in. off the work surface. Place all 14 ribs on the spars and glue. Pin $\frac{1}{4}$ "-sq. leading edge in place and glue. Without removing the frame from the plan, shape the rear $\frac{1}{8} \times \frac{3}{8}$ " stringer with a wood plane to be flush with the ribs. Lay in the top spars and glue.



Now plank the top of the wing starting with the leading edge sheeting, then the trailing edge, center section, and finally the cap strips. After the frame is thoroughly dry, remove, turn over, pin down again, and repeat sheeting sequence for this side. After adding the $\frac{1}{4}$ "-sheet wing tips, sand the whole frame and cover. After painting, the finished wing is inserted into the fuselage and glued.

Before beginning the fuselage (described after these notes on fiberglass cowl construction) decide whether to use a fiberglass cowl or the built-up balsa nose. I prefer the fiberglass nose which makes the engine fully accessible and interchangeable with other engines. Proceed with the fuselage construction assuming you will make the cowl. With the fuselage finished,

rough shape a block of solid soft pine or carve a balsa block as a form and fit to the nose at the firewall. Tack glue this block to the firewall, fitting it exactly and allowing the appropriate length for your engine choice. Make the bottom edge of the block a bit too large—it should extend $\frac{3}{16}$ in. below the bottom of the firewall. Now sand it out smoothly, but do not paint or dope. Remove it from fuselage. To allow overlap at firewall add $\frac{1}{4}$ " plywood extension to back of the block.

Mount the block pointing nose up on a piece of wood with a short length of $\frac{1}{4}$ " dowel. Cover the block completely with Saran Wrap and tie it to the dowel below. Next, cover the block with medium-weight fiberglass cloth; then saturate the cloth with

Continued on page 66

ful. If the model will not stall, it cannot drop a wing. Normally, a landing is performed by feeding in up-elevator trim until the ship is gliding on the verge of a stall (just like a contest free-flight job), then simply leaving the elevator alone and keeping the wings level to the ground with aileron. The Contender is already in a nose-up attitude, so no flare is necessary. Ground roll may be five feet or so, or it may not, depending on wind strength.

Leon Schulman, who made a Contender from original plans, reports that in a gentle breeze a true stationary hover is easily done by balancing engine rpm and up-elevator pressure. The seemingly small but highly effective ailerons are adequate to prevent a sideslip while hovering.

Of course, such reluctance to stall is bought at the expense of something else, in this case, easy spins. A spin can be done only with a model in a true stalled condition. The only way to guarantee a clean spin is to give enormous elevator movement, so the uppermost hole in the elevator horn is used. It might seem that the excessive elevator control would make the model sensitive near neutral, but this is not the case. As explained by Ed Kazmirski in his original *Taurus* article, a large LE radius gives very soft response close to the neutral.

Contender offers many possibilities for various power situations. The prototypes used 40's and 60's, but even a 29 would do nicely for those who want to learn to fly, using this design. On the other hand, a hot 60 gives an altogether different breed of cat. Add up the formula: weight, 4½ lbs., with thrust, 9½ lbs. Something is clearly going to happen, and it won't be dull. One of the original Contenders has a Supertigre G 60 F, powerful enough normally, boosted by installing a Merco Micro-Flo throttle. This

Dave displays innards of his Micro-Avionics-equipped model. He uses inverted S.T. 60 for power. The plane "explodes into the air."

combination has proved outstandingly successful, and more radio control fans should look at this throttle.

When so powered, the Contender does not take off. It explodes into the air—the only description which fits. A true 90 degree vertical climb can be maintained for 500 feet or more, while at 80 degrees it will go up indefinitely. It will climb in knife-edge flight. It can do square corners of seemingly zero radius. Observers have been unable to see a curve. On one occasion, 15 consecutive square horizontal eights were flown, using only the elevator. At the end of all this, the wings were still level to the ground. No aileron corrections had been necessary—that reliable forward CG did its work, taking out the expertise usually required for straight maneuvers.

Bear in mind that, with zero dihedral, a slight yaw will not result in so strong a rolling force. A degree or so of different heading may result after, say, a square loop, but it is unnoticeable because there is no bank generated.

Construction is fairly normal. Large LE and TE give the wing its strength. These parts can be made up easily from three pieces each, if building from the plans. A standard Kwik-Fli III canopy is used, cut down to fit. It can be tinted to any desired color in Rit dye (follow directions supplied).

To build the wing, the standard rib-tab technique is recommended. This will insure a true wing. The engine can be installed upright or inverted. The latter is preferred, if only for appearance.



The fuselage top is unusual. Instead of using a large block to get the shape, which is costly and time-consuming, a vertical keel of $\frac{1}{4}$ -in. sheet is mounted centered on the $\frac{1}{8}$ -in. top, then covered straight down to the sides. This results in a triangular top of crisp appearance. Being balsa-built, the Contender is easily repaired when the inevitable eventually happens. Who knows?

Continued on page 80



Apparently a plumber's helper fits most inspection holes. After all, there's tubing in the wing for any plumber to examine!



We suspect the sign on the rudder is fair warning to a fine precision jet-age team. To some, the Champ is just an accident desperately seeking a place to happen. In reality, it is a well-practiced show routine both in the air and on the ground.

The Frantic Junkster

ROBERT L. PARKS

\$600 worth of junk flying in loose formation is the

IT was a balmy Sunday afternoon. Spring had arrived in the Northwest, and birds filled the air with sight and sound just as they do every year at this time. Sitting on the fence near the gas pumps one could see some Bandy-Legged Chickchasers, Bleary-Eyed Nighthawks, Pigeon-Toed Pop-Sippers and even a Double-Breasted Seersucker. A few Meadow Larks were in the grass by the runway. In the air was a variety of colorful birds known only to the most ardent "bird" watcher. A red-wing Waco flashed by, a double-winged Mini-plane chased one of its kind past a yellow-breasted Ryan. A yellow-striped T-Craft tumbled and fluttered around a ruby-breasted Stitts.

It was spring at Thun Field and birds and bird watchers of all kinds were out in all their splendor. A Wobbly-Legged Silver Champ trundled past the twittering flock on the fence. What happened in the next five minutes would have turned Mac Sennett and his Keystone Kops green with envy. As it turned on to the taxi strip the right aileron fell off!

A screech of laughter burst from a few of the fence-sitters, but most of them jumped to their feet and pointed excitedly at the control surface lying inert on the ramp. As the Champ ambled out to the runway, a visiting Stinson pilot literally fell out of his airplane in an attempt to run before his

feet were on the ground. He scrambled after the Champ with arms, jacket, and mouth flapping.

We immediately knew what kind of bird this was from the unique sound of his call — "Hey! No!" It was obviously a White-Faced Heyno. He caught the Champ by one wing tip and frantically waved at the pilot while emitting his distress call "Heyno, Heyno!" Typical of this type of bird when it is disturbed.

The pilot in the Champ waved back, smiled, and applied full throttle. The Champ picked up speed slowly due to the weight of the Heyno bird hanging onto one strut. When the Heyno bird released his hold, the Champ bounced along the grass strip and careened into the air. The right wing, seemingly uncontrollable, dropped near the ground and the "Unflyable" climbed out in a near slip. It wallowed around the pattern and dropped down for an approach.

The Heyno bird's distress call changed somewhat during the takeoff to "Hey, Somebody — No!" Or "Heymy Godno!" Sometimes it was "Oh nonono." This is known as the dire distress call. The Heyno bird has been known to utter this cry at night — when he runs out of fuel over the Cascade Mts. This, however, was the first time it was recorded on the ground.

The distress cries faded away as soon as

the Heyno could see that there was no real concern shown by the flock on the fence. Confused, he watched wide-eyed as the Champ made its approach to a perfect wheel landing and taxied up to the gas pumps. Smiles and comments of "good show" came from the flock on the fence as the pilot climbed out.

The Stinson pilot was speechless, for he realized that he and many of the spectators had been "Barnum & Baileyed" by two of the Thun Field Gang. After a discussion with the pilot about flying characteristics, etc., we went to apologize to the "Heyno Bird," but he had stomped back to his Stinson and made a grim-faced takeoff to "Saneville." We haven't seen him since.

What he had witnessed was the beginning of a unique airshow act which thrilled crowds from southern California to Alaska during the 1967 season. Chuck Driskell, owner of the Champ and a competent aerobat himself, was intrigued with the idea of flying with one aileron. When Charlie expressed his idea to his peers he was met with either gales of derisive laughter or dire predictions that he would end up on a slab someplace. The "experts" had spoken! It would not work! When asked why, their reasons ranged from highly scientific explanations such as "You will crash!" to "An airplane has two ailerons, you know!"



Charlie likes straight-in approach to runway with steep glide path — maintains good air-speed. Who knows, he might air-loop first.

airshow circuit's most incredible act.

Well, not being an expert, Charlie sat down and evaluated the physical phenomena of airfoils and ailerons and proceeded to do it anyway. He got approval from the FAA, also doubtful, and demonstrated controlled flight with one aileron. Doubts were soon dispelled as the plane flew in a normal manner; climbs, stalls, turns, landing, all were smooth even if there was a six-foot-long chunk out of the right wing.

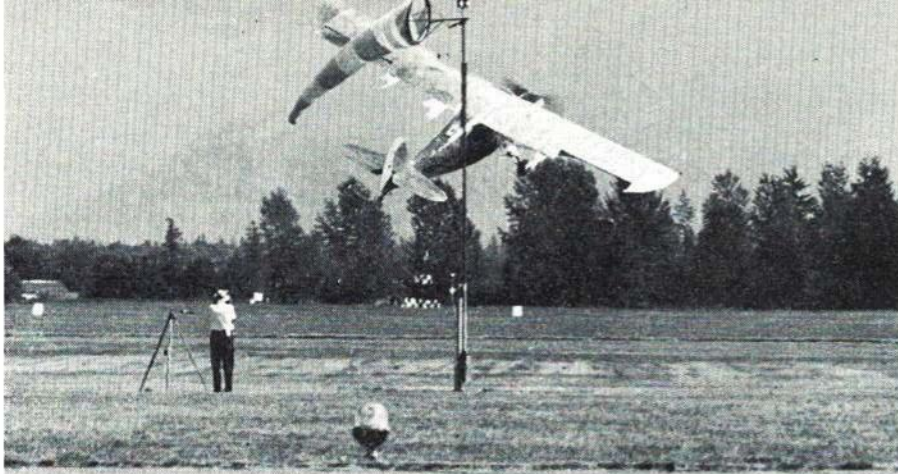
Since the Champ would fly OK with one aileron, it was only natural for Charlie to try it upside down, wrong side up, and backwards. He asked the FAA reps if they would like to watch but they declined and hurriedly vacated the area. If Charlie wanted to gouge up the countryside that was his business. Someone else could administer last rites!

After a light lunch of four hamburgers and three cups of coffee, Charlie cranked up the Thing and staggered skyward. At 1500 feet the Champ went up into a nice round loop. The crowd on the ground was then treated to a series of maneuvers that had them shaking their heads, laughing, and staring in wonderment.

Charlie's Champ would do everything in the books except sustained inverted flight.

The experts were very quiet and puzzled. It wasn't long before Charlie and his friend, Clyde Knucklecrunch, had an air-





Takeoff is a cinch, a little right rudder and wrong aileron and Charlie is across the runway in no time. A favorite trick is a complete 360-degree flat turn, easy in a Champ.



The act takes place between 800 feet and 8 inches. Pilot sometimes needs a hand to lift a wing. Plane looks different at each air show. Act changes to suit show requirements.



They always run better when you clean out engine compartment. All that's needed now is an aileron and rudder — any color is fine.



At conclusion of fright demonstration, Charlie kisses Mother Earth expressing thanks that nothing else fell off.

show act formulated around the ratty Champ and its penchant for shedding parts before and during flight. That summer the act was further developed and improved in numerous local airshows. By the end of the airshow season the "crazy clowns" and the flying crash of an airplane had gained a reputation and an invitation to participate in the granddaddy of all shows — the Abbotsford Air Show celebrating Canada's Centennial year.

This show was resplendent in sophisticated jets and gorgeous antiques and, when the Champ was dragged out of the hangar through the crowd to the field, the reaction was incredulous puzzlement. A very concerned fellow came forward with camera clicking and asked if anyone had been hurt. Charlie's answer was "No, nobody hurt — yet!"

Someone in the crowd shouted that he would buy it for 50 dollars if it wasn't smashed for the show. He was dead serious too, because light planes are hard to get in Canada and this one looked as though it possibly could be fixed.

The wreck was placed in front of the viewing stand and the bums announced that they were going to fly. The crowd, of course, was amused and expected to see a destruction derby wherein the wreck would be reduced to rubble — entertainment between the flying acts.

What did it look like? It looked as if it had crashed that morning. The left landing gear was collapsed; one elevator and the rudder were missing, as was the right aileron; the door was gone; the wooden prop was a shattered mess; the fabric was shredded; and the entire wreck was covered with dirt and shards of sagebrush. This makeup fools not only the general public but flying types as well. While preparing the Champ for a show in the States a group of pilots strolled through the hangar and asked when the crash had happened. Again Charlie answered with a straight face and told the Blue Angels (!) that it had happened that morning.

Well, as the afternoon wore on, the bums were busy "lifting" parts off airplanes in the parking area. A red rudder appeared, a blue elevator was found someplace. An aileron, propeller, and a halfway decent landing gear were "found" near some other airplanes. Gradually, the wreck began to take shape. They even got the engine to run on two cylinders and from time to time the Champ scurried around on the ground like a drunk chicken. Pieces kept falling off, smoke poured from the sputtering, backfiring engine, and the crowd was convinced that this wasn't a flying machine.

The bums, on the other hand, looked as though they just might get the thing to hang together long enough to get it off the ground. They proved their intentions by getting Frank Neglio, the airshow safety inspector to examine this fine specimen. Charlie checked the controls and the right aileron fell off for the sixth time. Frank shoved his fist through the rudder fabric. The bums put a masking tape patch over the hole and laboriously repaired the aileron. An argument ensued as to the airworthiness of the Champ, which was sitting there shredded, filthy, but with the engine running — sort of.

While Clyde Knucklecrunch, the mouthy bum, was engaged in the beef with the bad guys, Charlie Musclemcramp stomped over to the Champ, got in, and had the tail up before anyone could stop him. The Champ staggered off the ground and munched into a slipping climb — on three cylinders. The mild twittering of amazement which arose from the crowd changed to shrieks of awe when the right aileron fell off again! The plane munched to the right and settled toward the ground. More shrieks!

Up again into a sickening climb, the

Continued on page 64

OLD IRON SIDES

AMA record holder in Jet Speed was developed over several years and much engine testing. Article covers model and jet engine design and rework.

JERRY THOMAS

THE most intriguing, yet frustrating, type of model airplane is that flown in Jet Speed. Jet has the greatest unexplored potential; but the difficulty is that its powerplant cannot be put on a block, like a two-cycle engine, to see if a modification will increase its speed. It must be test-flown to study the effect of air flow on the tune of the engine.

Ed Fisher and I, when going team in Jet in 1967, started with great expectations. We succeeded in just burning valve after valve. This was the same basic engine I had used for years, so we felt that neither the plane nor the tank were the cause. To double check, the engine was installed on Rollie Hilesland's and Keith Loutocky's plane, which was running well. The engine continued to burn valves. The flojector, which had been used for 18 years, was replaced, and the ship turned a nice flight of 169 mph. A few weeks later the plane won Jet Speed at the Nationals in California at 174.86 mph.

My jet flying began in 1949 with a stock Dyna-Jet—the first of a long line of all-metal airplanes. It won first at 135 mph, and 20 years later Ed and I won first at 183.60 mph for the record with a .028 in. line.

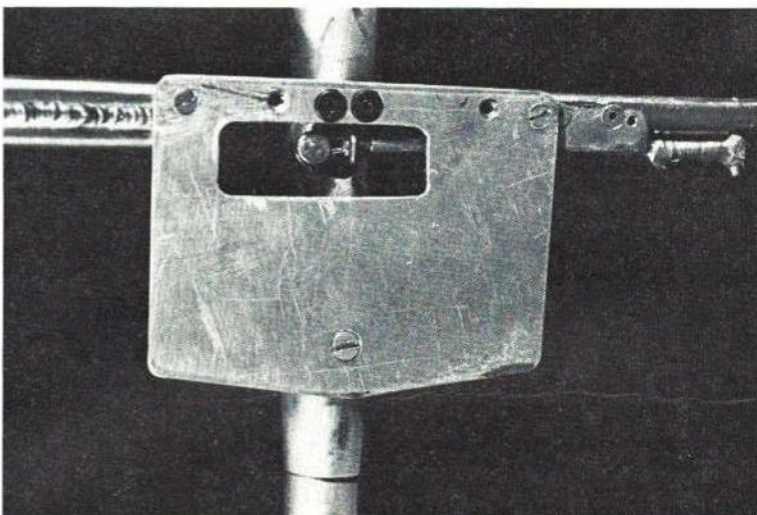
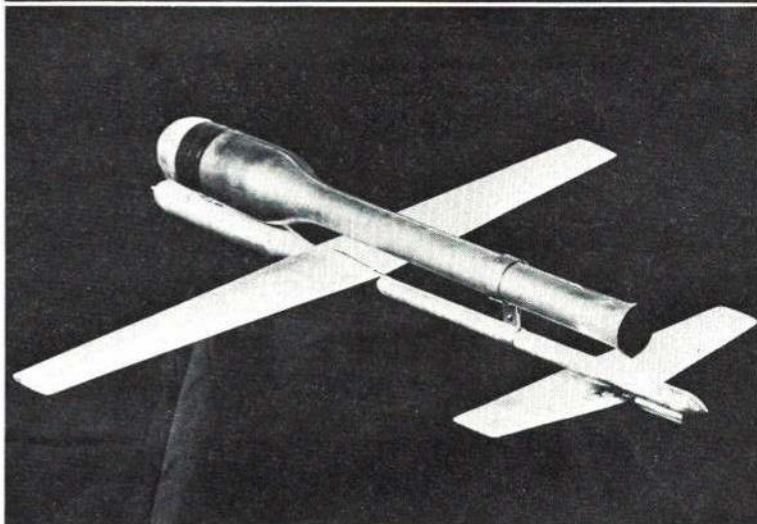
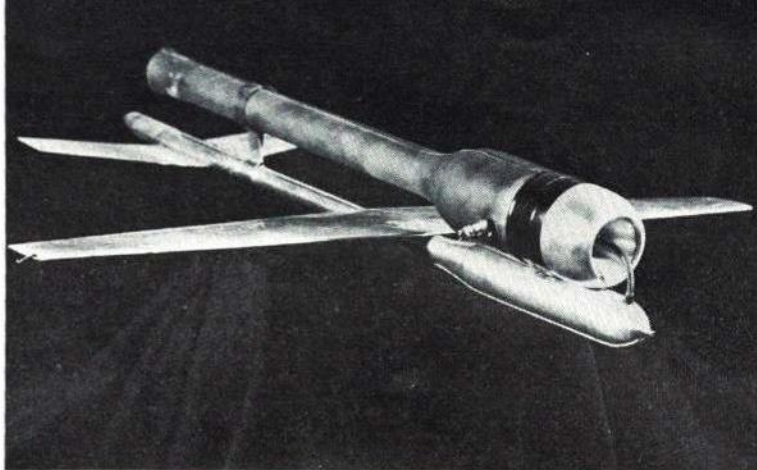
A first attempt at modifying an engine was to increase the valve lift by turning back the valve stop. This removed .030 to .060 in. from the stock at the outer edge of the valve stop, as shown on the plans. I settled on .040, which I still use, as best for power and reliability. Beyond this, whole leaves are lost during a flight, and valves must be changed quite often. When running a rich metering jet, five or six flights can be had before the edge of the valve starts to chip. This improvement, with Mono-line, put me in the 155 mph bracket.

When the valve stop is turned to get more lift, or opening, from the valve, continue

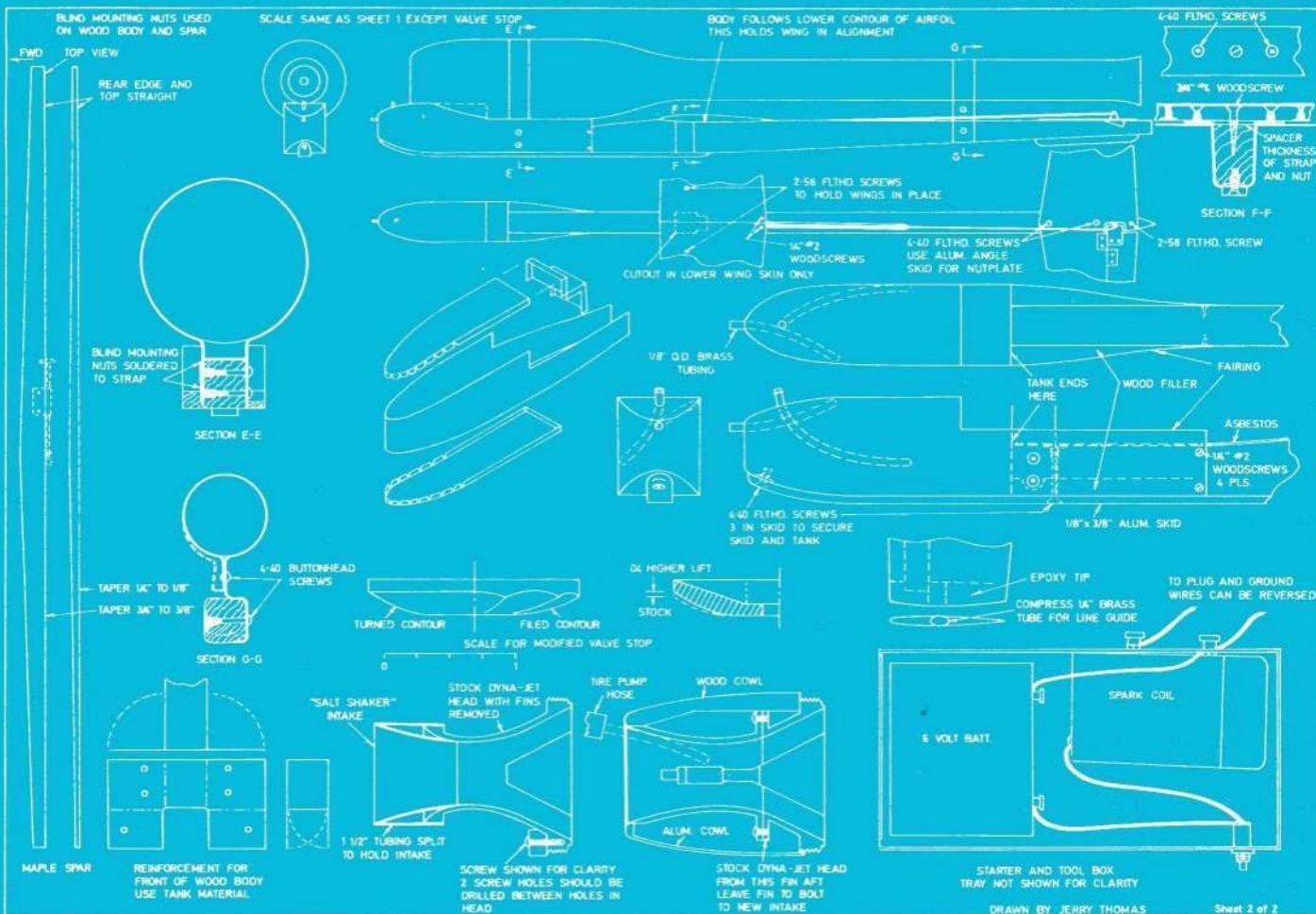
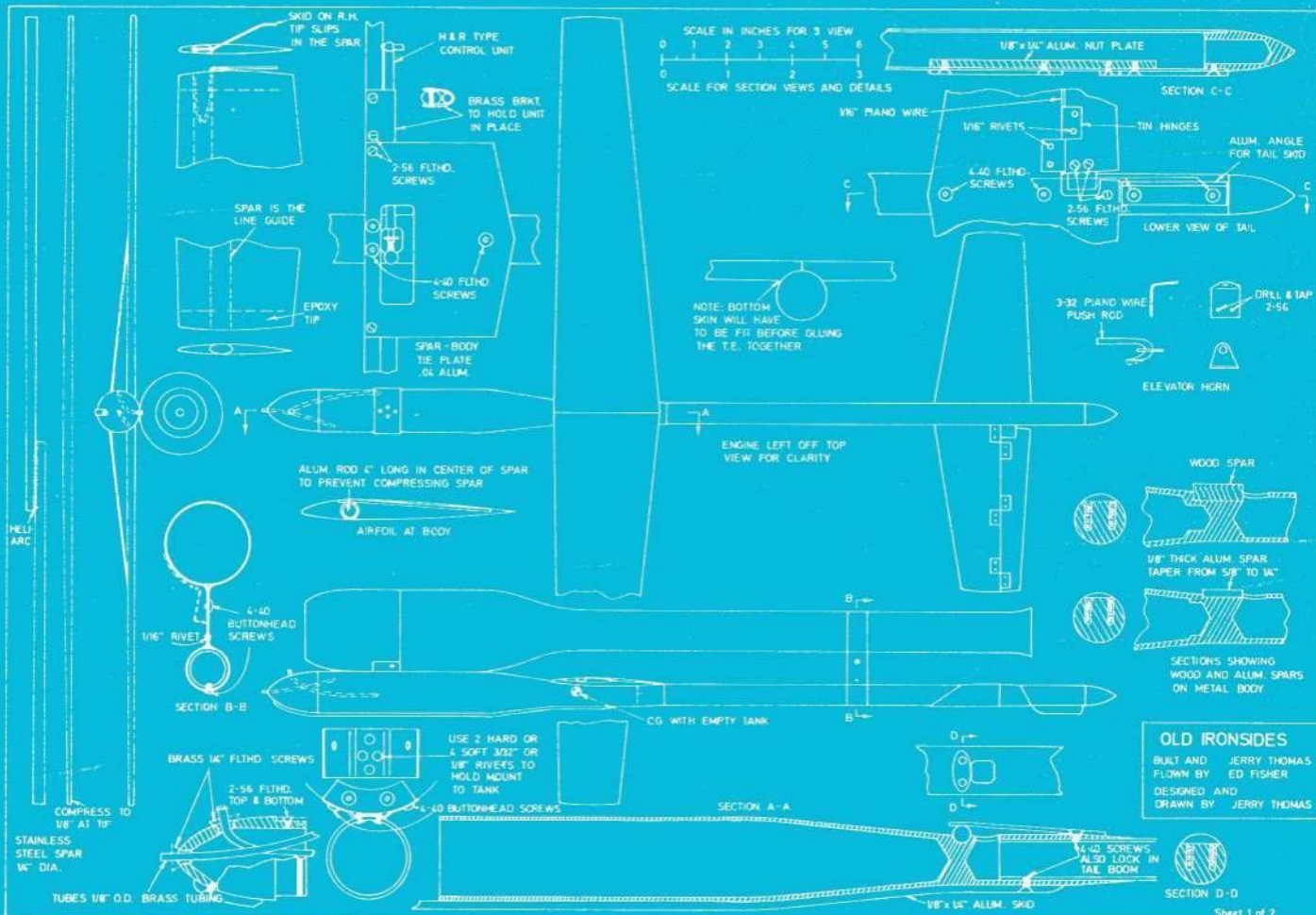
to check with a leaf from an old valve to get as much contact between the valve and valve stop as possible. Those who don't have a lathe can, with some patience, file ten "flats" to get the extra lift. Mark the .040 in. on the edge at one point. File and keep checking until the leaf makes contact as above. Then make a template of this curve and, using a valve to mark the valve stop for leaf position, have at it! Take time to do a good job.

Metering jets is a critical item. To check

metering jets with wire drills, I set my standard at a No. 60 drill for a No. 6 metering jet. This is done as a check to be sure sizes are really going up or down when testing. Metering jets have been known to vary in size for a given number. The Dyna-Jet instructions recommend a No. 4, but this varies with the plane and tank. I used either a No. 5 or No. 6 for years, and then found that this airplane and tank are best with No. 11, which is the same size as a No. 55 drill. Testing is necessary to determine the right



Both wood and metal versions are shown on plans. Detail above is wing, fuselage, and control unit assembly. Wing spar is welded steel tubing arranged so that Mono-line control wire goes out through the tubing.





A word of caution: Model jet engines are pulse jets which run extremely hot and should be handled by an adult. They must be launched immediately after starting, or they will actually melt. They burn raw white gas and make a very loud noise. But, they are fast, relatively simple, and fascinating. Author demonstrates best starting position and suggests plenty of practice without starting. Have CO₂ fire extinguisher handy.

size, since it varies with the tank, CG, etc. Sound is no guide. It's done strictly by clocking the plane. Our plane is usually going faster when it sounds erratic. When it leans out, it slows down.

The flojector does not have the hose connector as on a stock flojector. With practice it is easier to start a jet, since the plane need not be shifted. Note, before cutting off the hose connector, it points between the holes and is in line with them. This is the starting point. By taking the position shown in the picture and looking down into the intake, it is easy to judge by the spray of fuel, when the right place is reached. In case of flooding, with flames coming out the tube, simply point the tube on the tire pump at the valves. This will clear it and many times the engine will start. To modify the tire pump, put $\frac{1}{8}$ -in. or $\frac{5}{32}$ -in. brass tubing in the hose, and bend it slightly to come in at the approximate angle of the original connector. A medium or small diameter tire pump gives enough volume of air and doesn't tire the person pumping as quickly.

Squatting over a jet model when starting may seem dangerous, but the engine can't blow up because of the open combustion chamber. Flames sometimes come close to the lower extremity of the body, but in 20 years I have yet to be burned or to set any part of my clothing on fire.

When I decided to build a tank around the intake, the result was a tank longer than the intake in order to get the necessary volume of fuel. After much work, this design seemed a lost cause. Then a fellow launching the model made a chance remark that one certain tank seemed to have more thrust on the ground. After some thought, and much searching, I ended up with the end of a salt shaker taped to the inside of the intake to duplicate the length of the tank and flew it on my regular plane. This most unscientific adaptation jumped the speed from 155 mph to 167 mph. A turned intake, similar to those in the picture, evolved and turned 176 mph using the old .024 in. Mono-line. For those without a lathe, that old salt shaker and some epoxy could make a satisfactory substitute.

On the tuned intake, good results are obtained by using the length (shown on the drawing) of three inches from the valve face to actual intake. The venturi opening and minimum diameter are the same as a stock Dyna-Jet. To try tuning the engine, the overall length could be shortened by .25

in. and a 1.5-in. inside diameter tube attached to the cowl. Many combinations can be tried on a jet. It does take patience and one change at a time.

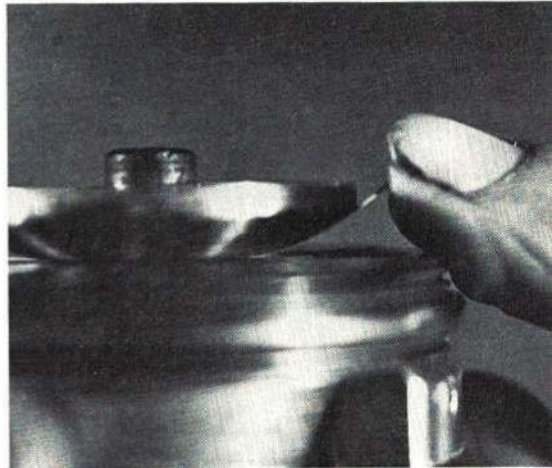
Getting the most out of a jet is not complete unless a good seal is created between the head and tube. If the head isn't a good "rattling fit" in the tube, carefully squeeze the tube until it is round and the head goes in easily with no bind. Then lap the lock ring and tube face on wet-or-dry paper until the surfaces are flat. The threads aren't perfectly true to the faces, so any misalignment will let the ring seat flat on the tube. It may sound like unnecessary work, but a year ago I was lazy when the head wouldn't lock solidly so it could not be turned, and I let it go as good enough. It meant 12 mph between that flight and the next when the head was seated and tight. The Scotch electrical tape that fairs the cowl to the tube is a good check on seal, because a leak will cut the tape like a knife.

The face that the valves seat on should be flat and have no nicks from burned or chipped valves. Find a flat plate glass window in a junk yard and on this, with No. 280, No. 320, and No. 400 wet-or-dry paper, depending on how deep any nicks might be, the head can be lapped in, even at the field. Using the paper wet simplifies the job.

To help eliminate burned valves, know the metering jet sizes and run the fastest rich metering jet possible. A No. 12 can be run but the No. 11 is faster. Beyond a No. 12, size of the flojector hole must be increased as it becomes the metering jet.

Two types of bodies are shown on the plans: the one used on the actual airplane; and the other a combination of a brass tank and a wood body, for those who don't have use of machinery or materials to make the all-metal body. Drawings for both bodies are clear enough to build from without detailed written instructions. Do remember to glue a piece of asbestos along the top of the wood body. Any good piece of straight-grained hardwood (no balsa!) will do—spruce is good.

Don't get excited about the fact that the fuel line does not go to the rear of the tank. Believe me, it works. The shorter fuel line gives much better running without a tendency to cut out. The fuel goes to the back of the tank on takeoff. Since the tank is almost full, there is no trouble getting fuel. In flight, the fuel is 30 times heavier so it presses to the outside of the circle if the



Improved performance possible by very careful alterations to valve stop. With file or lathe remove metal to permit valve to open slightly higher and therefore longer. This step, and a tuned front end are about the only really practical modifications for the otherwise stock Dyna-Jet. It works, holds record.



The Thomas/Fisher team. Dyna-Jet is made by Curtis Dyna-Products of Indianapolis, Ind.

model is tracking straight, and will go forward when the model starts to slow down.

The tank on the actual model was a piece of spun tubing obtained from an aircraft salvage firm, but the one shown is turned from $\frac{1}{4}$ -in. 24ST aluminum bar stock, as is the nose of the tank. The seal on the tank nose is a $\frac{1}{8}$ -in. neoprene "O" ring which can be obtained from a plumbing supplier. It must be just a light push fit since the fuel will tend to swell the "O" ring. Screws holding on the nose and the front of the skid go into the tank, but no leaking problems have developed.

The tubes are soldered to the two $\frac{1}{4}$ -in. brass screws after the screws are put into the tank nose. Drill the $\frac{1}{8}$ -in. holes in the screws first and countersink the nose just enough to get the screw to seat. Then file off the excess. Wind a strand of soft wire around the end of the fuel tube and solder. This helps obtain a seal to eliminate running lean and burning a valve. Change the neoprene tubing for every flight session.




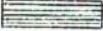


On the brass tank, the exploded view shows how parts go together. Tin the edges and fit the top, bottom, and end inside the side piece and sweat-solder together. Note

Continued on page 74

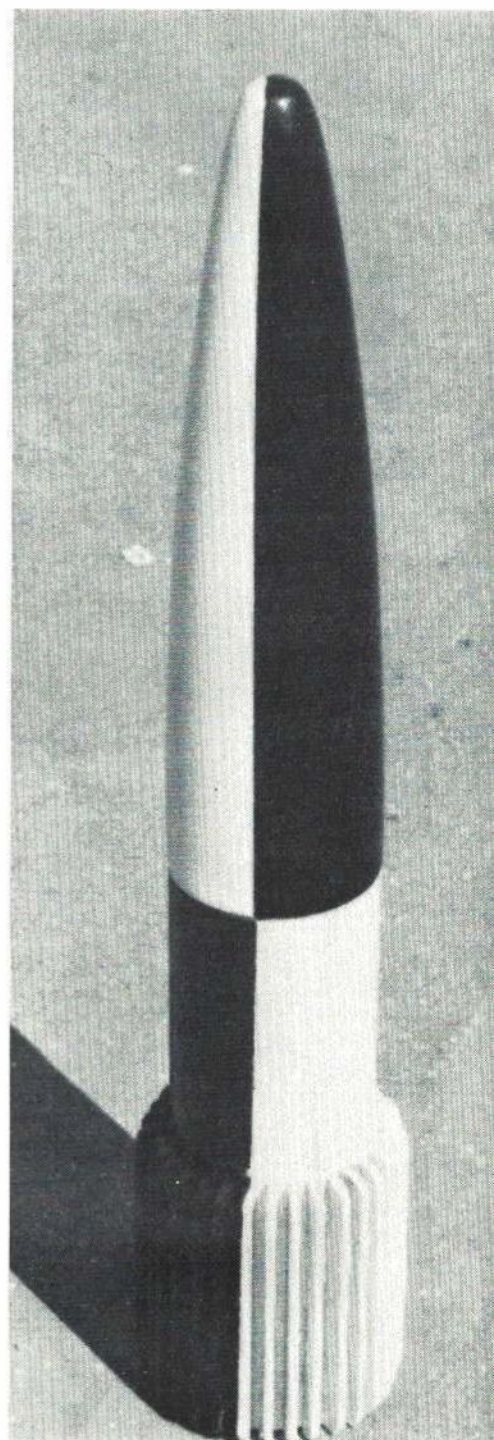
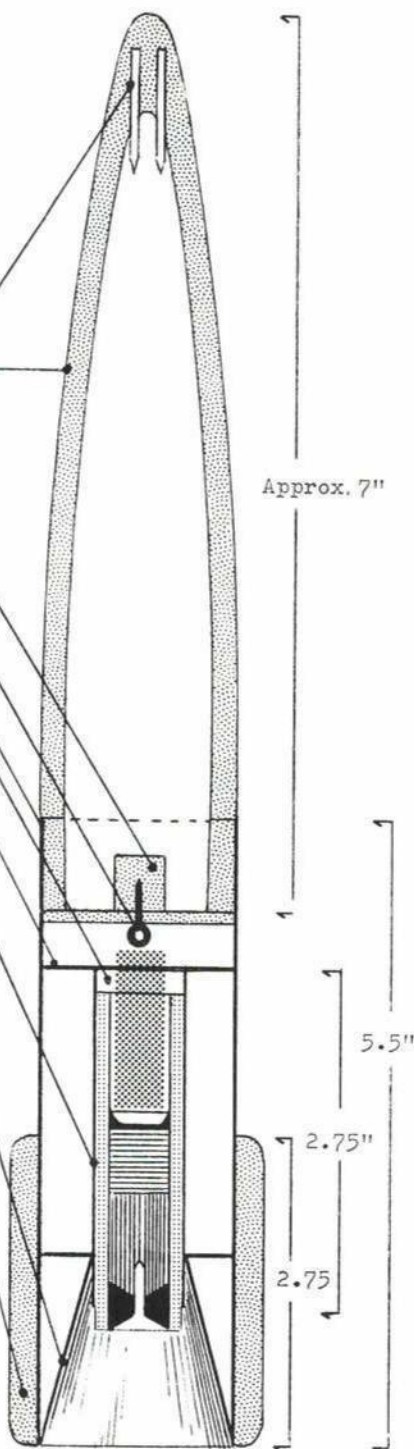
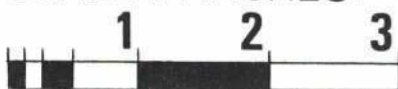
V-32

NOSE WEIGHTS (NAILS)
 NOSE CONE (681-BNC-60AH)
 NOSE CONE BASE (SCRAP BALSA)
 SCREW EYE (651-SE-2)
 BODY TUBE (651-BT-60R)
 ENGINE BLOCK (651-EB-20A)
 PAPER ADAPTERS (651-RA-2060)
 ENGINE TUBE (651-BT-20J)
 PAPER SHROUD
 FINS, 32 (from $\frac{1}{16}$ " BALSA)
 ...also: crepe paper,
 shock cord (671-SC-2)
 white glue, paint,
 launch lug (691-LL-2A).

LEGEND:

	BALSA
	STREAMER
	ENGINE CASING
	DELAY CHARGE
	FUEL
	NOZZLE

SCALE IN INCHES:



Experimental model with 32 tiny fins goes straighter and higher. It does not weathercock.

MELVILLE GRANT BOYD

photos and drawings / THE AUTHOR

THE V-32 is an unconventional model rocket that is satisfying to construct and fly. The absence of obvious fins makes it appear unflightworthy. However, the 32 finlets are as effective as four conventional fins of much larger size. It is 11 in. long, and weighs 1.8 oz.

As in all model rockets, the stability is controlled only by the configuration of weight and surface area. The center of gravity must be somewhat ahead of the center of air pressure. The center of air pressure

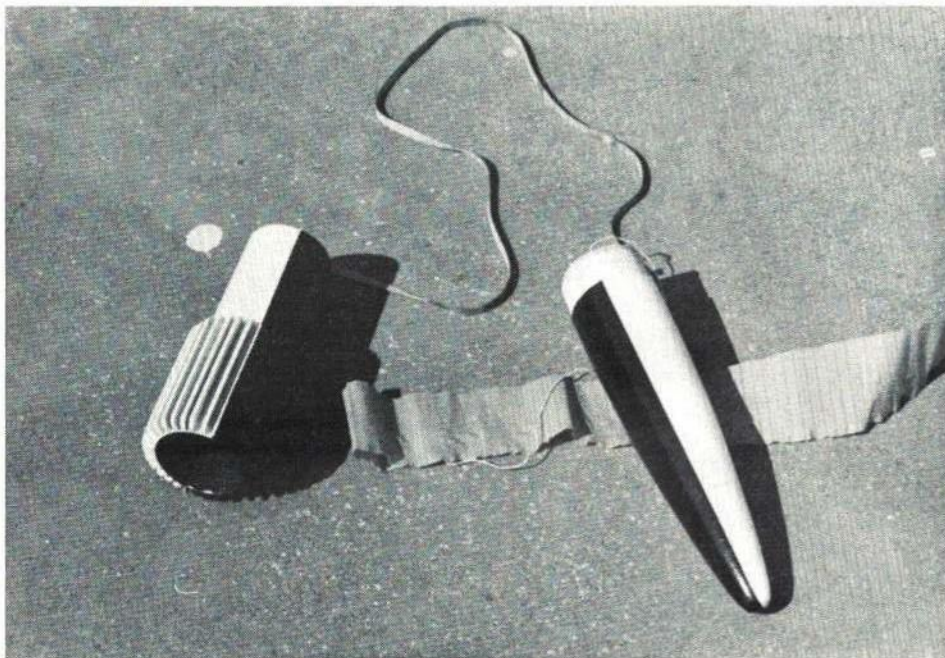
is defined as the central point at which all external air pressure may be assumed to be acting. The ratio of fin area to length and weight is extremely critical in a model rocket which usually has no internal stability controls such as gyroscopes.

The engine assembly is recessed up into the body tube to help shift the center of gravity a few precious fractions of an inch forward. Likewise, the nose cone, hollowed and weighted at the tip, shifts it further still. The many finlets present little surface

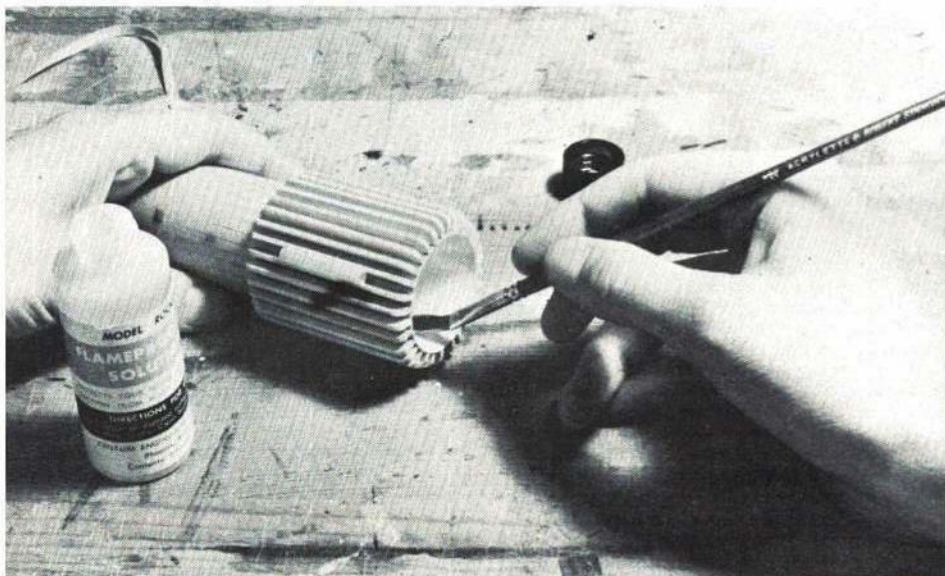
area to the wind, thus avoiding the old weathercocking tendency. Weathercocking simply means the tendency of a large-finned model rocket to head into the wind, thus decreasing the beauty and altitude of upward flight.

Although construction is rather straightforward, it is best to have had some previous building experience.

Model rocket engines are safe, reliable, inexpensive and usable only once. Available from Estes, Centuri and other major



Since there are no widely protruding fins to break in landing, recovery system is just a length of fire-proof crepe paper. It all tumbles earthward with engine retro blast.



Engine is recessed in the body, so the flame outlet must be fireproof. Author uses Centuri Flameproofing Solution. Note launching lug glued firmly between finlets.

model rocket manufacturers, the engines are certified by the National Association of Rocketry and are of standard sizes, weights and thrusts.

The main plan shows a typical engine cut lengthwise. The solid fuel is ignited electrically from a distance because engines are nearly impossible to light safely with flame. After the fuel burns out, a delay charge ignites, creating little additional thrust, but providing a white trail for tracking purposes. Then a small charge burns, creating hot expanding gases which cause a good deal of pressure. Normally this pressure is utilized to activate some simple recovery mechanism, usually a parachute or streamer. This allows the model to return safely to earth, where it can be readied for another flight. In this model the nose cone blows off, pulling out the streamer, which is rolled and inserted compactly into the unused upper end of the engine.

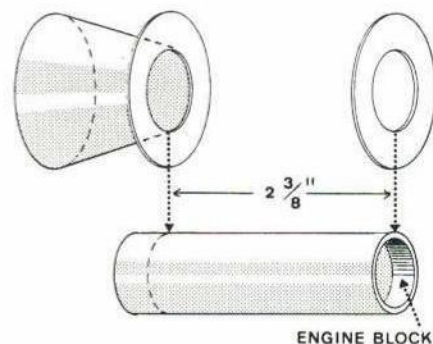
A streamer enables the most rapid and direct recovery, as parachutes tend to drift some distance. However, with a streamer, weight must be kept to a minimum to avoid damage upon impact. If a parachute is used, the model must be built with a body tube two inches longer to allow room for the parachute and its protective wadding.

Estes parts are used throughout. Similar, but not identical, Centuri parts may be substituted. White glue is used to bond all parts because it makes for a sturdier joint than airplane glue.

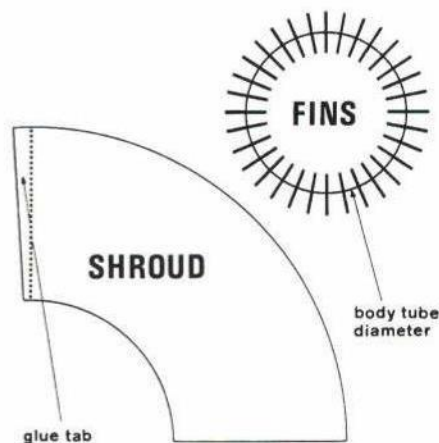
The engine assembly must have a generous fillet of glue applied at all joints to ensure that it will not rip out. The finlets are cut from balsa ($\frac{1}{16} \times \frac{1}{4} \times 36''$) that has been sanding-sealed except for the side which glues to the body tube. The full-size shroud pattern is traced onto sturdy card stock, then cut, test fitted and glued together.

This particular version of the V-32 must

ENGINE ASSEMBLY



Engine is assembled with standard parts and shroud. Be sure engine block is firmly glued.



Half-size drawing for engine shroud and finlet gluing guide. Scale up with compass.

employ an engine that allows room in the forward end for tucking in the streamer. A B6-4- or B14-5-rated engine provides the necessary initial thrust and leaves room for the streamer.

Balancing the completed model is critical. The swing-test gives quick results. Tie a string around the model at its balance point and point it in the direction to be twirled. Twirl the model rapidly in a horizontal plane, observing stability. If the model tumbles, insert several nails or slivers of lead into the tip of the nose cone, slide the string forward until the model balances, and twirl again. Repeat the process until stability is achieved. The model must be twirled rapidly to simulate the several hundred miles-per-hour speed of flight. Do not add more weight than needed for stability. All testing must be done with the appropriate engine in place.

After stability is achieved, push the weights below the surface of the wood and fill with balsa putty. Give the nose cone several coats of sanding sealer or filler coat, sanding carefully after each application.

The model should be painted in highly visible colors in a distinctive pattern that will stand out against the sky, and on the ground after descent. The original V-32 was spray-painted white and allowed to dry. It was then masked lengthwise, down the middle, and one half spray-painted black. After drying, the nose cone was twisted one half revolution, producing a simple pattern reminiscent of the German V-2, its namesake.

Using standard launching equipment available from the manufacturers, this model should make many successful flights. Many improvements and variations may be developed from this basic model.

F/F BOB MEUSER

General Correspondent
SPORT

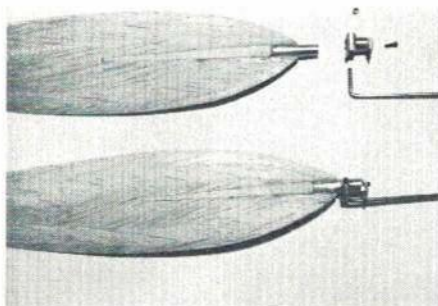
Payload Cargo Event: Suppose someone announced a new event for gas models which are to be inexpensive, rugged, and easy to adjust. A 40-sec. max prevents the models from drifting far—ideal for small fields. The event is to be a real test of skill at designing, building, and flying. Wouldn't such an event be a welcome departure from the screaming demons now commonly accepted?

Such an event already exists in Payload Cargo which has provisional status in the AMA rulebook and is listed on the sanction application. Nevertheless, the event has not become popular. It is held as an unofficial NFFS-sponsored event at the Nats, which is about its only appearance. AMA is not enthusiastic about unofficial events at the Nats, and if they are discontinued Cargo seems doomed.

The rules in brief: maximum wingspan, 48 in.; max engine run, 20 sec.; max engine displacement, .025 cu. in.; minimum total flight time, 40 sec. for official flight; 12 at-



Payload cargo deserves more attention at contests. It offers new challenges. Here Willis' Topper starts winning NATS flight.



Beautiful laminated prop on Bob Wilder's rubber jobs is better because of warp resistance and torque variable pitch!

tempts allowed to make three official flights; a one-oz. dummy pilot measuring $\frac{1}{2} \times 1 \times 1\frac{1}{2}$ " is carried. The total of the gross weights for the three official flights is the score, so the model can be loaded up until it will barely make 40 sec. It must ROG. Three sheets of plywood make an official takeoff strip.

Continued on page 83

F/F WALT MOONEY

Specialist Correspondent
SCALE

New CO₂ Engine: Bill Brown of Brown Junior is introducing a new engine with a displacement of .005 cu. in. The sample engine he sent me for testing, complete with a model Piper Super Cruiser, is highly impressive. The CO₂ fuel for the engine is easily available in standard seltzer bottle cartridges, carried by almost all liquor stores. The loading device works like a charm. Seven to ten flights are available

from each cartridge, which makes the operating cost about two cents a flight.

Typical motor runs with the Super Cruiser were as follows: 45 sec.; 2 min. 50 sec.; 3 min.; 2 min.; 1 min. 30 sec.; 50 sec.; as well as three more shorter runs. Because there is no de-thermalizer on the model, flights have been slightly terrifying. Four flights the first day were over five minutes long. These times may sound almost unbelievable, but several members of the San Diego Orbiters were present and favorably impressed.

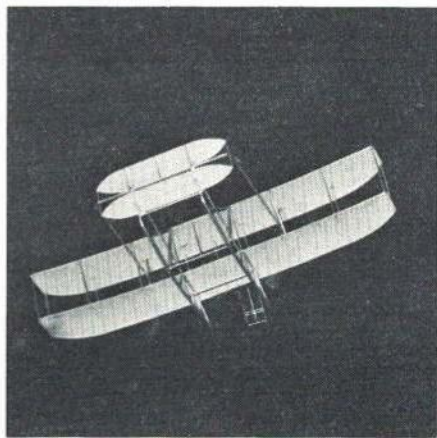
Second and third motor runs are longer because the tank is cooled down by the expanding gas during the early runs, and therefore can be filled with more CO₂ on the next refueling. However, after several refuelings the pressure in the seltzer cartridge has decreased.

Model Makers: Bob Clemens' Peanut Scale Demoiselle and Avro 560 are examples of what can be done with a small expenditure for materials. His Waterman Racer is of the same excellent quality. That grand old man of aviation, Waldo Waterman, who lives in San Diego, is still building and flying airplanes long after most men have retired. His latest is a pusher monoplane with a Corvair engine and is mounted on twin floats.

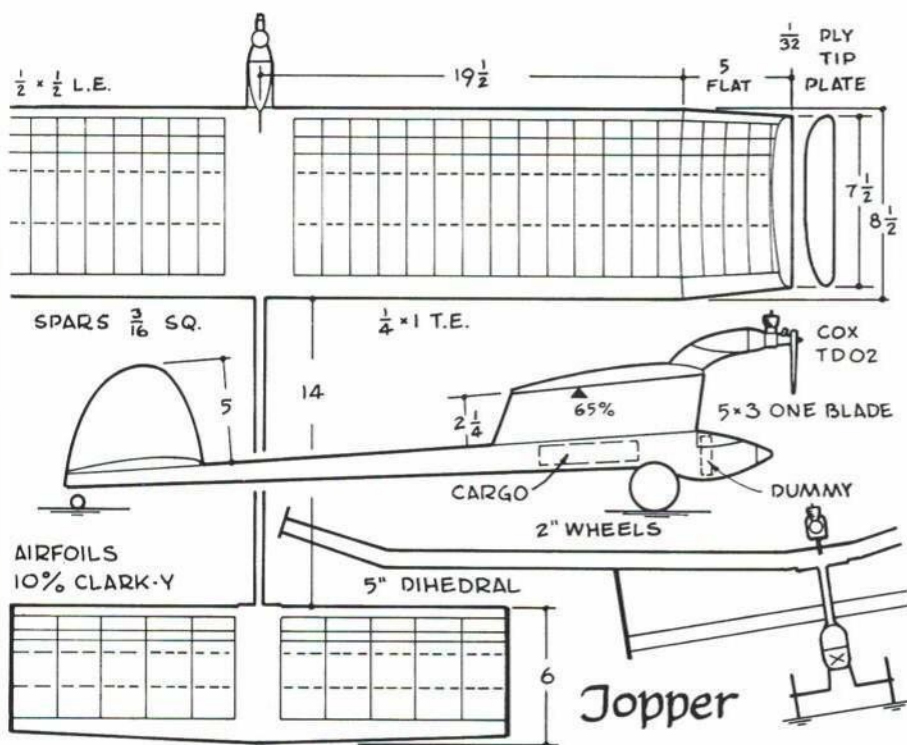
Scale Bull Session: The year's longest Scale bull session began Sunday morning, Feb. 22, when we left for the Flightmasters'



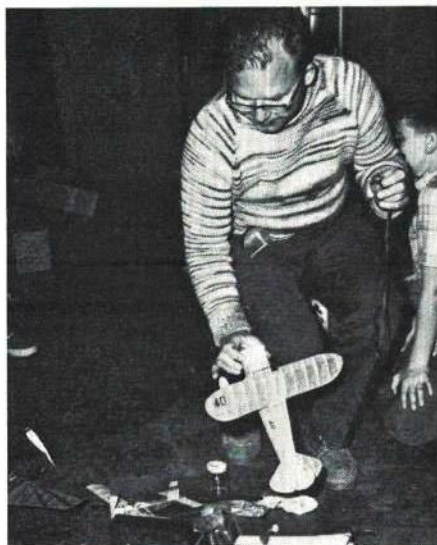
Fernando Ramos prepares 1903 Cessna for Peanut scale meet. Highly undercambered wing and long tail give great duration.



The original twin pusher, Wright Flyer by Frank Rogers. Rubber goes aft from tips of stabilizer. Surprisingly fine flying model.



This plane is really a combination of odd-plane parts, not a special design, yet it lifted 21 1/2 ounces with the 020 engine which sports a large diameter one-bladed prop. Try one.



Walt Mooney rubberizes his Mr. Mulligan. Although light, it is a fast flyer. Site of event was the Los Angeles Space Museum.

indoor scale meet at the Los Angeles Space Museum. First stop was for Fudo Takagi in San Diego; next, up to Escondido for Bill Hannan and his son Kenny; then over to San Marcos for Russ Barrera. With the two Mooney boys and the chauffeur, there was a van-full, and the conversation was almost entirely on scale models.

The flying site in the Space Museum was no blimp hangar, but it was large enough to fly several models at once without crowding. The meet drew 38 entrants, nine of them in Junior Peanut Scale. Probably the most impressive model there was an exact scale

Continued on page 83

F/F

CHUCK BROADHURST

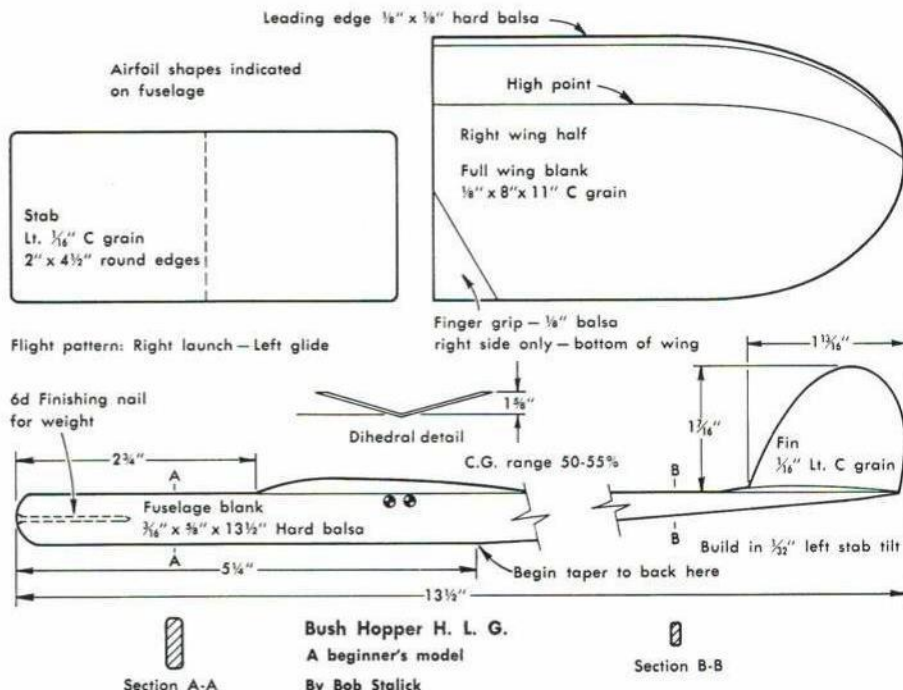
Specialist Correspondent
POWER

Gathering of Eagles: Hardy Brodersen reports the Detroit Balsa Bugs will sponsor an all-FAI contest for prize money. A "Gathering of Eagles," as they call it, has an entry fee of \$25 for each event—for Wakefield, Power and Nordic A-2. The contest will be held on Sunday, July 26, 1970, at Bong Field, Wis., just 60 miles from Glenview, Ill., where the Nats begin the following day.

World Championship rules will apply. Seven rounds will be flown, one and a half hours each, starting at 7:00 a.m. In the Power event only one engine may run in the launch area on the ground or in flight.

Here's an example of how the prize money would be divided. If an event has 25 entries, the total purse is \$625.00. Ten percent is deducted for the sponsoring club (\$62.50) and five percent for the timers (\$31.50). The balance, \$531.25, is distributed as follows: 50%, First Place—\$265.63; 35%, Second Place—\$185.94; 15%, Third Place—\$79.68.

With the Nats close by, the "Bugs" might draw a crowd. Brodersen says he has AMA assurance that "professionalism" isn't a worry as there have been numerous events in the past where prize money was awarded. "But I would feel much better if there was some direct and specific response from CIAM on the point," he says. . . .



Bush Hopper H. L. G.

A beginner's model

By Bob Stalick

(with apologies to Warren Kurth)

F/F

BOB STALICK

Specialist Correspondent
GLIDER and RUBBER

Hand Launch Gliders: Of all the events on the AMA F/F schedule, nothing is so misunderstood and underrated as the hand-launch glider. Yet the fundamentals of aerodynamics and hours of pleasure exist in those few cents worth of balsa and glue!

Successful outdoor hand-launch glider flying has few mysteries. Many designs, from the sophisticated types such as Lee Hines' Sweepettes, to the more basic thermal "pigs," are highly competitive. I have had excellent results with a basic Hedgehopper, by Warren Kurth, which appeared in a back issue of AAM.

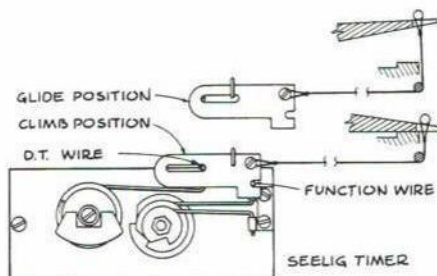
Several details are imperative to successful flying of a hand-launch glider. Among them are: light weight, proper wood selection, correct airfoil shapes, balance and finish. The accompanying plan, a modification of the Hedgehopper designed for my six-year-old son, was adapted for his young, weak arm. (Although I must admit to getting quite a kick out of flying it myself.) Using the following hints, it or any other glider can be successfully duplicated. Selection of wood is essential in building a competitive model. Choose hard, stringy balsa (12- to 14-lb. stock) for the fuselage, lightweight C-grain balsa (5- to 7-lb. stock) for the wing and tail assembly.

First, cut the wing blank to shape. Then carve, plane, and sand to the indicated airfoil—measuring frequently so that the wing thickness is consistent throughout. Cut the blank at the dihedral joint and carefully bevel both panels for a good, flush joint. Join wing halves with Titebond.

The fuselage must be carefully tapered to allow for both flexibility and strength. The wood must be without knots or soft spots, and care must be taken not to undercut any part of the tail boom. The stabilizer and fin cannot be sanded so thin that doping will warp them.

Glue the parts together so that everything

Continued on page 81



Hand-shaped cams on timer stop engine, adjust stab, and rudder in sequence for proper glide transition. Fully adjustable.

C/L BILL BOSS

General Correspondent
SPORT and SCALE

Pull-Test Requirements: Early this year much smoke and dust was generated about the 32G pull-test requirement, and the use of braided versus solid line for certain control line events. Just about every newsletter had an editorial on this item. Once the dust cleared, quick action by AMA officials and the CLCB settled on a 25G pull-test for Carrier I and II and Scale Racing, and the use of braided lines to remain in effect for 1970.

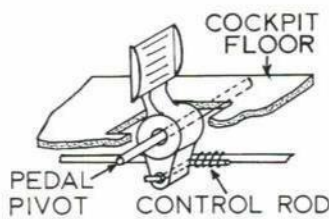
The furor raised over the 32G pull-test and the type of line to be used should result in revised line requirements for all CL events. For too many years, all CL events have been referred to the speed-for-line requirements. Because of the wide variation in the speeds, weights and types of planes flown, all CL events should have line sizes and types and pull-test requirements tailored to the individual events. To this end, Jean Paillet, District II CLCB member, is working on a proposal, to be presented to the CLCB in 1970, outlining specific recommendations for new line requirements in all control line events. The goal is implementation in 1971.

The analysis of line strengths, braided versus solid, now being undertaken, should settle the question which lines and sizes can be used and still meet safety requirements....

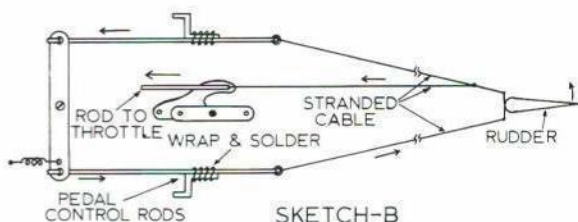
American Aircraft Modeler in Brazil: A recent letter from Paulo P.S. Brandao and Richard M. Davis, of Uruguaia, Brazil, both of whom are civilian pilots, outlined their trials and tribulations in the pursuit of CL model flying. Obtaining kits and general modeling supplies, which appear in their country in extremely limited quantities, is difficult. The nearest town in which AAM can be purchased is Porto Alegre, about 400 miles from their home.

Few of the materials we enjoy, such as foam wings, decals, MonoKote-type coverings, etc., are available. Most of the supplies are limited to CL profile and a few stunt and scale kits.

Despite these difficulties, both modelers make good-looking models. Paulo said that the engine, a Fox 29 used in the P-47, is switched to an AT-6 scale plane when it is flown. How many of us have to switch engines from one plane to another to enjoy



SKETCH-A



SKETCH-B

Last month we showed how to mold rudder pedals. Here is method of putting them in the PT-19 control-line scale model. Retarding throttle for landing moves the rudder to increase line tension, rudder pedals move accordingly. Yes, control stick also is operated.

our hobby? ...

Combat Anyone?: The Acton Combat Exposition, Sept. 6, 1970 (Labor Day weekend) at Acton, Ontario, Canada, will be a day dedicated to flying Fast, Slow and FAI Combat events. Trophies and prizes will be awarded to the top three places in each event. In addition, cash awards of \$200, \$100 and \$50 will be given to the three Fast Combat winners.

Flying will take place at the Acton Fairy Lake Park which provides camping facilities, washrooms, fishing and swimming—this could be a family outing.

Last year's Combat Exposition was won by Don Patton, with Dave Adamski, second.

Continued on page 88

C/L JOHN SMITH

Specialist Correspondent
SPEED and RACING

CL Speed On Upswing: A beautiful lineup of 1/2A Proto models was entered at the Southwest Regionals in Phoenix last February. The planes, which flew on lefthanded props and two wires in this event, got in all their official flights. Dale Kirm, who made these props available, also reports that the difference between Profile two-wire and enclosed single-line is less than one and one half mph. He didn't list a price for his props, so send five dollars to 1449 East La-Palma Ave., Anaheim, Calif. 92805, and be surprised....

New 1/2A Proto Record: Jimmy Wade set new record of 80.22 mph in Profile at the Southwest Regionals, back-up was 79.00 mph. Model was Santana (in AAM last year) by Kirm: two-wire, single-bladed, lefthanded prop....

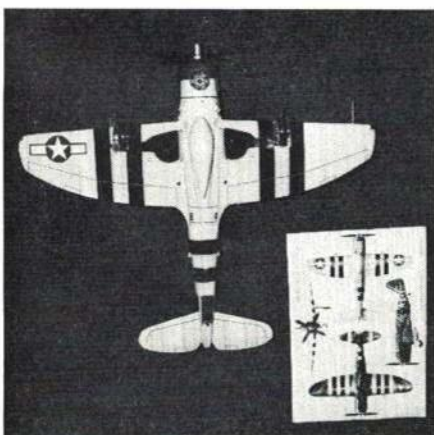
Lower Pull-test For 1/2A Speed?: That is a suggestion from Dale Kirm who feels that 40G pull is too high for 1/2A. Bellcranks are being pulled out of models, and a 20-lb. pull on an eight oz. model is only two pounds below breaking point of .008 lines. This was a problem at the last NATS in all classes on two-line setups. Eleven of 20 airplanes



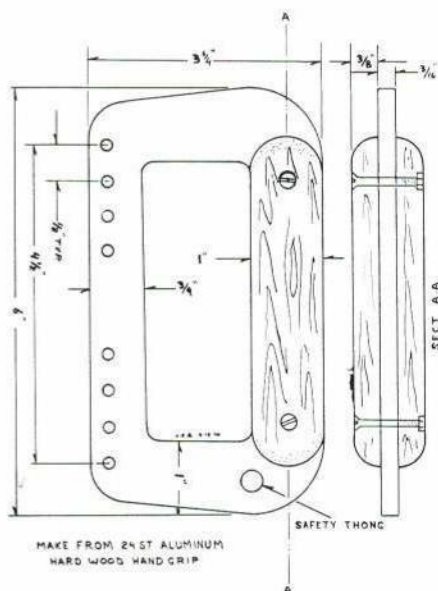
Position is everything? Well, it helps Ron Getz complete a profile stunter in school woodworking shop. Photo by Charles Bauer.



P-47N by Paulo Brandao and Richard Davis of Uruguaia, Brazil was built from Top Flite kit and follows paint scheme for AAM four-



color drawing in September '69 issue. Workmanship is excellent. Modeling in Brazil is expensive, many items are unavailable.



Under extreme line pull in Speed and Scale some plastic handles have broken. This one is aluminum based; it certainly won't fail.



Entries at Southwestern Regionals in 1/2A Proto. Most used 2-line control systems and lefthand props were used by winners.

that came unglued during pull-test were two-wire jobs. Building them stronger may be the answer. . . .

Where Have All The Fliers Gone?: The answer is teams. Many name fliers have teamed up with an engine expert. We are seeing many new faces and some real fast flying. . . .

Plastic Handles Unsafe: Those who are still flying on plastic two-line handles, beware. The plastic has been breaking under load, as well as during the pull-test. If these handles break in flight, only the flexible wire that runs through them is left to grasp. It is almost impossible to hold this wire without being cut badly. So play safe. Make up a good aluminum handle as shown. . . .

Read the Rules Book: The new whipping violation rule states that after the second violation all flights are scrubbed. So keep the wrist in the pylon and don't get ahead of it. If still pulled through the yoke, try hooking the thumb around the upright. Lots of fliers do this and find it helps. Remember, half the game is keeping the ship in the circle. . . .

Better Watches For Record Flights: A proposal is being written which would require 1/100 sec. watches to be used on all flights turned in for possible records. In the 180-190 mph range, the tenth of a second gap is almost five mph. The watch variation in Proto to 2/10 instead of 4/10 now allowed may also be changed. . . .

This and That From the Whipping Post: If all works out, a new flight card may be used at the NATS. It will contain three tear-off sections. One section is to be given to the flier after each flight and will show his time and speed. This should help cut down the crowd around the timers' table and leave them free to do a better job. Last year the timers missed several flight times and were called down by the contestant. Remember that, while many of these Navy helpers do an excellent job, they have not timed a model airplane before. There are enough back-up watches to catch almost any mistake so don't go ape if they goof one. They are giving up their time off to make your NATS visit a happy one. . . .

C/L JOHN BLUM
Specialist Correspondent
CARRIER and STUNT

Navy Carrier Recap: To continue the recap of Navy Carrier activity at past Nats, the 1957 event brought additional refinements as contestants took advantage of proven innovations. The Robert's Flight Control system was coming into its own. Standards were being set. Adaptable equip-

ment was more readily available, and more kit and plans information was in the hands of the modelers. When equipment and accessories attained standardization for a period of time, Carrier flyers began to concentrate on competitive flying techniques that would get them on the deck.

The first over-500-point flights in the seven-year history of the event came in 1957. These scores, like the 400-point milestone of the 1954 Nats, held for a number of years. Steve Babin, flying a McCoy 60-powered Guardian, placed first in Open with 520 points. With the first five places in Open at over 500 points, the challenge was high. However, scores dropped back to the high 400's in 1958 and 1959 Nats, although the methods and equipment remained basically the same.

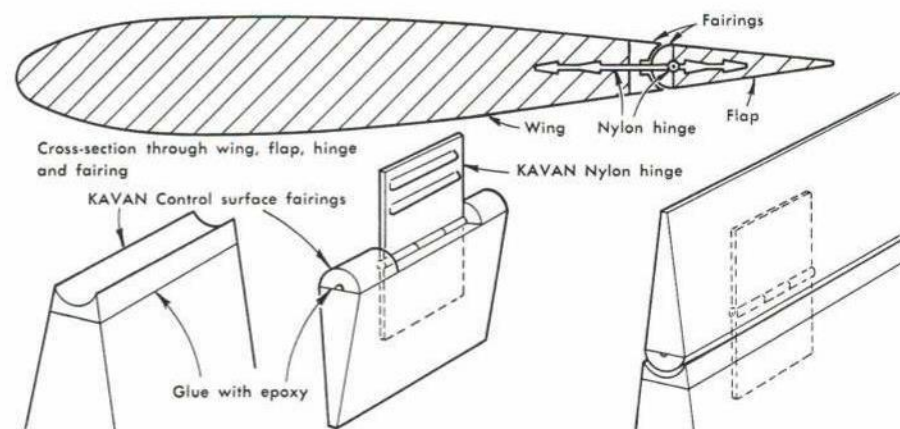


Max 35 powered Jetco Dolphin is built and flown by 12-year-old Mark Bauer. A good intermediate trainer flies fairly slow.

A wide variety of Maulers, Skyraiders, Corsairs, Bearcats and the Guardian were flown. The 437.51-point score at the 1959 Nats was earned by Virginia Randall using a twin Dooling 36-powered Tigercat. This was the first Nats win in Carrier by a twin-engine aircraft (3-view of Tigercat and specifics, July 1961 AAM).

As most flight and throttle operational problems were solved, more range in the speed phases was the goal. As a result, popularity of the McCoy 60 with its reputation for dependability and high speed was inevitable. When provided with a throttle, it offered the needed power control characteristics. Flights of 90 mph in a good model were possible "right out of the box." The McCoy remained popular until the Rossi 60 was introduced years later. . . .

Control Surface Fairings: From Kavan, German manufacturer of model airplane parts, come the accessories needed to create neat, compact, control-surface fairings. (Many Kavan throttles also are used in Carrier.) Sketch illustrates the application of fairings to wing and flap. By using a sand-



Kavan of Germany now offers a much improved hinging system which not only looks much neater but, because it eliminated hinge gap airflow problems, affords better control surface performance. Works on all controls for any type model. Imported by Polk's.



K&B 40 RR in Guillow's Trainer by Bill Johnson. Throttle system also regulates pressure tank system, as explained in text. Used as flying test bed for engine ideas.



As you read this in summer, imagine the coolness of the snow on the wings. S.T. 40 in the Guardian pulls it along at 85 mph. Symmetrical 16% wing; weight is 24 oz.

paper block to assure precise flat surface on member, the mating convex and concave fairings can be epoxied in place. The mounting of Kavan nylon hinges is also recommended. When installed as shown, they permit axial movement of the flap to assure neat, but close, movement of the matching parts. . . .

Muffler Survey: The Valley Forge (Penna.) Signal Seekers (RC) conducted a survey on mufflers to evaluate their need and present use. Of 272 questionnaires mailed to AMA-chartered clubs, 50% were returned, representing a total of 5467 AMA members. Complaints included excess power loss, 65%; poor attachment, 40%; poor silencing, 32%. Recommendations requested a design-integrated engine-muffler, 57%; establishment by AMA of noise standards, 29%. Of particular note is that 14% of clubs require mufflers.

When considering a responsible approach
Continued on page 88

R/C DON LOWE

General Correspondent SPORT and PATTERN

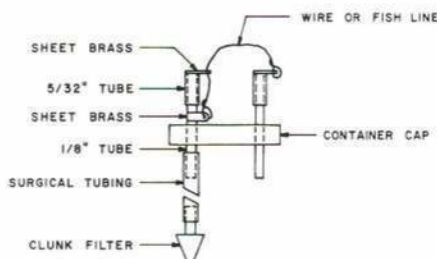
Toledo Is Utopia: To me the Toledo Show is modelers utopia, with every conceivable RC goodie and the latest and best in model design and construction ideas. Every year it's better and more crowded. Surely the show could use twice the floor space.

Among the highlights was Bill Lehn's (a WORKS member) reaction to those crazy Sweeney concoctions of an RC Ukie which Ed and I demonstrated in RC combat. Seeing the first modified Voodoo zip into the air, he thought "What in the world is a Ukie combat demonstration doing in an RC show?" The crowd could hardly believe its eyes when these modified Voodoos, with two channels of control (aileron and elevator), powered by muffled 19's, and sans landing gear, roared off into wild combat. The maneuverability was great and the symmetrical configuration kept the spectators on their toes trying to figure out up from down!

This is the closest approach to practical RC combat that I've seen. Why wouldn't this same design be good for club contest pylon racing?...

Single Model Racing Events: A number of clubs are turning to what might be termed standard or single model-design racing events. The Milwaukee Flying Electrons are building copies of Dario Brisighella's Vindicator for summer fun. This airplane is a simple design and yet is most attractive. Dario says they can be built in an evening. Another club with a similar idea is the Delaware Radio Control Club. Tony Wilford reports that they are building Jr. Falcons. It doesn't matter too much what the ship design is as long as all models are the same and represent a minimum investment in time and dollars. This certainly is an excellent way to stimulate interest and gain experience for moving into Formula I and II competition....

St. Louis Happening: Al (Snoopy) Signorino has the details on a unique "happening" in St. Louis on September 27. The St. Louis *Globe Democrat*, in cooperation with the St. Louis Modeling Association, is sponsoring an event to commemorate the 60th Anniversary of the London to Paris Air Race. For those who are short on history but saw the movie, *Those Magnificent Men and Their Flying Machines*, the aircraft were really something to behold (but not to fly!). Two-inch-scale models of these aircraft will race over



Clean fuel system involves stopper at fuel vents. Idea by Wayne Groth. See text.



Original version of Bede Aircraft BD-4 has unique construction in fuselage. One inch foam/balsa slabs shape up the boxy fuselage. Design by Francis Chan and son. Flying site is 5000-foot abandoned old city airport!

easy overland course. Al's address is 11959 Glenvalley Dr., Bridgeton, Mo. 63043....

Rated Pilot's Program: The Mentor Area Radio Control Society (Cleveland, Ohio) Newsletter reports on its Rated Pilot's Program, which is believed to be a first. Its purposes are to encourage fliers to upgrade their skills, to provide a means of classifying pilots for contests, and to improve safety by restricting student pilots.

The following ratings have been established: Dual Pilot—permitted to fly only with the full attention of a higher rated pilot; Sports Pilot—required to demonstrate controlled take-off and landing inside a 100-ft. diameter circle; Competition Pilot—re-

Continued on page 86

R/C GEORGE SIPOSS

Specialist Correspondent R/C CAR RACING

New Cars at Toledo: The Toledo RC Conference was bigger than ever and RC cars were the hit of the show! No less than eight manufacturers displayed new models and accessories.

For Delta, Bill Campbell showed his latest creation, a \$79.95 basic car kit. Curtis-Citizen-Ship had, at \$89.95, a car with a sturdy, box-like chassis. Wenzel Engineering's entry, a simple car with Indy wedge-type body, sells for \$79.95. Ra/Car's Winnah, a simple side-winder, was featured for \$69. The Heathkit entry is a new RC car, \$50 without engine. They also offer a companion kit radio system for radio controlled cars. Its simple, sturdy construction seems to be the way to go these days.

On the other end of the spectrum, two



Action at the midget track at Toledo. Ideal location could be site of some real model racing next year. Ten cars great variety.

very sophisticated cars, with transmission and fully articulated suspension, are aimed at the advanced modeler. Dynamic Models diecast car (\$129.95) had many nutsy-boltsy features including torque converter transmission. Ra/Car showed their two-speed gearbox and fiberglass chassis car, the Sonic.

Electric cars made their mark with the introduction of Control Technology's Scorpion (\$139.95). This car features an interchangeable frequency mode which means that 15 cars can now be raced on the regular 27 MHz band.

The Best Car of the Show award was won by George Siposs' Ra/Car Lola-GT-based special with operating gullwing doors, etc. Frank Furnas' entry, an Indy Wedge, came

Continued on page 86

R/C BOB MORSE

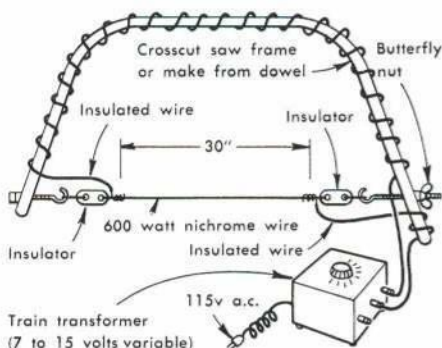
Specialist Correspondent PYLON RACING

Mid-Wing Minnow: A new fiberglass mid-wing Minnow is being developed by Bob Violet and Cliff Telford in the DC area. Yes, a mid-wing Minnow did exist and did race in the Goodyear events. Bob and Cliff say the ship is fast and groovy even in rough air. Fuselage has rivet lines, stringer lines, and other details molded in the fiberglass. Cheek cowls take the new S.T. engine too. Bob and Cliff say the ship will be available commercially....

Assembling Fiberglass Wheelpants: Several people have asked how to assemble fiberglass wheelpants. Try this: Mark the wheel cutout on each wheelpan half (four total), then with the center edge (the joint) down flat on the jigsaw table, saw the wheel cutout free; repeat this three more times. Next, make a simple drill template



Coming from Francis Products, the Formula I "Shoshonik." Said to be real groovy. Nose looks like it has some "Ol Tiger" influence.



With increasing popularity of foam-core, it should be realized that the core cutter is a very simple tool easily fabricated from available equipment. Here is such a cutter from Joe Nall. Transformer controls heat.

and drill an axle hole in each half. Sand the edges to be joined on a flat board sandpaper block.

Place two halves together and wrap securely with masking tape, keeping the joint matched. Apply a 1/2-in. glass cloth strip to the inside of the wheel joint, with appropriate resin through the wheel cutout. After the resin has cured, remove the masking tape, sand and fill the joint, and the wheelparts are ready for paint!

Use only polyester resin with formed polyester parts and use only epoxy resin with formed epoxy parts. Never mix them! . . .

More About Perfect Plank: A problem was created by mentioning all the virtues of "Perfect Plank" as a building board. George Reis, Jr. (Phoenix, Ariz.), informed us that it was unknown in his area. It seems that "Perfect Plank" is manufactured in California, at Chico, and is shipped only in carload lots to its customers. Barker Industrial Supply, Redwood City, California, does receive small lots occasionally and has wrapped and shipped a 2 x 16 x 96" piece to George, in Phoenix, for \$21.12 plus \$4.50 for freight.

So, for those interested in "Perfect Plank" here is a supplier who will be glad to ship odd lot pieces, as well as an idea of the costs. It's worth it for those who can afford it. . . .

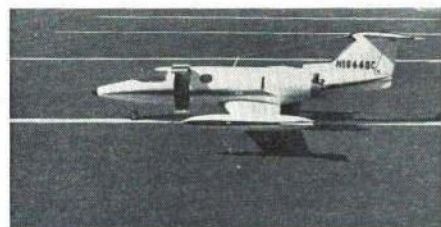
Aileron Belleranks: An aileron bellerank assembly for those thin Formula I wings consists of a 6-32 stud attached to an .045-in.-thick aluminum mounting plate and a tapped Williams Bros. nylon crank. Overall height of the complete assembly is about .060 in. greater than the bellerank itself. A real time saver. Available from Nelson Model Products, 1414 W. Winton Ave., Hayward, Calif. 94545, at about a dollar a pair, including the belleranks. . . .

Western States Pylon Championships: The Pioneer R/C Club (Sunnyvale, Calif.) will again host the Western States Pylon Championships at the Turlock Airport. Due to the growth of this racing event, the sponsors have been forced to restrict racing to Formula I and FAI. A minimum entry of ten in the FAI event is required. CD is Lou Delateur, 1655 Wright Ave., Sunnyvale, Calif.

R/C

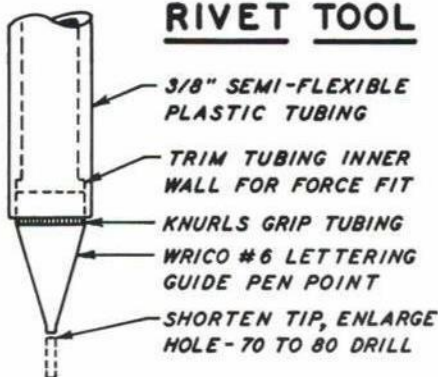
CLAUDE McCULLOUGH
Specialist Correspondent
SCALE

Those Magnificent Men: The Greater St. Louis Modeling Association and the *Globe-Democrat* plan a novel affair for September 27th — The 60th Anniversary London to Paris Commemorative Air Race. Over a closed or easy overland course, old-time RC models will battle it out for fun and prizes. Also scheduled are WW I Scale and Semi-Scale. See Don Lowe's column for other details. . . .



Two S.T. 40's power scratch-built Lear Jet by D. Wood, Gene Pool. Took four months.

RIVET TOOL



Rivets Without A Gun: Every scaler daydreams of the ultimate model, detailed down to the last rivet. But how? Pin heads turn out hopelessly oversize under 3"=1' scale, vibrate off and are heavy. English builders tried dabs of thick paint. Dave Platt's arrival on the U. S. scene with his epic Dauntless, featuring rivets simulated with white glue, set a new standard of realism. Good with synthetic finishes, white glue will not adhere to dope or vice versa. Spots of epoxy or fiberglass resin? An intolerably sticky mess! Dick Graham experimented with Sig-Bond aliphatic resin glue, found it stuck to dope and dope sticks to it, even when masking tape is pulled free.

A hypodermic needle seems like an ideal tool for applying tiny drops of glue but steering the point to an exact spot and simultaneously pressing the plunger is tedious. A successful solution is shown in the accompanying drawing. This impromptu gadget can be comfortably held like a pencil and easily guided. The Wrico lettering guide pen point (art supply stores) is modified by shortening and drilling out the tip with a No. 70 to No. 80 drill. The size of the hole determines the diameter of the droplets, so start small and enlarge as necessary. The pen point is force-fitted into the plastic tubing so that it may be removed for cleaning with the accessory Wrico needle or a fine wire and water.

The higher the level of glue in the tubing, the faster it drips from the tip. As the droplets appear they are lightly touched to the filler-coated and sanded surface of the model, then pulled free by an upward motion. Too much down pressure breaks the surface tension and causes the glue to spread out in a puddle which dries into an oversize pancake rather than a neat, rounded shape. The scale size of brazier head rivets is usually very small and the tendency is to overdo the size of the drop. This sometimes looks acceptable until viewing the cumulative effect of the finished job. Even with practice a certain number of rivets will not pass inspection. Let them dry slightly and they can be lifted off with a knife point and replaced.

Only those blessed with an artist's eye should try ad lib riveting. Crooked lines and sloppy spacing will ruin the effect. Study photos of the prototype and lay out correct patterns. Drawing a line around an oval cross-section should be done in a simple jig stand with a bearing at front and rear to mount the fuselage on its datum line. A pencil allowed to slide back and forth in a piece of brass tubing mounted on a stand will mark a perfect guide line as the fuselage is rotated. . . .

Tattle Tale Tape: Some common brands of masking tape from paint stores leave a chemical residue which even soap and water does not seem to remove from a color-doped surface. Worse, it stays invisible until spraying on clear dope soon causes yellowing everywhere a piece of tape was applied.

Continued on page 87

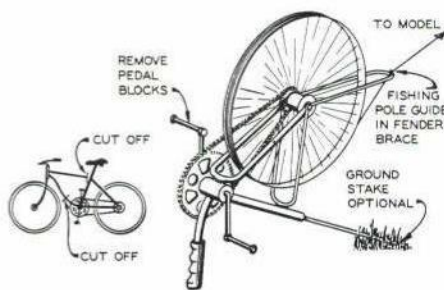
R/C

HOWARD McENTEE
Specialist Correspondent
GLIDERS and FAI

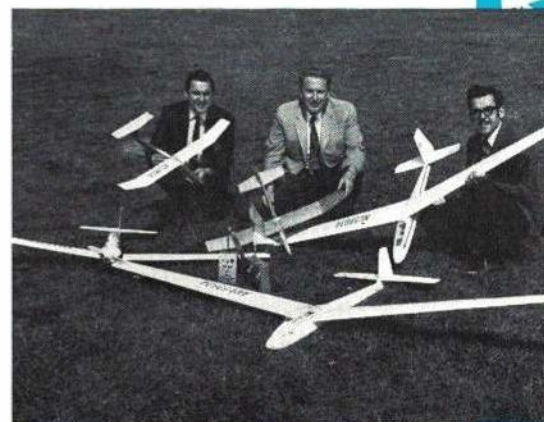
Hand-propelled Glider Winch: Longtime model-builder Bob Godden presents a simple conversion of the rear portion of an old bike to make a hand-driven glider tow winch. A 26-incher (check bike dealers, Salvation Army, even the local dump!), with the unwanted frame parts hacksawed off, was used. It can be cut down even more if the unit is to be hand-held. However, it is probably much more practical if spiked in the ground, as shown. A bike with two-speed rear axle is perfect. Each turn of the 26-in. wheel hauls in about seven feet of line. When the model is at its peak, just put on the brake! Bob says it's possible to wind about 1000 feet of line on the rim (tire removed). He had, lofted gliders as large as the 108-in.-span Graupner Foka successfully. . . .

Rudder-Only RC Gliders?: Cliff Osborn asks if gliders are practical with only rudder control, and what limitations such a craft would have. They are not only possible — but a lot of fun (and at low cost, too). The Soaring Associates, a group of RC glider enthusiasts who fly at the Los Angeles Basin, proves the point. Roland Boucher has a little glider which carries two-channel Kraft equipment for R and E, while E. V. Phillips uses a rudder-only job steered by Ace Commander pulse equipment and an Adams Baby actuator. Rudder-only certainly isn't as versatile as R and E — but an experienced

Continued on page 84



Bicycle adaptation by Bob Godden makes fine muscle-powered glider winch.



Officers of Soaring Associates pose with variety of gliders. Club leaders are Boucher brothers who kit Astro Flite models shown here. Soaring is more than hot air.



Cessna A.W.

One of the most efficient four-place planes of the late 1920's makes a high-time rubber job.

THE Cessna A series set the pattern for the many successful Cessna light planes that have been built in the last 40 years. The Cessna AW was introduced in 1928 after Clyde Cessna left the Travel Air Company and began his own company. It was powered by a 110-hp Warner Scarab engine which gave the airplane a top speed of over 125 mph and a cruising speed of 105 mph, quite respectable for a four-place airplane even today.

The AW enjoyed considerable success in air races in the late 1920's. For example, it won the 1928 Class A Air Derby from New York to Los Angeles, averaging 122.46 mph.

TOM STARK

This high performance resulted from a very clean aerodynamic design, especially for the era in which it was built. Some of the features that contributed to the clean aerodynamic design were the use of a fully cantilever, tapered wing, the small number of struts in the landing gear, and the minimum frontal area of the fuselage.

Many of the features that made the Cessna AW a high-performance airplane also make it a very fine model. The lack of wing struts reduces drag and weight (generally

struts aren't structural in a model) and makes the model easier to build. The relative location of the wing and tail makes for a stable model; however, an increase of about 20% in stabilizer area was made since the full-scale airplane stabilizer was quite small compared to the wing.

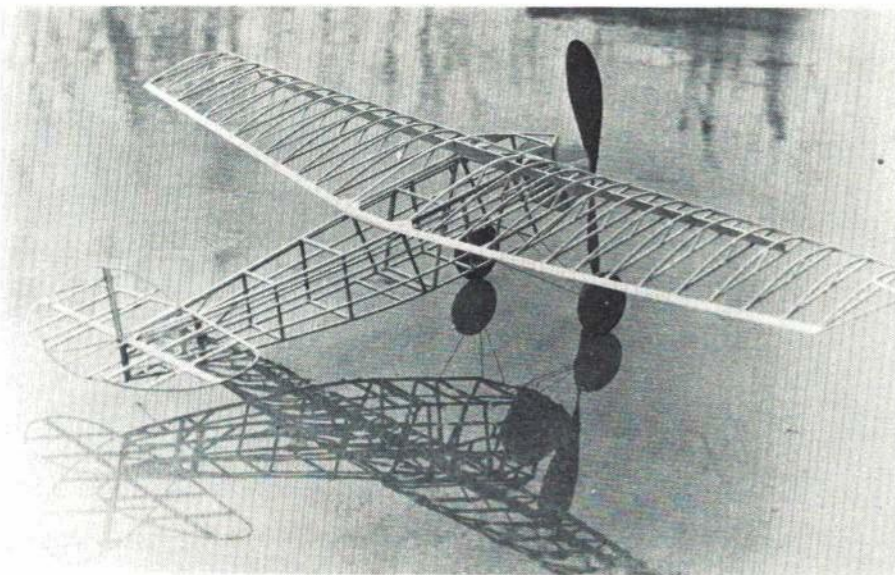
Two Cessna AW models have been built. The first was strictly for indoor flying scale competition. The structure was kept as light as possible but at the expense of some minor additional complexity. It performed well enough to place second in its first contest, the WORKS (Western Ohio Radio Control Society) indoor contest in March 1968. The plans show the outdoor version. Actually, it is only slightly heavier and is recommended for those builders who do not plan to enter indoor scale competition. The outdoor version was built while the author was serving with the Air Force in Thailand. All materials and tools, including dope, were carried in a box from a \$1.29 Guillow rubber-powered kit, which shows how little is required to build the AW.

Before beginning construction study the plans, then read the following. This will enable you to plan your work and eliminate unnecessary effort.

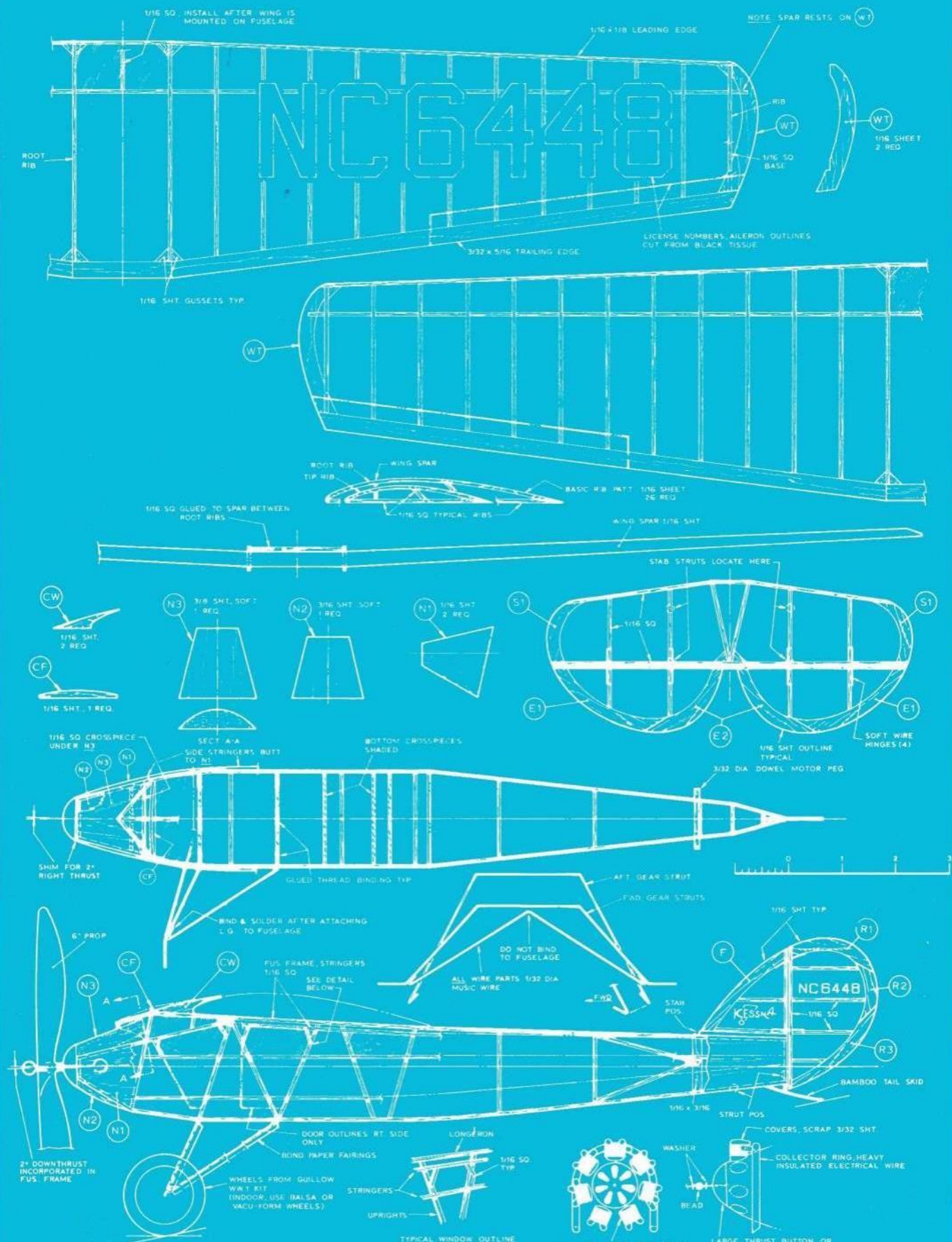
Begin by building one fuselage side directly over the plans. It is recommended that the plans be protected with wax paper or clear plastic wrap material. The horizontal parts of the window outlines are not to be added when making the fuselage sides since the outlines are formed by stringers.

While the first fuselage side is drying begin work on one wing panel. The wing is built in three steps: one wing panel, center section, then the other wing panel. The parts should be allowed to dry thoroughly between each step. Pin down the leading and trailing edges. The bottom parts of the ribs are $\frac{1}{16}$ "-sq. balsa and are installed now, as is the wing tip. The full-span spar is

Continued on page 78



Indoor version is fine for Peanut Scale. Note overall lighter wood and construction.



POWER

OUTDOOR: 1 LOOP 3/16" ABOUT 14" LONG.
INDOOR: 1 LOOP 5/32" ABOUT 14" LONG.

FINISH

COVER WITH ORANGE TISSUE FOR NC 8448,
YELLOW FOR NC 9091

NOTES

1. PLANS SHOW OUTDOOR CONSTRUCTION. FOR INDOOR USE
LIGHT WEIGHT Balsa & MAKE THE FOLLOWING SIZE
CHANGES:

WING T.E., 1/16" x 3/16"
RIBS, 1/32" x 1/16" BASE, 1/32" SHT RIB
FIN. STAB., 1/32" x 1/16"
FUS. UPRIGHTS, CROSSPIECES AFT OF
L.G., 1/32" x 1/16"

1928 CESSNA AW
INDOOR/OUTDOOR RUBBER POWERED
SCALE - 1" = 1.71"
DESIGNED & DRAWN BY TOM STARK, AUG 88

TRACED & INKED BY *Dez*

GETTING STARTED IN R/C

A deeper look into superhets.

HOWARD McENTEE

LETTERS from two readers call attention to incorrect information given in Part 28 of this series (March 1970 AAM) regarding the troublesome image interference problem inherent in most superhet receivers. As noted, the oscillator in a superhet is tuned to operate at a frequency differing from the signal frequency (that produced by the matching transmitter) by exactly the intermediate frequency of the receiver—usually 455 KHz. The oscillator may be either higher than the signal frequency or lower. For a signal frequency of 26.995, the oscillator would be on either 26.540 or 27.450 MHz; either crystal frequency would produce a difference of 455 KHz when mixed with the 26.995 MHz signal frequency, the 455 then being amplified in the IF section of the receiver. But with the lower oscillator frequency, a signal on 26.085 MHz would also produce the proper 455 KHz to pass through the IF section.

If the receiver designer had set his oscillator higher than the signal frequency, an unwanted signal on 27.905 could also produce 455 KHz. Strong signals on either 26.085 or 27.905 MHz, therefore, could possibly bother a receiver tuned to 26.995, depending upon whether the receiver oscillator is tuned lower or higher than the signal frequency respectively. Note that both these undesired signals are exactly twice the IF (or 910 KHz) away from the signal frequency. If mysterious interference develops on any RC spot, find out if the receiver oscillator is lower or higher than the signal frequency. Then check for strong sigs at twice the IF away (if the monitor receiver will tune this far outside the Citizens Band).

As pointed out in Part 28, the more expensive superhets—especially those utilized in multi-digital receivers—always have an extra tuned circuit between the antenna and the mixer. There may or may not be a transistor between the two tuned circuits. In either case, the additional tuned circuit provides much improved input selectivity, which makes the receiver far more immune to image interference than are those hets with just one tuned input circuit.

Some further points on receivers should be mentioned. First, why is 455 KHz such a magic number that it is used in practically every RC superhet? It's a matter of economics—tiny IF transformers on this frequency are available in any quantity and size from many makers at low cost. They are used in millions of broadcast band pocket receivers, and RC makers utilize the same units! Actually, much higher intermediate frequencies would be a real advantage, since they would move the troublesome image frequency much further from the RC signal frequencies—so even a single-tuned input circuit could reject most signals on the image spots. But the RC makers would have to order specially-made—and vastly more expensive—transformers, so they stick to 455 KHz! Higher intermediate frequencies would have a slight disadvantage in that the selectivity and amplification of each IF stage would be less;

however, an added IF stage could make up these deficiencies.

Transformers aren't the only way to obtain needed selectivity in the IF receiver section. The Heathkit superhet utilizes tiny ceramic filters in the IF section, tuned to the odd frequency of 453 KHz; the tiny red plastic case of each filter contains two ceramic disks which vibrate at exactly 453 KHz. Three of these filter units produce ample selectivity. All the transistor amplification takes place after the signal has passed through the three directly-coupled filters. The use of ceramic IF filters in RC hets has not been widespread, nor has it been continued by various RC makers who have tried them. These filters first appeared in the Heathkit Model GDA-19-2 in early 1969 (part of RC system GD-19). They are also being used in the new three-control GD-57 system, so apparently they have worked out well for Heath.

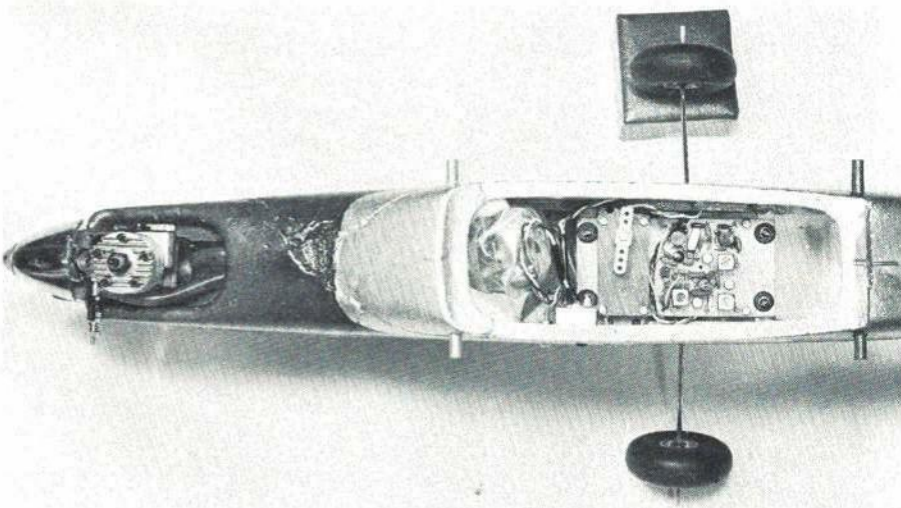
Described in Part 28 was a receiver setup that utilizes a separate transistor for the receiver oscillator (also termed the local oscillator) and for the mixer (which is also termed the converter). However, these two functions can be combined in a single transistor. This practice is widespread in small broadcast band receivers and has been used to some extent in RC superhet (the Heathkit GDA-19-2 receiver utilizes such circuitry). Such a mixer-oscillator is often termed an autodyne stage. It will have tuned circuits (and a crystal to hold the receiver to the exact desired RC spot) about the same as those found in sets with separate mixer and local oscillator circuitry.

The second detector (mentioned in Part 28), which follows the IF stages, is usually a diode, but can be a transistor. If the latter, it is often termed a power detector and acts as both a rectifier and as an audio amplifier. The diode has no amplification properties, so an extra AF stage is usually needed with such a detector. This stage of a receiver is sometimes referred to as a demodulator.

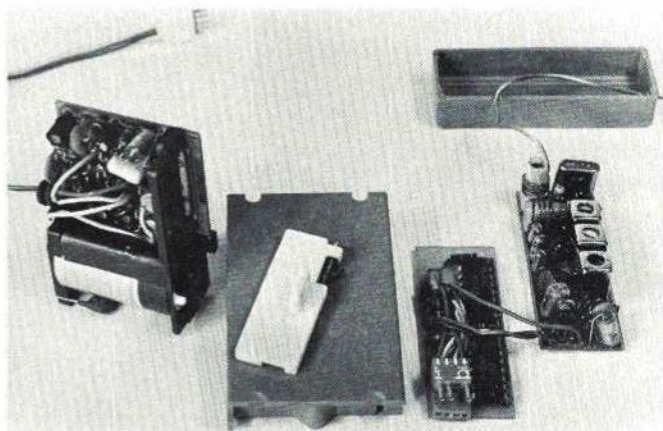
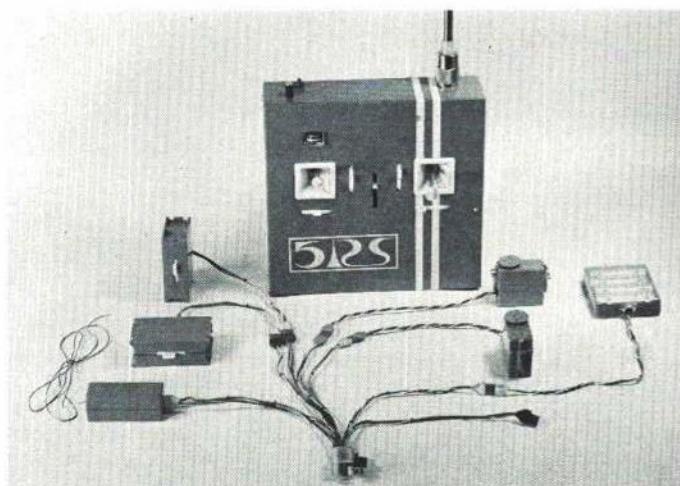
Following the detector and perhaps a stage or two of AF amplification, the receiver circuits progress according to the particular control system in use. If it is a digital system, the decoder comes next, but the circuitry is too complex to be discussed here. If the receiver is to drive an escapement (a lot of them are still in use!), a proportional actuator or servo, one of several output circuits, may be required. A single-ended receiver will drive an escapement, a relay, or a magnetic actuator of special design (one in which the rotor and output shaft are magnetically biased to one extreme of movement—the incoming pulse signal drives the actuator to the opposite extreme), such as the tiny Bentert. Actuators with center-tapped windings (or dual windings) require a double-ended receiver output for best results. Double-ended receivers—or one with relay output—are required for most sequence-type motor-driven servos.

What parts of receivers are most troublesome? Vibration is a vital factor in most receiver failures, along with crash damage. Since they were never designed to withstand the vibration found in model planes,

Continued on page 76



Installed in Ranger 42, World Engines' Digit Miglit shows the parts of a typical superhet receiver. Looking closely, you can see three square objects; these are the IF cans. Oblong item is the receiver crystal. To right and left of crystal are the antenna and mixer tuning coils. Parts count is: four transistors, 18 resistors, 13 capacitors, one diode, and an RF choke. A superregen receiver needs one-fourth as many parts.



Installation of equipment is easy because switch is junction for all wiring. Two servo choices are linear Bonner RS or rotary Orbit PS-4. Gold-plated ITT plugs used for reliability.

Bonner-type servo uses much improved harmonic drive. Decoder and receiver have extremely low parts count. Integrated decoder makes package quite small. Receiver parts are coated for protection.

Larson 5 RS System

A Blue Ribbon Review

FRED M. MARKS

THE first production digital RC system, known as the Bonner Digimite, was manufactured by Bonner and designed by Frank Kaegle and Gordon Larson. It also became the first of the "mini" systems, as well as one of the first to be produced in the 72-76 MHz band. Then Bonner decided to retire and the Digimite was no more. Service and repairs for this excellent RC system were carried on by former Digimite staff members.

The Larson Electronics 5 RS is an updated, upgraded system based on the design and long experience gained with the Digimite 4 RS and 6 RS. Thus it is a tested and proven design produced by people experienced in radio control systems.

The system tested was delivered with complete schematics. Installed in a Trainer

Master, it was charged overnight then flown the next day in cold, gusty weather and has been flown during each flying session since.

The test system was on 75.64 MHz (Green-White), a frequency which occasionally knows interference at the DCRC-West field. The 5 RS has a rather powerful transmitter and no interference was noted at any time. The system is available on all 27, 50-54, and 72-76 MHz frequencies. To permit full evaluation, the system was ordered with both servo options available, i.e., with both the Digimite servo-mechanisms and Orbit PS-4D servo-mechanisms, two of each.

Color of the system is a distinctive orange, trimmed in white. The transmitter is 7 by 7 by 1 7/8". The metal case is coated with a "leatherette" finish. The sticks are similar to the Digimite originals in that trim is electro-mechanical, i.e., the neutral position of the stick is moved to give trim. These redesigned sticks are quite smooth. The face of

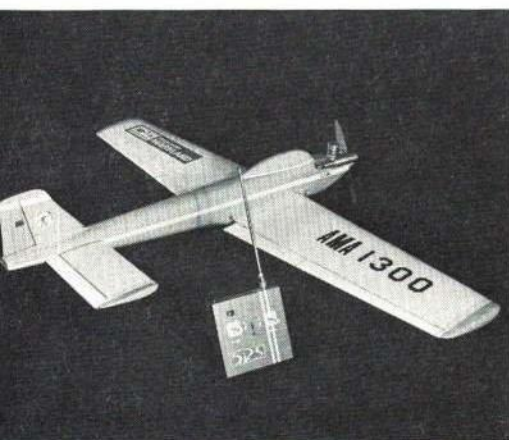
the transmitter is free of screws or protrusions. The fifth channel lever is unique in that a slide potentiometer is used. The control lever, located at the center and conveniently near the control sticks, slides up and down which permits a somewhat longer than normal travel for good vernier control of auxiliary functions.

This transmitter has what I consider to be one of the best antenna connectors available. A coaxial connector is used which never rattles, comes loose when removing the antenna, or exhibits any looseness. Another nicety is the meter arrangement: RF output is indicated during transmitter operation; however, the meter indicates charging current when the batteries are under charge. I like this better than the usual light bulb which inevitably fails or the neon bulb which is sometimes difficult to see.

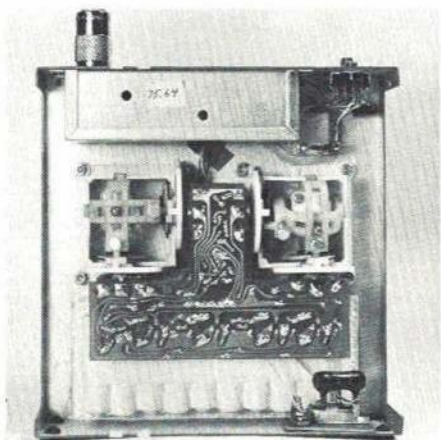
Internally, the encoder board mounts to the control pots, the charging circuitry is mounted on a small board at the bottom of the transmitter, which insulates it from the case. The entire stick/assembly/encoder board is readily removable for servicing. This was a 72-76 MHz set and the RF section is mounted under a shield at the top of the transmitter.

The airborne unit presented some outstanding innovations. Astoundingly small, the entire receiver, including built-in plugs for power and signal leads, is 7/8 x 7/8 x 2 1/4". The high-impact plastic case, molded in two halves, has grooves to retain the PC boards. One board contains the receiver RF and pulse amplification. A second board contains all decoder logic in two integrated circuits. The only additional components on the decoder board are the steering diodes for the five individual channels. A low parts count and the use of integrated circuits means added reliability. Further, the small size and light weight mean that the receiver is practically indestructible.

Another feature of the airborne set also
Continued on page 72



Flight testing was done in Dee Bee Beta using all five controls. A winning combination.



Because of high power output, Larson uses box around RF section to contain radiation.



Both photos: Smithsonian Institution

The Fiat C.R. 32

This extremely rugged and maneuverable Italian biplane fighter reached its zenith in the Spanish Civil War—even fought in World War II.

DON BERLINER

IN these days of magnificently restored Beech Staggerwings and delightful little Pitts Specials, it seems almost obscene to call a biplane "ugly." But for all its sterling qualities, the Italian Fiat C.R. 32 must be ranked near the bottom of the beauty scale.

Had it been designed for airshow work or as a purely sport airplane, this might have been important. But the Fiat was a fighter and, for its day, a good one. It was extremely rugged and exceptionally maneuverable. Perhaps it was also a bit lucky in not having been thrown into the ring against really top-notch opposition until it had established a reputation.

The C.R. 32 began its career in 1933 when just about everybody's air corps was still sold on two-winged fighter planes. It saw most of its action during the Spanish Civil War of 1936-38 when the change to monoplanes was starting to take effect. And it faded from the scene in the early days of World War II, after having given birth to the C.R. 42, the last biplane fighter produced by any country.

The C.R. 32 Chirri was from a long line of Italian biplane fighters designed by Ing. Celestino Rosatelli, starting with the C.R. 1 of 1923. The prototype C.R. 32 emerged from

the Fiat factory in 1933 and was quickly placed in production as a replacement for the larger, slower and less maneuverable C.R. 30.

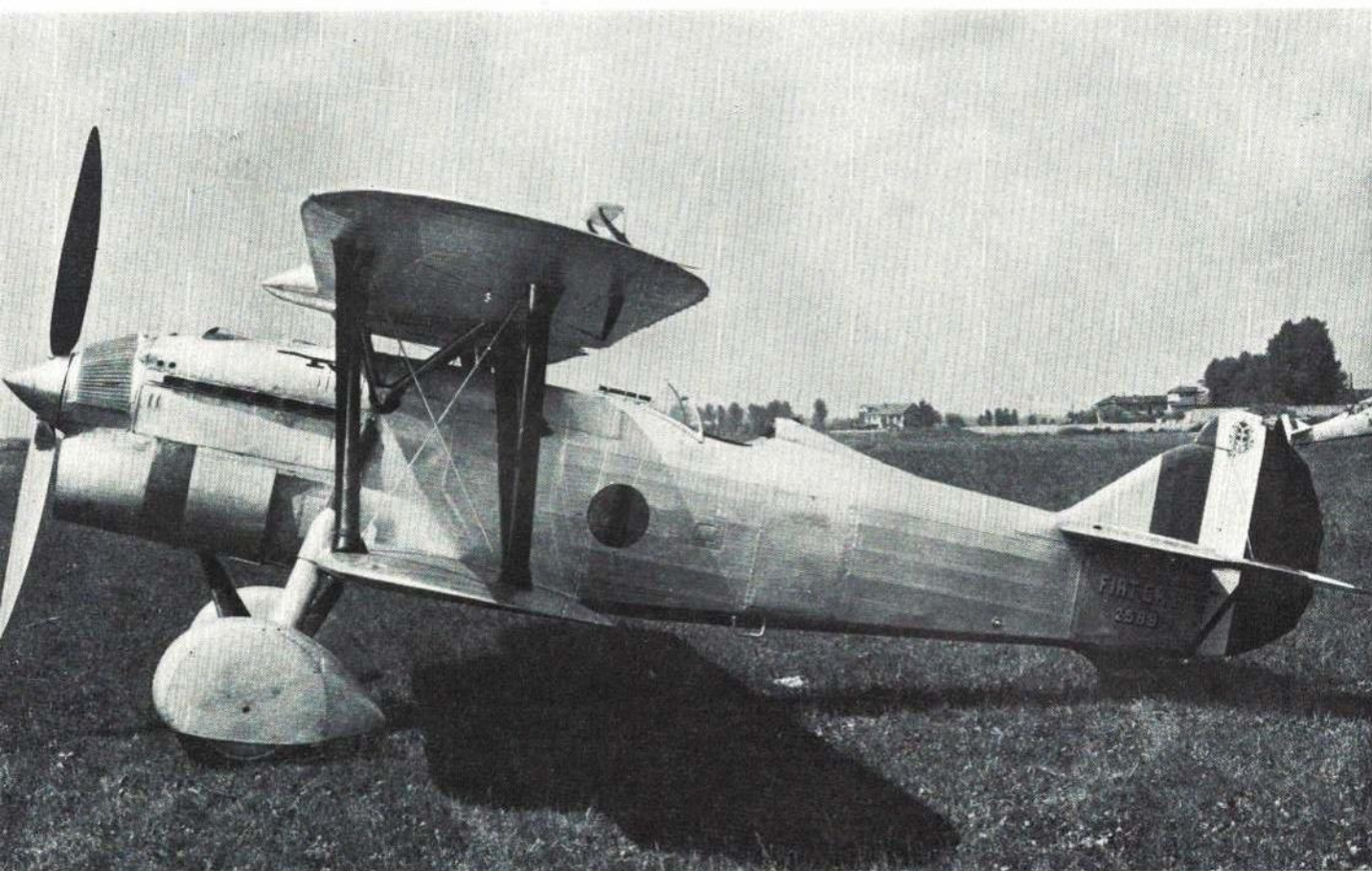
Hundreds of the unequal-span biplanes fought in the Spanish Civil War on the side of the Loyalists who were backed by Nazi Germany and Fascist Italy against the Republicans who were backed by the USSR, in what turned out to be a dress rehearsal for World War II. Its opposition consisted of slow Polikarpov I-15 Chato biplanes and the faster but less nimble I-16 Mosca or Rata. First in action with the Squadriglia La Cucaracha, the C.R. 32 eventually produced more combat aces than any other fighter type used in the war.

The Spanish Civil War was a time of learning some basic lessons of modern air warfare, such as the importance of protecting the vital parts of an airplane from enemy bullets. According to the French *Revue de l'Armée de l'Air* (February 1937), "The Fiat C.R. 32's revealed themselves vulnerable from the front, where the oil and water radiators can be easily reached; their fuel tank is without protection under the fuselage, and practically every one of this type, when shot down, caught fire before touch-

ing the ground." Learning can be expensive.

As the Soviet Union had no high-performance fighters to give the Republican forces, the C.R. 32 established a fine combat record. In a way, too fine, for the Italians were so enthusiastic about it that they proceeded to develop more biplanes and entered World War II with a clearly second-rate air force, more than a quarter of its fighters being C.R. 32's and others being C.R. 42's. Fat Russian biplanes were no problem for the Fiats, but British Hurricanes and Spitfires encountered in the African desert were another matter, and the Fiat quickly became the symbol of a bygone era. From night fighting and close support operations, it was hurriedly demoted to training within a few months of Italy's entry into World War II.

While it was the Germans, Italians and Russians who were most interested in what was going on in the Spanish skies, the U.S. was also showing curiosity, though not very much. The U. S. Army Air Corps' knowledge of the C.R. 32 was provided by the Assistant Military Attache for Air of the U.S. Embassy in Rome, who was given a guided tour of the Fiat Co. plant at Turin. Not exactly cloak-and-dagger stuff, but the infor-



mation proved to be pretty accurate.

Capt. F. M. Brady reported in May, 1934, to Washington on dimensions, performance, equipment and the details of construction. "The fuselage is of dural tubes. All joints are of high-grade steel, machined from the block. The shape of the fuselage is a quadrangular pyramid consisting of four longerons and a number of horizontal and vertical struts. The entire structure is reinforced and stiffened by means of diagonal struts and cross wires. The nose of the fuselage is shaped into an engine bed which carries the engine and also the water and oil radiators. The oil tank is above the reduction gearbox of the engine, under the engine cowling. A tail wheel is provided. The pilot's seat is adjustable.

"The lower wing, in two sections, is attached to the lower fuselage longerons. The upper wing, also in two sections joined at the center, is attached to the fuselage by means of an inverted V cabane of four struts. The wings are rigidly braced by means of a Warren truss arrangement. Only the upper wing carries ailerons. The wing profile is slightly bi-convex."

Power was a Fiat A.30 R.A. water-cooled 60 degree V-12 engine, geared 1.6:1 but unsupercharged. Driving a ground-adjustable two-blade metal propeller, it was capable of producing 600 hp at 2600 rpm at sea level for takeoff, and 550 hp at 2750 rpm at 10,000 ft. Total fuel capacity was only 92 U. S. gallons, giving an endurance of less than two hours at cruising power.

Offensive power consisted of two .50-cal. Vickers machine guns or two .30-cal. Fiat machine guns for the early models, and two .50's and two .30's for later ones. The first versions could carry 12 4.4-lb. anti-personnel bombs, while the later Fiats carried one 220-lb. or two 110-lb. bombs.

Basic equipment included an R.A. A-80

voice and code transceiver; an A.G. R-61 Mistri-type camera; oxygen, and a Garelli model S compressed air engine starter.

Spain and Italy weren't the only countries to use the C.R. 32, although they were the main ones. Several of the biplanes were used by Paraguay in the Gran Chaco war against Bolivia. Some went to Austria and flew for the Luftwaffe after Germany swal-

lowed up that country in 1938. Still others were used by the then-illegal Hungarian Air Force just before World War II, and a few went to Venezuela and to China.

Of more than 1200 C.R. 32's built, there are few remaining, which is not particularly surprising. Perhaps the only one on display is at the Museo del Volo (Museum of the Air) in Turin, Italy.

VERSIONS AND VARIANTS

C.R. 32: First production version. More than 350 built in 1934-35.
C.R. 32bis: Replaced C.R. 32 in production in 1935. More than 300 built.
C.R. 32ter: About 100 built in 1936. C.R. 32bis with modified landing gear and equipment.
C.R. 32quater: Major production version. Almost 400 built in 1936-1939.
HA-132-L: Built under license by Hispano in Spain, starting in 1938.

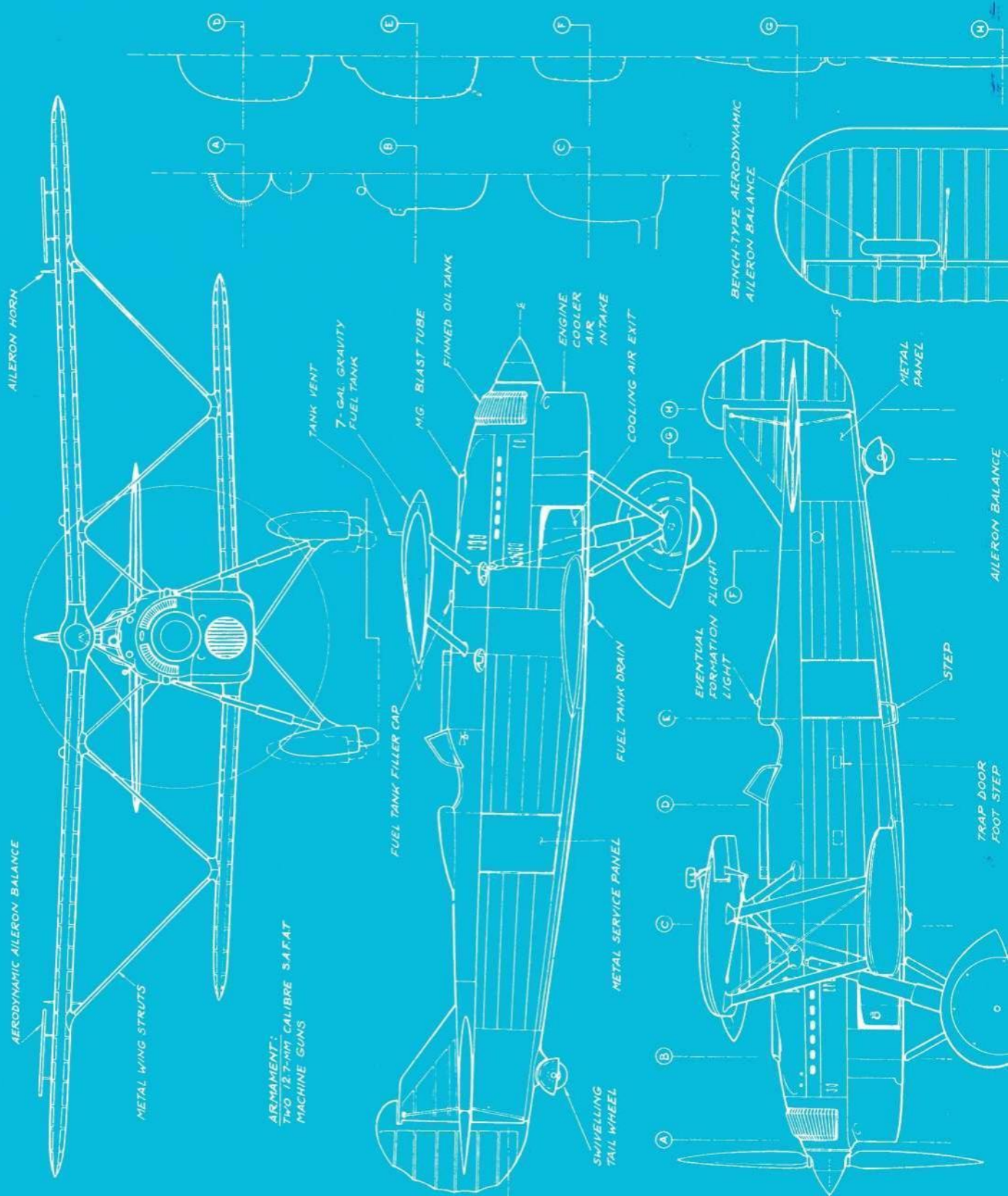
SPECIFICATIONS

Wingspan (upper): 31' 2"
Length: 24' 5"
Height: 8' 6"
Wing area (upper): 153.86 sq. ft.
Wing area (lower): 83.92 sq. ft.
Empty weight: 2772 lbs. (C.R. 32); 3042 lbs. (C.R. 32quater)
Maximum weight: 3962 lbs. (C.R. 32); 4200

lbs. (C.R. 32quater)
Wing loading: 16.6 lbs./sq. ft. (C.R. 32); 17.6 lbs./sq. ft. (C.R. 32quater)
Power Loading: 7.26 lbs./hp (C.R. 32); 7.64 lbs./hp (C.R. 32quater)

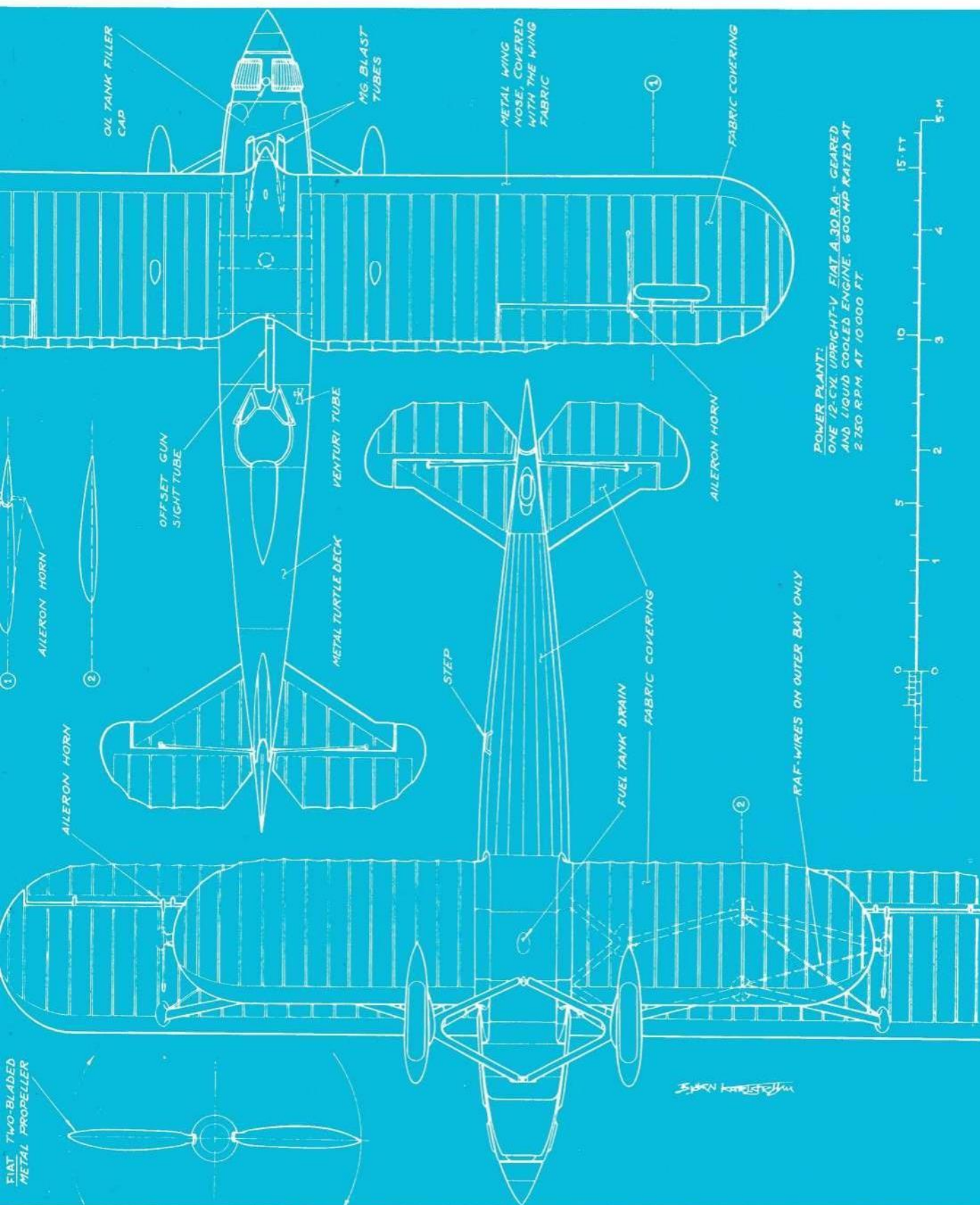
PERFORMANCE

Maximum speed at sea level: 218 mph (manufacturer's estimate for C.R. 32); 205 mph (C.R. 32quater)
Maximum speed at 10,000 ft.: 233 mph (manufacturer's estimate for C.R. 32); 221 mph (C.R. 32quater)
Time to climb to 10,000 ft.: 4 min. 30 sec. (manufacturer's estimate for C.R. 32); 5 min. 10 sec. (C.R. 32quater)
Time to climb to 16,400 ft.: 9 min. 30 sec. (manufacturer's estimate for C.R. 32); 10 min. (C.R. 32quater)
Service ceiling: 27,880 ft. (manufacturer's estimate for C.R. 32); 25,750 ft. (C.R. 32quater)



Fiat C.R.(1932)

Descended from the Fiat C.R. 32, it began service in 1932. Italy entered the war with 32's and 42's.



long line of fighters begun in 1923, the C.R. 32 933, led to the C.R. 42. Enthused by this biplane, V II with one-quarter of its air force consisting Russian biplanes were no problem in the Spanish

Civil War but Hurricanes and Spitfires were another matter. The Fiats were quickly demoted to trainers. The Fiat A.30 R.A. engine developed takeoff 600 hp. Late-model armament was two .50- and two 30-caliber machine guns. Some 1200 C.R. 32's were built.

Combat ship goes R/C for Speed

TERRY PRATHER

Editor's Note: After seeing Terry's model at the MATS show in January the Editor converted a Goldberg Voodoo to RC. Following one frightening flight with a 35, the engine was changed to a 19. At the Toledo show, the Editor and Don Lowe flew two RC Voodoos in combat, towing six-foot streamers. May sound wild, but such 19-powered models are safe and easy to fly. A man-to-man RC combat event has been desired for years; is this the way? More on the Voodoos and event possibilities in a future issue.

COMBINE an Orbit radio, a K&B 40 RR, and a control line combat ship and the result is nothing less than a tiger by the tail. Seeing this thing fly is quite a surprise. The Winder was built as an experiment to see how practical a plane like this would be for Open Pylon. It is not recommended for a beginner for obvious reasons.

Control line combat had occupied me for several years, then RC Goodyear caught my eye. Teaming up with Denis Schauer, an engine technician at K&B who had been going strong in control line rat, was a great help to the Goodyear efforts. Both of us were interested in building a different kind of Open ship. Besides, the challenge of flying a standard control line ship RC was intriguing. Although the Winder wasn't legal for the Open Pylon event, we felt it would prove our ideas.

The Winder combat ship was my design, so all the patterns and parts necessary to build the plane were available. Very few changes were required since the radio just fits in the one-in. thick airfoil. Ailerons were added and the mounts extended to accept the K&B 40 RR. Total weight of the plane ready to fly was two lbs.

The plane was finished the same weekend as the MATS show in Orange County. What would the experts say? Everyone thought it was a fantastic idea, but, unfortunately, no one felt it would fly. But it had to be tried. That afternoon we went out to the Whittier Narrows flying field. The 40 soon was screaming and Denis was ready to hand-launch the thing. It felt strange to be holding a box instead of a handle when I gave Denis the sign to launch the aircraft.

The plane jumped out like a rocket, banked to the left and went straight up. Then it happened. Within the next few seconds it did a combination of rolls, loops and everything else imaginable, without any help from me. Fortunately, only a couple

Continued on page 64

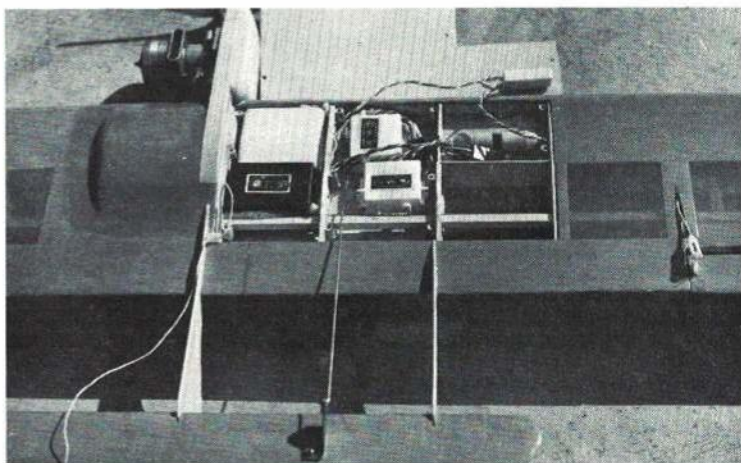


All photos: Bill Johnson

Would you believe, model topped 200 mph!



It is not launched in conventional sense — just let go and it flies instantly.



Radio installation requires thin servos, receiver, and battery. Mounting and position of components balances the engine cylinder. Light plywood flap covers compartment and holds switch. Note all-moving stabilizer.

NEW PRODUCTS CHECK LIST

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

FRANK PIERCE

Plans & Things/PT-22. Detailed prints of trainer provide all data necessary for accurate scale reproduction. Front-view, plan view and details of landing gear, engine, cockpit. For display or RC, plans taken from existing full-scale plane. Two sheets, \$4.50. Write for complete list of other plans. **Plans & Things**, Box A, Escondido, Calif. 92025

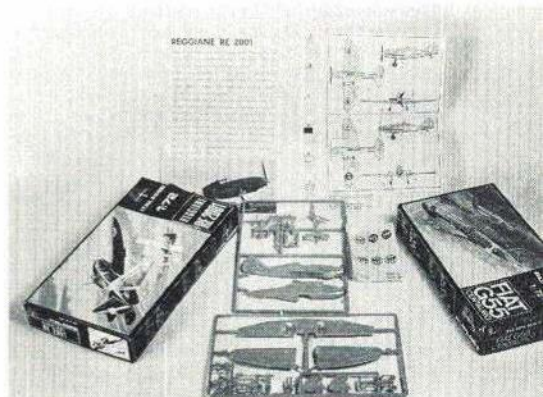
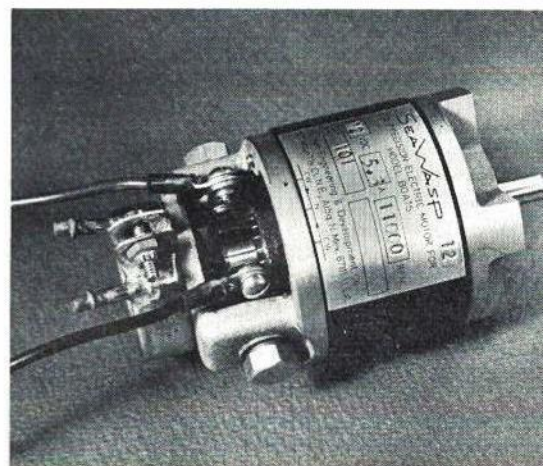
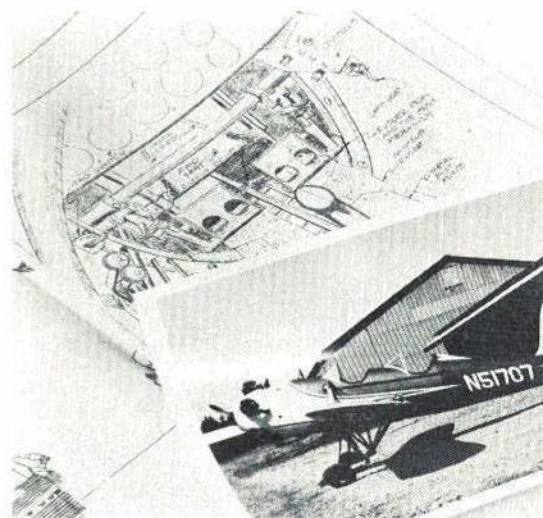
Nelson Model Products/New 61 engine. Imported from Austria, **Hirtenberger HP61FR-R/C** turns 11- to 12,000 rpm with 11-8 prop. Front-rotor design, adjustable idle, ball bearings, make engine ideal with heavy, scale, Open Pylon racers, 7-lb. FAI models, etc. Available with accessory mufflers and **Perry carb.** \$59.95, base price. **Nelson Model Products, Inc.**, 1414 W. Winton Ave., Hayward, Calif. 94545

Top Flite Models, Inc./R/C Nobler. Now in RC, kit is designed for full-house operation, uses mechanically coupled flaps and elevators. Complete nylon hardware, formed canopy, built-up balsa construction. Detailed instructions. \$29.95. **Top Flite Models, Inc.**, 2635 S. Wabash Ave., Chicago, Ill. 60616

Kroker Engineering and Development Co./SeaWasp electric boat motor. High quality and rugged, motors are designed specifically for marine use, can be water cooled for long top-speed runs without overheat. 13 oz., may be operated intermittently with input of up to 16 volts for max torque of 18 in./oz. with water cooling. 12-bar commutator **SeaWasp 6**, \$39.50. 24-bar **SeaWasp 12**, \$41.50. Water-cooling, \$4 extra. **Kroker Engineering and Development Company**, 10616 Moon Valley Ct., N.E., Albuquerque, N. M. 87111

Italaerei Model Import/Two scale plastic kits. In 1/72 scale, WW II Fiat G55 and Reggiane RE2001 fighter models have excellent detail and workmanship, complete assembly procedures with three-view plans. Full national and squadron marking decals. Other Italian aircraft models in same series. Details, write Mr. Lang, **Italaerei Model Import Co.**, Box 5607, Las Vegas, Nev. 89102

Dremel Mfg. Co./Engraving tool. Electric engraver has five adjustable cutting depths for all types of hard and soft materials. Marks everything from stone and plastic to steel. **Dremel Manufacturing Co.**, Box 518, Racine, Wis. 53401



Kit for impressive sailing schooner, "Emma C. Berry," \$34.95. Craft is 49½" long, 40" high, beam 10¾". Can be sailed free, with rudder-only on RC, or operated with rudder and sails. Sterling even shows how to launch and retrieve dory by radio! Hull built-up, many parts die-cut. Complete deck one piece die-cut plywood. Spars and booms tapered. Includes ample lengths of rope, true scale and realistic color. Also top-quality sailcloth, two kinds of chain, dozens of accurately molded plastic and metal parts. Authentic copy of original schooner, berthed at Mystic (Conn.) harbor. **Sterling Models, Inc.,** Belfield Ave. & Wister St., Philadelphia, Pa. 19144



Multi-sail RC Schooner the Emma C. Berry by Sterling is for meticulous modelers.

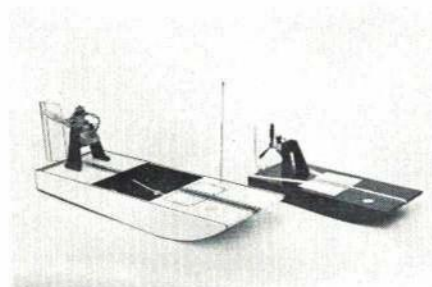


In metal-flake colors the fiberglass "Lil' Boss" by PMP Mfg. for competition racing.

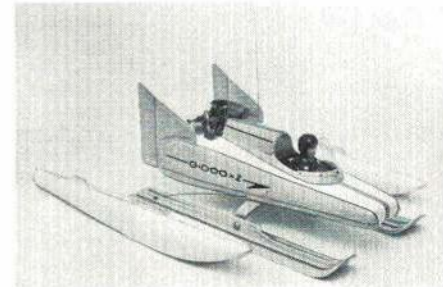
Lil' Boss hydro is a modern design for all-out competition. Entire cockpit section, integral with engine cover, removable for access to powerplant and radio. Small vertical fin incorporated at rear of this removable portion. Hull fiberglass, available in five metal-flake colors. Craft comes in three sizes — 27", 36", and 42" long. Kit for 36-inch costs \$49.95. **PMP Mfg.,** 2893 S. Shoshone, Denver, Colo.

Swamp Buggy and **Lil' Swamp Buggy** are two air-driven pusher-prop water skimmers patterned after those used in Florida's Everglades. Bigger craft, 28" long and 10" wide, utilizes a 19 engine, intended for RC; kit, \$14.95. Smaller Buggy 18" long, 7¾" wide, takes 049 engine, can be run free or with radio; kit \$5.95. Both built of plywood, have large air rudders behind prop, and radio compartments with tight screw-attached cover. Simple, fast construction. **Dumas Products, Inc.,** Box 6093, Tucson, Ariz. 85716

Air-prop driven vehicle for water or snow is **G-Doo x 2**, made of tough plastic, adaptable to either floats or skis. Length with floats is 26". Pusher engine mounted at rear of body, with large fin and movable rudder on either side of prop. Intended for 29-45 engines, has reached 50 mph on snow. Kit includes 2" scale "pilot," with both skis and floats, costs \$29.95 (less engine and radio); \$26.95, less skis. Only two radio controls needed: steering and throttle. Fully-equipped weight about 4½ lb. Fuselage, skis and floats fully formed. Just assemble the parts with hardware and struts provided. 8/6 pusher prop recommended. **G Products Co.,** Gleasondale Industrial Park, Stow, Mass. 01749

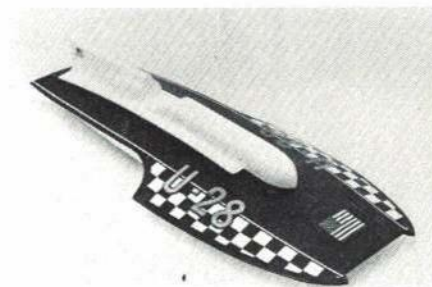


Air boats in two sizes from Dumas offer all-wood simplicity and fast construction.



A unique air-prop vehicle for snow or water operation is all plastic. From G Products.

The **U-28** is a new fiberglass hydroplane kit from GEM Models. Takes any large engine, is a real mover. **G.E.M. Models, P. O. Box 342, Broadview, Ill. 60153**



The U-28, a fiberglass hydroplane kit from G.E.M. Models for racing with big engine.



Looking fast while at rest, Wildfire by Octura Models is general-use runabout.

Wildfire 60 is a runabout or general-purpose high-speed boat for big high-revving 60. Engine can be hidden and streamlined in the deck bubble. Kit by **Octura Models, 8148 N. Milwaukee Ave., Niles, Ill. 60648**

Dynamic Models' torque converter transfers power from engine to rear wheels, eliminating clutch. McLaren MK8A 1/8 scale sport car, built on aluminum chassis, has sturdy front wheel suspension, scale wheels, torque converter parts, wheel springing, etc. Body molded in 1/16" butyrate, finished as desired. Engine and flywheel not included. All holes are drilled, tapped; assembly simple screw-driver and wrench job. Suspension components fabricated, not molded, from separate metal pieces; appears light, rugged, accurate. Kit, \$127.50. **Dynamic Models, 13309 Saticoy St., North Hollywood, Calif. 91605**

Delta Dash II kit contains all parts to make running chassis, except engine, fuel tank and radio equipment. (No body included.) Parts for independent front suspension, au-

tomatic clutch, ball bearing drive train, brakes, wide Can-Am tires with vented, spoked disc wheels, etc. Kit, \$79.95. Variety of 1/8 scale bodies available, as are several 19 engines, cooling flanges, air filters, exhaust systems, all extra cost. Various gear ratios available. Vast variety of hardware and parts for scratch builders in stock; catalog, \$1. **Delta Systems, Box 754, Bridgeton, Mo. 63042**

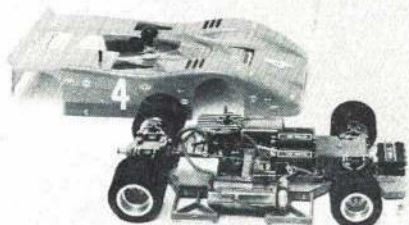
Wen-Car body of latest racing wedge design is formed from 1/8"-thick high-impact plastic (GT-style bodies available soon in several models, including Mercedes C 111). Monocoque metal chassis affords complete protection to radio gear, helps eliminate ra-

dio noise. A-frame front-end suspension has unique trailing link to take strain off servo; upper control arm is a precision extrusion. Sand-cast magnesium wheels equipped with soft racing slicks. Automatic clutch has expanding ring and is adjustable. Drive gear machined integral with clutch housing allows fast gear changes (ratios of 5-1 up to 8-1 available). Larger driven gear is attached directly to wheel hub. Heat-sink type engine mounts fit any size crankcase. Extensive use of aluminum alloys keeps ready-to-run weight under 5 lb. Retail \$79.95, less engine. **Wenzel Engineering Co., 16 Newbridge Rd., Hicksville, N. Y. 11801**

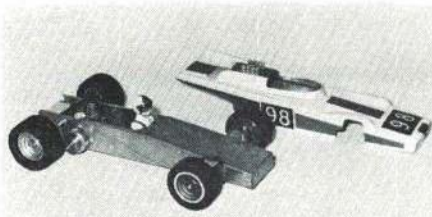
Noiseless, odorless, smokeless, electrically-

NEW PRODUCTS CHECK LIST

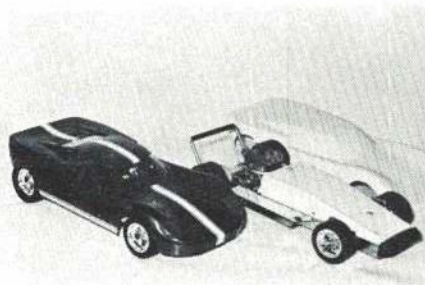
These products seen at the major 1970 model airplane and radio control trade shows.



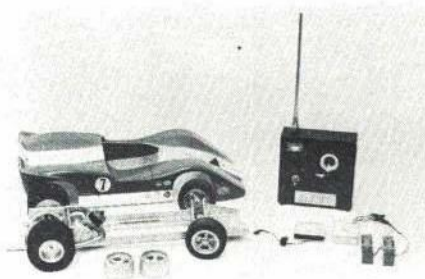
Highly detailed torque-converter equipped car by Dynamic. All independent suspension.



Monocoque metal chassis and several special alloy parts in Wen-Car by Wenzel Eng.



Heath's Spectre is gear-driven sidewinder with steel chassis and ABS plastic body.

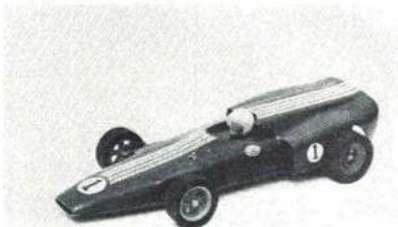


RCE offers radio with changeable crystals, sidewinder scratch-built car componentry.

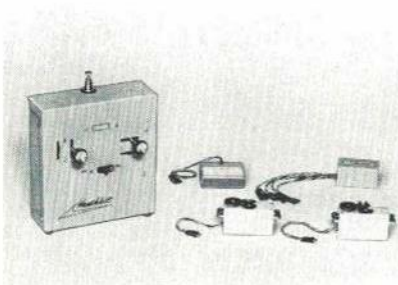
driven race cars are basis of the **Scorpion System**. Cars powered by gel-type (non-spilling) lead-acid batteries and special electric drive motors geared to rear wheels. Simple, rugged chassis, with Formula I bodies, adaptable to other styles. Unusual system allows each digital transmitter to handle up to three cars; slave control units plug into transmitter for two extra cars. Variable control lever in each receiver switches any of three cars to any of the transmitter control units (by digital switching, not by any change of T and R frequencies). Speed control all-electronic. System offers continuous speed change in both directions and steering; also useful for boats. Two-function system costs \$299.95. Options are throttle servo



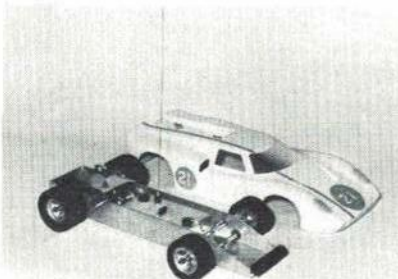
From Delta Systems the unique Delta Dash II kit. Many parts molded in plastic. For 19's.



The fast all-electric Scorpion by Control Technology. New type batteries make it go.



The radio for Heath's car is kit GD-57. Three channels, rugged capacitor servo.



Curtis-Car is belt-driven sidewinder. Clutch at axle. Curtis makes Citizen-Ship radios.

for gas-powered cars or boats, several types of battery chargers, and assembly kit for car. Most car components also sold separately. Basic electronic system which allows up to three models to be run (throttle and steering for each) from one transmitter and two slaves—over a single radio channel—is equally applicable to glow-engined cars, electric or glow-driven boats. By utilizing the five 27 MHz radio frequencies and controlling three models from each transmitter, 15 models could be in action at one time. Cars operate on 12V; electric drive battery pack rated at 2.6 AH. Cars $\frac{1}{8}$ scale with 12" wheelbase, top speed of 20 mph. **Control Technology Inc.**, 344 Hamilton, Birmingham, Mich. 48011

Heath's new offerings include **Spectre** car at \$49.95; kit for complete radio system with two servos, \$129.95. Can supply Veco 19 (not kit) for \$19.95. Car kit complete, includes molded, unfinished ABS body, parts for fully adjustable front-end with coil-spring suspension. Special container completely encloses receiver, battery and servos to exclude dust and oil; adjustable centrifugal clutch and flywheel assembly, chromed mag-type wheels, tires that lock together to eliminate slippage. With GT-style body, $\frac{1}{16}$ "-chromed steel chassis, car is $\frac{1}{8}$ scale, has drive ratio of 5.5:1. Fuel tank's 4-oz. capacity provides 15-30 min. running time. Top speed is 25 mph. Kit GD-57 radio system can handle three servos; two operate from front panel sticks, the third from small lever on back of case. Outfit is digital, can be had on 27, 50 or 72 bands. Receiver has two decks stacked, servos usual Heathkit capacitor-feedback style; battery pack flat 500 mAh. Charger for both packs built into transmitter. Control system provides maximum of 4 to 5 hours' use—depends upon amount of servo operation. **Heath Company**, Benton Harbor, Mich. 49022

Six body styles offered for the **RCE** cars are McLaren M6A and M8A, Lola T-70, 68 Can-Am Ferrari, Lotus Turbine Wedge, and Cro-Sal Wedge. Molded from .060 clear butyrate plastic, bodies have reverse curves and underwrap. Two sidewinder chassis—one, 8" wide requires some lathe work to finish; other 4" wide, no lathe work. Cast wheels with 4 or 5 spokes available. Full line of individual car parts—centrifugal clutches, belt drive components, exhaust system materials, etc. Custom RCE radio system developed expressly for auto racing is three-control digital, incorporates **R/C Development's** transmitter control stick. Charger built into transmitter for all nickel-cads. Interchangeable crystals allow quick frequency shift at the track. Receiver double-tuned front eliminates interference when other cars close. Throttle varied by spring-loaded lever on transmitter case side. Sideways stick movement handles steering, up-down stick movement available for any other needed control. Throttle lever also takes care of brake actuation. Servos have dual linear output arms. Complete radio system (all batteries, two servos), \$209.95. **Race Car Enterprises**, 3703 Dover, Ft. Wayne, Ind. 46805

Several body styles in high-impact plastic offered for **Curtis-Car**, all $\frac{1}{8}$ scale. Chassis of $\frac{1}{16}$ "-thick tensile aluminum intended for 19 engines. Lexan wheels molded so that dense sponge rubber tires lock on. These tires give best traction, lowest weight, are simple to replace when worn. Unusual drive system links engine to clutch on rear axle with a Gilmer belt. This slightly flexible but entirely non-slip drive absorbs the uneven power impulses from the engine, eliminates critical gear alignment and mesh problems. Centrifugal clutch fully adjustable. Ackerman precision steering system utilized, easily adjusted for caster. Brake on rear axle operates in low throttle position. All chassis plastic parts are of tough Lexan. Heavy rubber front bumper minimizes collision damage. Kit, \$69.50; fully assembled, \$89.50. Intended especially cars and boats is DV-2 digital propo system. Vinyl-cased transmitter uses dry battery. A $\frac{3}{4}$ -oz. receiver-decoder features integrated circuits, crystal filters. The 2- $\frac{3}{8}$ -oz. servos offer both linear (push-pull) and rotary outputs, have minimum of 4-lb. thrust, also contain integrated circuits. Radio system comes only on 27 MHz spots, fine for cars and boats, or planes (such as RC gliders) requiring only two controls. **Citizen-Ship Radio Div.**, **Curtis Dyna-Products Corp.**, Box 297, Westfield, Ind. 46074

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PLANES JUST FOR FUN!

Easy to build, easy to maintain, and low in cost and upkeep, this new breed is fine for beginners. AND more and more of the big plane fliers are joining in on the fun so they can keep their hands in—or teach their youngsters.

To help the Fun Plane along, Ace is offering two plans now. More later. These are full size with enough details to allow almost anyone with just a bit of experience to build and fly. They are designed specifically for radio gear of no more than 3 ounces—and here is where the new Commander R/O Baby Twin pack comes in. Just right and proven dependability!

Rudder-Only does allow you much more than simple steering—you can do loops, spirals, Split S, and many more. You can gain or lose altitude simply by widening or tightening your turn.

DICK'S DREAM

This 34" job is designed by Owen Kampen. Named for the late Dick Adams who developed the magnetic actuators. Essentially this is a scaled down Whiz Kid, but has a few features especially for this size plane. Easy construction. Plans are full size.

No. 13K29—Dick's Dream Plans \$1.00

CITABRIA

This semi scale is a design by Roman Bukolt. Has 34" span and features simple slab construction. Another eye catcher at the Toledo Conference. Full size.

No. 13K30—Citabria Plans \$1.00

VOGT THROTTLE RESTRICTORS

Now there are three! We have had sizes for the Tee Dee .010 and .020. Then Cox changed the size of their new .020 jobs (\$13.95)! Earlier ones measure .373" diameter; the new ones measure .423" diameter.

No. 16K171—Vogt Cox .020 Restrictor \$2.00

(New .423)

No. 16K173—Vogt Cox .020 Restrictor 2.00

(Old .373)

No. 16K105—Vogt Cox .010 Restrictor 2.00



NEW! NEW! NEW! NEW! NEW! NEW! COMMANDER DE GEM RECEIVER

The designers of the fabulous Commander DE Receiver have miniaturized and weight has been reduced! The new Commander DE Gem Receiver measures only 1 1/16" x 1 1/2" x 1/2". Weight of the bare receiver is approximately .5 ounce.

This is superhet equipment, and uses the same high grade components as the proven regular Commander DE. As a matter of fact, some of the exact same components, such as IF cans and RMC capacitors, are used in the mini version, simply because they have proven themselves and are not finicky as far as tolerance or temperature is concerned. This does not allow as great a shrinkage, but it does make for dependability.

The new Commander DE Gem is double ended for output into a dual actuator. However, it may be converted quite easily to single ended operation to feed into an actuator of the Bentert type.

Operation is on 2.4 volts with phenomenal range. May be used with 3 volts.

No. 12K2—Commander DE Gem Rx \$31.50

NOTE: The Standard Commander DE and SE receivers are furnished in the Commander Packages. The GEM is offered separately at the present time.

RAND PRICE REDUCTION

Since the time we acquired the Rand Manufacturing facilities, we have run a very careful cost analysis of the actuators and GG pack and Dual pack. In view of lower overhead and economy effected because of continuing mass production, we are happy to announce the reduction in price of a number of these units. The savings are not as a result of any short cuts. The same high quality as always.

When so many other prices are rising, it is with pleasure that we announce the following reductions:

No. 14K127—HR1, formerly \$14.95, now only \$11.00

No. 14K128—HR2, formerly \$18.95, now only \$14.00

No. 14K126—LR3, formerly \$19.95, now only \$15.00

No. 15G40—GG Pak, formerly \$39.50, now only \$33.50

No. 15G46—Dual Pak, formerly \$75.00, now only \$60.00

(All units shipped since February 2, 1970, have been invoiced at the foregoing prices)

DEVCON!

No. 24L143—5 Minute Epoxy \$1.20

No. 24L144—Plastic Mender-Cement .60

No. 24L145—30 Second Contact Cement .40

No. 24L143—5 Minute Epoxy \$1.20

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DOW CORNING SILASTIC RTV 732

General purpose silicone rubber adhesive and sealant needs no catalyst or heat. Reacts with moisture in air and vulcanizes in 24 hours at 77 degrees F and 50% relative humidity. Moisture resistant and heat stable. Tack free under one hour. Two ounce tube. White.

No. 24L15—Dow Corning Silastic, 2 oz. 1.50

We Have The PULSE of R/C!

**PROVEN RELIABILITY! IN PRODUCTION NOW! LIGHT WEIGHT SYSTEMS!
VERSATILITY FOR SMALL PLANES; POWERFUL ENOUGH FOR LARGE JOBS!**

The reception of our Commander R/O series could only be called fantastic—from California to New York, from Texas to Michigan, from Colorado to Illinois, from Mexico to Maine, from Oregon to Florida—there are satisfied users everywhere. AND the list is growing!

Acceptance is from beginners—BUT a lot of it is coming from the digital pros as well! One of them writes: "I never realized how much fun simple R/O flying could be until I bought one for my daughter—now it looks like I'll need another for her!" . . . "No long trips to flying fields—just short jaunts to the neighboring areas; and my fuel bills are low!" . . . "I am 16 and just completed my 10th successful flight with a Whiz Kid, Commander R/O equipped. Great!!!"

. . . From a California dealer: "One of my customers has sold his 'X' brand digital and all his big equipment. He's sold on R/O fun flying!" From Carl Goldberg: "Just a word to let you know how much I've enjoyed flying your Ace Commander Rudder-Only Stomper in our Ranger 42. . . And so it goes!"

A number of clubs are talking about Rudder-Only or SAC (Single Axis Controlled) contests for next year!

The Commander series of Packages from Rudder, to Ghost, to Fast Pulse are all designed around Transmitters engineered by Don Dickerson.

son. Each is designed for its specific function.

The airborne packs of the Commander systems are built around the Commander Superhet. Used as a DE unit in the R/O packs, it has been redesigned for a 3.6 volt input and Single Ended (SE) output for the Ghost and Fast Pack. Thousands of these receivers are proven in the field.

The Commander Series is completely wired, tested and guaranteed. It will not be available in kit form immediately. Transmitter battery, 9 volt of the M1603 or equivalent, is required.

Recommended chargers for the nickel cadmium battery packs used in the airborne units are shown at right.

A Commander package can be your doorway to fun—whether you are a novice wanting to get into Radio Control; or an old hand wanting a change of pace.

COMMANDER GEM IS AVAILABLE FOR R/O PACKAGES

You can get the new Gem receiver with any of our Rudder Only packages if the size is of importance to you. Simply order by catalog number, specify GEM, and add \$5.00 to the package cost.

NOW! NEW COMMANDER R/O BABY TWIN

We can honestly say that this combo is one our customers demanded; we kept getting occasional orders for our R/O Baby, but with the twin actuator. The demand increased and we investigated—these were going in some of the small jobs which required light weight, but needed the extra power provided by the Twin Baby actuator.

Our new Commander R/O Baby Twin has about 50-75% more power with only a .4 increase in weight—total airborne weight is LESS than 2.9 oz! Uses the outstanding Dickerson-designed transmitter, (uses M-1603 dry battery) with the regular Commander DE receiver, and 225 ma 2.4 volt nickel cadmiums—for dependable performance every time. Current drain is the same as the Regular Commander Baby. Completely wired and tested and guaranteed.

With some of the newer 32 to 42" plane designs appearing in the model magazines, this package fills the gap between our Baby and Standard.

Available on all CB frequencies except 27.255.

No. 10G15T—R/O Commander Baby Twin \$72.95

COMMANDER GALLOPING GHOST
Rudder, Elevator, Motor—One Actuator
No. 10G18—Commander Ghost \$109.00

COMMANDER FAST PULSE PACK
Rudder, Elevator, Motor—Two Actuators
No. 10G19—Commander FP \$139.00
All 27 MHz frequencies, except 27.225.

COMMANDER CHARGERS

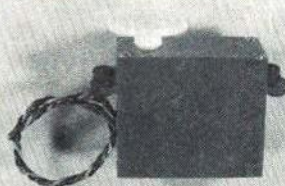
Now chargers of four different kinds as required by the Commander series of airborne units. Baby—25 ma at 2.4 v; S—Standard and Stomper—50 ma at 2.4 v; GG—60 ma at 3.6 v; FP—100 ma at 3.6 v. Assembled.

No. 34K4—Commander Baby Charger \$4.95
No. 34K5—Commander S* Charger 4.95
No. 34K6—Commander GG Charger 4.95
No. 34K7—Commander FP Charger 4.95
* Standard or Stomper

VARI CHARGER

If you want a more universal type of charger for your nickel cadmium battery supplies the Vari-Charger has much to recommend it. It features a high quality transformer and will charge up to 5 or more cells in series with up to 150 millamp current. Charging rate is adjustable from 20 to 150 mls, with easy-to-use chart.

No. 34K21—Ace Vari Charger Assembled 9.95
No. 34K22—Ace Vari Charger Kit 7.95



KEN'S PULSE THROTTLE CONTROL

Manufactured by Ken's R/C this new unit uses a motor driven servo. Designed for high, medium and low throttle on Rudder Only Pulse systems, the control requires only slight modification to the Transmitter. Easy to hook up to airborne R/O Packs—just three wires. Uses same battery supply. Designed specifically for the Commander R/O series of Standard or Stomper size.

Housed in a WE S4 case. Completely wired and tested. Weight only 1 3/4 oz. only.

Transmitter modification is simple, since Throttle Control requires a fast pulse momentarily. Kit is available or complete custom factory conversion of your transmitter.

No. 14K69—Ken's R/O Throttle Control \$24.95

TRANSMITTER CONVERSION

Kit to allow you to convert your Commander R/O Transmitter for above motor control. Easy to follow instructions.

No. 14K70—Tx FP Throttle Control Kit \$3.00
No. 14E71—Factory Custom installation of above unit in your Tx (includes above kit) \$6.00
(Postage return paid)



COMMANDER R/O PULSE PACKS

Ideal for Beginners and Sport Flyers

RUDDER ONLY PULSE IS: LIGHTEST—2.5 oz. for Baby * SIMPLEST—only one moving part, noise free * VERSATILE—arrange to suit * EASY to install * LOW COST to operate and maintain * GREAT for Beginners—CHALLENGING to the pros * FUN!

The R/O Packs feature the Dickerson transmitter described above with the Rand single axis stick, and the Commander DE 2.4 volt superhet receiver. Has an Adams actuator of the size of your choice, depending upon your aircraft, with nickel cadmium batteries wired with an on and off switch. AND each pack will save you \$10.00 if you bought the individual items separately.

The R/O Baby is for .010 to .020 jobs, has two 225 MA nickel cadmiums, and the regular Baby Adams actuator. The airborne weight is 2.5 oz.

The R/O Standard uses the LV single Adams actuator for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The R/O Stomper used the LV Twin Adams actuator for up to .15 or can be boosted for use with .19. Airborne weight is 4.9 oz.
(Charging equipment extra)

No. 10G15—Commander R/O Baby \$69.95
No. 10G16—Commander R/O Standard 71.95
No. 10G17—Commander R/O Stomper 74.95
All 27 MHz, except 27.255. Specify.

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Our NEW Handbook-Catalog is bigger and better than ever. We specialize in equipment for the Beginner, Sunday and Fun Flyer. More items for the do-it-yourselfer; more products from most major manufacturers, in addition to many Ace exclusives. Greatly enlarged HANDBOOK section. Last year this was called "bible for R/C." A MUST! by R/C editors. Price is just \$1.00 POST-PAID. This is completely refundable on your first order! And that order also puts you on our mailing list for our newsletters and R/C Data Service—acclaimed the world over. You can't lose—send your buck on a round trip today. It could be the best dollar you ever spent!

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The Min-x Astromite 72 . . . is another first for the Remote Control industry . . . providing "glitch-free" operation with "velvet touch" control.

Over the past 10 years the Min-X Company has placed emphasis on manufacturing a stronger transmitter and an insensitive receiving unit . . . permitting interference-free flight maneuvers.

Our research department has engineered the ultimate in R/C systems . . . with mini-components and integrated circuitry.

R/C devotees have long awaited the introduction of a precision-engineered R/C system that can guide them to a winning performance . . . Min-X Astromite 72 . . . is here!

check these features

- Vinyl clad transmitter and receiver case
- Complete system includes transmitter, receiver, 4 servos and an integral charger
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- Airborne unit weight of 13½ oz.
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- Kraft engineered sticks
- Available in 4 or 6 channels
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- Dual Stick — 4-channel system . . . \$ 325.00
- Dual Stick — 6-channel system . . . 375.00
- Single 3-Mode Stick — 4-channel system . . . 349.00
- Single 3-Mode Stick — 6-channel system . . . 399.00

(Prices are effective February 1, 1970)

Dealer Inquiries Invited

MIN-X RADIO, INC., 8714 Grand River, Detroit, Mich., 48204



INTERESTED IN JOINING A.M.A.? Over 25,000 did in 1968. Membership details may be had by requesting FREE BROCHURE from above address.

Radio Control at the 1970 National Contest

Compared with some former years RC at the 1969 Nats was a happy success. This judgment is made on the basis of complaints, both during and after the Nats. Not that there weren't any—there always are some—but there were very few. This was an interesting result because there had been some "noise," before the Nats, that the planning was bad and many problems would result.

It was predicted that entries would be down, and apparently some people did stay away. Yet more contestants than ever before showed up—almost 50% more than the year before! The table in Fig. 1 shows the entry in all RC events in recent years, and in each of them the 1969 figures were the greatest ever.

So more people took part last year, with very few complaints—obviously a very successful RC Nats. But there has since been a lot of concern and planning, for the 1970 Nats loomed as a bigger problem that would need some new thinking rather than a mere rerun of the previous operation.

Politics was involved, too. A study of the Woods RC Committee report of early 1969 made it plain that many of the complaints therein had to do with RC at the Nats. This was followed by a recommendation from one of the committee members that another committee was needed—one to represent contestant thinking in Nats planning.

There was some resistance to this at planning levels because it was felt by some that contestants were unaware of many of the problems and compromises involved in Nats planning, which often prevented events from being run on an optimum basis. But, finally, after much review of the '69 Nats and preliminary planning for 1970, a contestant's committee was established by the AMA president. Jim Kirkland, of Valparaiso, Florida, a former AMA vice-president, 1969 RC team member, former RC Nats Pattern Champion, and originator of the proposal for such a committee, was appointed chairman.

Kirkland promptly named a committee to represent major RC interests of Pattern, Pylon and Scale. The committee members: Ed Keck, Webster, N. Y.; Ron Chidgey, Pensacola, Fla.; Dan Carey, Ft. Worth, Tex.; Claude McCullough, Ottumwa, Iowa; Paul Good, Phoenix, Ariz.; Granger Williams, Bell, Calif.

Time was very short and there was a real question of how effective the committee could be, with only about eight weeks between its establishment and the Nats planning conference in Toledo at the end of February. But Jim Kirkland came through with a 25-page report about two weeks before the conference—time enough for the Nats Executive Committee to receive it in advance and ponder the feasibility of

the recommendations in the report.

Some basics came out of the report: Pylon had more time in the '69 Finals than seemed warranted by the number of contestants involved, Pattern should have had more time, A & B Pattern should be added. There were many other recommendations, but these were the key ones affecting time distribution among groups of contestants.

The Nats Executive Committee spent most of its time in '70 Nats RC planning trying to accommodate these key points. It had the benefit of another report, by '70 Nats RC Director Kemp Bunting, of Munster, Indiana, which analyzed the Kirkland committee recommendations. The NEC also had a suggestion by Ed Shipe, '69 Nats RC Manager, concerning a new shared-time concept which could obtain more flights than previous schedules.

When all recommendations of the contestants committee were reviewed, some had to be dropped as unrealistic—a simple case of desire conflicting with problems over which the Nats Executive Committee had no control. For example:

Publication of Nats dates prior to Feb. 1. No doubt about this being desirable, but a Navy commitment this year could not be obtained prior to Feb. 13. Up to that point

the bigger question was whether there would be a Navy-hosted Nats at all. With military bases being closed down all across the country there was much uncertainty about where and when the Nats could be held in 1970; there may be even more confusion like this for 1971.

Extra hours and/or days for flying. As a result of problems during the 1968 Nats at Olathe, when extra hours were tried as a means of accommodating more flying, the Nats Executive Committee had previously agreed to avoid this approach again—too many side problems with both civilian and military personnel trying to operate from 7 am to 7 pm. Overwork caused fatigue and morale problems that outweighed the advantages. Also, even without direct Navy help in the RC events during overtime hours, other Navy personnel efforts would be required for station security and crowd control—the overall effects on Navy operation were not acceptable.

More judges and better geographical representation. The basic problem here is to obtain enough qualified judges, from anywhere. Too many volunteers, even when highly recommended by others, have turned out to be disappointing. In general, as many judges as possible are recruited for the Nats, from all over the U. S., but the response has always fallen short of the goal. This year we have a similar need for judges at the Team Selection Finals in September. Some judge candidates have already indicated they might be able to do the Nats or the Team Finals but not both, the preference being for the Finals. The outlook, therefore, is that the Nats judging problem is bigger than ever.

Only one Pylon Racing event. This is in conflict with another committee recommendation that A & B Pattern be added. The

Fig. 1. These figures represent the official entry levels in Pattern, Pylon, and Scale for the years indicated.

	Pattern	Pylon	Scale	Total
1966	136*	—**	34	170
1967	111*	79	20	210
1968	125	58	23	206
1969	144	115***	45	304

* Class III only

** No Official Pylon Racing flown.

*** 65 entries in Formula I, 50 in II.



Official U. S. Navy photo

All outdoor flying for the 1970 Nats (July 27-August 2) will take place at Glenview Naval Air Station, near Chicago, Ill., shown above. Entry forms not postmarked by midnight of June 22 may be submitted only at the Nats and only on Monday, July 27. Indoor events will be flown on Monday and Tuesday at the Washington Park Armory, southeast Chicago, approx. 90-ft. ceiling.

Nats Executive Committee consensus was that if more than one Pattern event would be held, then two Pylon events should be permitted. However, it was agreed that the number of hours scheduled for Pylon Finals in 1969 could be reduced in 1970, and the savings could be applied to Pattern events. It was noted, however, that rain last year decreased actual Pylon time just as it did in 1968.

Olympic style judging for Pattern and Scale. This would display to spectators the scores by judges as each maneuver is completed. This is a possibility still being explored. If feasible it may be used for Pattern Finals if not for Qualifying. Similarly, the number of judges, rotation of same, discarding of high and low scores, as recommended, is being considered further.

Minimum time between flights. This highly desirable goal is normal Nats procedure, but is often compromised by the need to balance flight lines. Fairness to contestants dictates that a round should be completed on all lines before following with another round. Aborts and false starts on some lines causes them to fall behind others, so it becomes necessary to slow down the lines which have not had similar problems. To not try to balance flight lines causes other problems.

Four stage pattern qualifications. This was considered too restrictive to too many contestants. Only nine hours (one day) would have been available for all Class D contestants to fly, with only one flight score to determine advancement to next stage. The top thirty, plus the top twenty from 1969, would have advanced to the next stage. Based on 1969 figures, about one hundred contestants would have been eliminated after the first day's flying. Instead, a two-stage Class D Pattern event was approved, with all contestants competing for two days (as many complete rounds as possible) and the top twenty to fly off in a Finals similar to the third stage recommended by the committee.

Most other contestant committee recommendations were adopted, both major and minor:

The Class D Pattern was approved, using only FAI maneuvers for both Qualifying and Finals, with AMA rules for all other aspects of the event.

Transmitter processing and meet registration to be operated concurrently, so that a contestant proceeds directly from registration to processing. Marking of processed transmitters for easy identification was also approved.

All of the committee's recommendations concerning Scale were adopted, including: judging before flying, use of new standardized scoring form, use of two flight lines and other flight line procedures normal to Pattern events.

For Pylon, use of a safety barrier at the number one pylon was approved, as was event location other than the Pattern and Scale sites—to minimize setup and event transition problems.

Beyond the contestant recommendations, the Nats Executive Committee added some other innovations. A variation of Ed Shipe's shared-time concept was adopted. This permits Scale and Pattern Finals to be flown simultaneously, each from two flight lines. Last year each had two flight lines but the events were flown during different time periods so that two or more flight lines were empty during these events. The time saved by this and by a reduced Pylon Finals period were made available to A & B Pattern.

Originally an even greater savings was hoped for, had it been practical to fly Pattern and Pylon simultaneously. This would, however, have required coming up with an eight-way division of frequencies—four groups for each event. A study of frequency

usage and the problems of maintaining balanced flight lines showed that this procedure would not work unless frequencies could be assigned to all contestants in advance. The compromise of using four frequency groups, divided between Pattern and Scale was adopted instead.

The study resulted in conjecture that frequency assignment for future Nats beyond 1970 might be necessary. Two ways are possible—either by assigning frequencies to contestants or by limiting events to certain frequencies (one group for Pylon, one for Pattern, one for Scale, one for Gliders, etc.). It is expected that these possibilities will be looked into further for possible 1971 use.

In approving A & B Pattern for the 1970 Nats, the Nats Executive Committee realized that the addition has what appears to be orphan status—tacked onto the end of the week, after the Saturday awards banquet, limited to only five hours, subject to bad weather wipeout. But the committee was concerned that there was no reliable data available to determine likely number of entries. Earlier scheduling would have seriously affected all other events, and a very large entry could prove its undoing, with insufficient hours available.

The limited Sunday A & B schedule is, therefore, a calculated risk. Hopefully

enough will enter to prove the need for future (and possibly greater) Nats accommodation, but not too many to prevent enough flying for all. As scheduled, about 130 flights can be flown, using four flight lines for five hours. Up to 150 are possible if most flights don't use up maximum permissible time. Thus somewhere between forty and fifty contestants could get three flights each, breaks and weather permitting.

The important point seems to be that A & B have a foot in the Nats door and, if enough entrants participate, despite the schedule problems, a larger slice of the schedule may be justified in the future.

The Nats planning conference was held on Feb. 26; its schedule recommendations were approved by the AMA Executive Council on Feb. 27, then by the Navy on March 13. Those participating in the planning conference were: **John Patton***, AMA President; **Earl Witt***, AMA Secretary-Treasurer; **John Worth***, AMA Executive Director; **Ed Shipe***, Nats RC Manager; **Kemp Bunting**, Nats RC Director; **Clark Macomber**, Nats Scale Director; **Pete Sotich***, Nats FF Manager; **Gosta Johnson**, Nats CL Director; **John Clemens***, Nats Air Show Director; **Bob Lophshire**, AMA Public Relations Director. Those indicated by asterisks (*) are also members of the Nats Executive Committee.

Frequency Fund Now in Good Shape

The photograph immediately below shows a raffle in progress by the **AMA chartered Keystone RC Club**, Philadelphia, Pa. The Bucks County, Johnsville and Glenside RC Clubs participated in the auction with the Keystone group. Proceeds of the auction, \$30, were donated to the AMA Frequency Fund.



Thanks to this contribution and many others, the fund now is in good shape to carry on FCC monitoring efforts through 1970. Major contributors since the first of the year have been: **Toledo Weak Signals Club** (\$1,000), **Kraft Systems, Inc.** (\$500), **Model Rectifier Corp.** (\$100), **DC/RC Club** (\$100), **Chicagoland RC Modelers** (\$69), **Toppers RC Club** (\$50), **Whirlwinds of Southwestern Michigan** (\$25), **Radio Control Modelers of Baltimore** (\$25), **Burlington County RC Club** (\$25), **Dean S. Wright** (\$25) and **Rockaway Valley RC Club** (\$20). Many other contributions in amounts of \$5 and \$10 have also been received—too numerous to list, but all very much appreciated.

Other Programs Need Help

While the frequency program presently is in good shape, there are other programs in need. The **Scale Team Fund** (RC and CL) needs help as does the **Control Line Team Fund**.

The Scale Fund amounted to only \$176 when this was written, to be divided among six team members for state-side transportation in getting to the World Championships in England. When the team members depart in August they may be hurting financially unless the fund is built rapidly by contributions.

Of the above amount, \$78 was donated by the **AMA chartered New England RC Modelers** at their March 28 meeting. Sixty members donated a dollar or more, suggesting a good approach for other AMA chartered clubs to try out at their meetings. The photo shows **Harvey Thomasian**, AMA Dist. I RC Contest Board member, presenting the NERCRC check to AMA Executive Director **John Worth**.



The **Control Line Team Fund** needs similar help. At press time there was only \$435 to be divided among 13 U.S. team members for the World Championships in Belgium, also in August. Purchase of the embroidered shirt pocket patches described last month will help—outright donations to the fund will help even more.

Speaking of contributions, we'd like to thank **Dan Parsons** of Albuquerque for his \$100 donation to the RC Team Fund. Dan contributed the proceeds from an article he did for **RC Modeler** magazine.

Air Force Championships at Scott AFB

The 1970 Air Force Model Airplane Championships is planned for Scott AFB, Ill., July 15-20. Having nearly the same event lineup as the AMA Nationals, the AF meet will choose a new Air Force Grand Champion and runner-up. Also, a team will be chosen to attend the AMA Nationals and defend the Air Force 1969 National Team Champion title.

The Air Force Championship Contest is open to active duty Air Force personnel. For additional details, contact **Major Walter K. Hennigan**, USAF, USAFMPC (AFPMBSB), Randolph AFB, Tex. 78148.

1970 Winter Meeting of the AMA Executive Council

An often misunderstood part of the Academy of Model Aeronautics is the operation of the Executive Council — the AMA board of directors. This is largely due to the fact that very few AMA members have been able to take part in a council meeting and see the group in action.

This year, however, at the annual winter meeting of the council there were more new faces than usual and we have a candid report from one of them. **Jim Perdue**, brand new vice-president from AMA District Five, formerly from Tullahoma, Tennessee, and now from Athens, Alabama, took part in his first council meeting and afterward said the following:

"Frank Schwartz (Associate V.P.) and I attended the Winter Executive Council Meeting held in Toledo, Ohio, on February 27th. There were three Associate V.P.'s present, and I was proud to say that we had one of them. This was a highly enlightening meeting for me and I wish it was possible for every member of AMA to have an opportunity to see first hand the AMA leadership in action. Frank was equally impressed with everything. Every item on the agenda received careful attention in every detail, and everyone had a chance to speak his mind.

"I came away from this meeting with an entirely different view and am now convinced that the reins of AMA leadership are in capable hands. I have never seen a more sincere, dedicated, and all around fine bunch of guys anywhere. I wish to thank the membership for making it possible for me to have this opportunity of making the trip to Toledo, of meeting and working with those fine dedicated modelers from all over the country."

Also new to council meetings were **Ron Morgan**, Scotland, Pa., new District Three vice-president; Associate Vice-Presidents **Frank Schwartz**, Nashville, Tenn., **Frank Morrissey**, New Berlin, Wisc., **Al Seidowski**, Brookpark, Ohio. This was the first time that associate vice-presidents participated — their positions in AMA are relatively new, having been created by the 1969 council the previous winter.

The 1970 winter meeting began about nine in the morning and at the noon break Jim Perdue was welcomed to the ranks of the "rubber stampers." This is the title often given to Executive Council members in the past, by people who have not understood how the council operates and who have misinterpreted the fact that council decisions are usually unanimous or nearly so.

Such agreement seems strange in an organization with so many varied interests and opinions. But it does illustrate that when a group of people have access to the same information and use it in discussion of a problem, the action focuses on areas of agreement. The end result is usually a decision that discards individual differences and represents points of common acceptance.

Such discussions often reveal that individual dissent is usually based on misinformation. In a council meeting, with a dozen or so people from all kinds of background and from all areas of the country, an effective filtering action takes place and agreement develops based on blends of various inputs.

This doesn't mean that there aren't any disagreements or arguments — there are but they usually serve only to point up extremes of a problem and the direction needed to reach agreement on a solution. To the credit of all involved, not much time is wasted on bickering — the effort is typically to explore rather than to sell a viewpoint.



Photos show most of the attendees of the AMA Executive Council winter meeting at Toledo. Above (L to R): Stan Chilton, Dist. IX V.P.; Gosta Johnson, Dist. VI V.P.; General Brooke Allen, executive director of the National Aeronautic Assn.; John Patton, AMA president; John Worth, AMA executive director; Earl Witt, AMA secretary-treasurer. Below (L to R): Ron Morgan, Dist. III V.P.; Jim Perdue, Dist. V V.P.; Frank Morrissey (nearly obscured), Dist. VII Assoc. V.P.; Bill Lank, Dist. VIII V.P.; Jack Josaitis (nearly obscured), Dist. VII V.P.; Cliff Telford, Dist. IV V.P. Also attending, but not shown, were Assoc. V.P.'s Frank Schwartz and Al Seidowski; John Pond, Dist. X proxy; and Bill Boss, Dist. II V.P., who photographed these pictures.



That's how the council operates. Here's what happened at the Feb. 27 meeting:

The meeting was convened by President **John Patton** at 9 a.m. He introduced General **Brooke Allen**, executive director of the National Aeronautic Assn., Washington, D.C.; and **Bob Lopshire**, AMA's current PR director. General Allen addressed the group concerning the NAA divisions and affiliates, and their relationship with the NAA (AMA is the division overseeing aeromodeling activities — others are concerned with soaring, parachuting, ballooning, etc.).

President John Patton then outlined meeting procedures; voting by council members only, but discussion permitted by all present upon recognition by the president.

The 1970 Nationals schedule of events as recommended by the Nationals Executive Committee, was presented to the council by **Earl Witt**, N.E.C. chairman. After discussion it was moved by **John Pond** (District X Proxy) that the schedule be approved as presented. Seconded by **Bill Lank** (VIII), approved unanimously. Discussion was short since the schedule was essentially similar to that used in the highly successful 1969 Nats; schedule modifications were all considered improvements.

AMA Executive Director **John Worth** next gave a presentation on the Nationals status with the Navy, including possible future developments as far as Nationals sites, and progress made with the Navy to date at Glenview Naval Air Station concerning the 1970 Nationals. The basic picture is that plan-

ning for the 1970 meet is well underway but that the future for 1971 and beyond is cloudy, with much uncertainty due to military base shutdowns. Pending further developments the Navy is expecting to host the future Nats only at Glenview, at least until the base availability situation stabilizes.

Nationals operating procedures were discussed with members of the Nationals Executive Committee (four of the NEC members are also council members). Problem areas from previous nationals were brought up. Among these, it was decided that there would be no requirement at the 1970 Nats for the first-flight-by-noon rule which had been very unpopular in the past. To expedite flying, the possibility of posting scores was discussed, especially more complete posting. It was pointed out by Nats Executive Committee members that posting entire events became a clerical problem and, as has been experienced at each Nats location, obtaining enough clerical help (Navy) is usually impossible. A 1969 problem area in CL Speed was brought up. This was a decision, reportedly given to the entire Speed group of entrants, that three bolts would be required in speed pans. Further discussion indicated that this had really occurred in only a few cases where the Speed Director felt that the models were unsafe as assembled — that this was not a safety rule applied to all models and there were no plans to apply such a rule blanketly in 1970.

Status of AMA official publications. The

agenda question was "should the AMA magazine subscription be made optional with reduced rates for membership to those who choose not to have it?" Worth gave a presentation to the council on the cost of the magazine and some of the procedures involved between AMA and the publisher. He also described communications with various magazines, seeking to find the most desirable arrangement, and advising other magazines of the standing opportunity for them to make offers.

The psychological value of obtaining a magazine, giving members a sense of belonging was noted; also the great effect on renewal of membership at year end—membership notices stressed the need for prompt renewal to avoid loss of magazine issues, and the response indicated this was a major influence since approximately 20,000 members had renewed by year end.

Jim Perdue (V) expressed the opinion that AMA should be in all magazines and that the magazine subscription should be optional. **Bill Boss** (II) questioned the definition of "official" publication, which resulted in lengthy discussion and quotes from the by-laws by many members of the council.

A motion was made by the secretary-treasurer to continue the present (non-optional) policy on the magazine arrangement; seconded by **Jack Josaitis** (VII). **Stan Chilton** (IX) supported the action, and noted the need for the reasons to be explained:

Basic to this is the principle that voting members should not be able to complain that they were not being informed—it was noted that if the magazine were not provided, some other publication would be needed. It was further noted that several options were already being offered: Juniors and Seniors are not required to get the magazine; neither are those who are already subscribers or who are members of families already receiving the magazine.

The council unanimously approved the current magazine arrangement, noting that it is a major factor in AMA's growth since 1966, constantly giving AMA exposure to many thousands of potential new members—thus overcoming the constant annual dropout problem experienced by all membership associations. Incidental to the decision, it was pointed out that AMA is currently over 2,000 members ahead of last year's record rate, building up to the fourth straight year that all previous membership records will be exceeded.

Status of AMA Competition Newsletter. The agenda question was whether by-laws action should be taken to clarify this status. A by-laws change to Article XIII was proposed by **Worth**; seconded by **Gosta Johnson** (VI). There was little discussion, as this had been pretty well covered in the previous item. The vote taken was unanimous, in favor. It was agreed that the following revision would be submitted for Leader member ratification at the next opportunity (changes in italics):

"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)."

Proposal for creation of RC Executive Council: a followup of 1969 council consideration of this Woods Committee recommendation. **President Patton** discussed his letter of January, 1970, "Which way for RC representation within AMA," which was sent to all chartered clubs and AMA officers, and amplified further on statements made in that letter.

Worth made a recommendation on adopting the four points of the January letter, noting that the council seemed to agree, following almost a year of study, that the present AMA structure, properly used by the membership, provides the best means of serving special interests within AMA. It was noted that through use of existing Contest Boards and special committees, plus the help of affiliated groups working within AMA, the needs of special interests were or could be well represented. The many divergent views among RC'ers was also noted to be a key factor weighing against the likelihood of an RC Council providing better representation than was now possible.

Discussion followed concerning specific action to be taken on the proposal, with the general consensus being that the Associate Vice-President program, newly instituted in 1969, was the best method of accomplishing the objectives of the Woods Committee report. **Chilton** then moved that the council endorse the four recommendations made in the president's January, 1970, letter; seconded by **Lank** and approved unanimously. The recommendations:

1. Encourage the formation of special interest groups to work within the existing AMA structure, in the manner of the NMPRA (National Miniature Pylon Racing Association), NFFS (National Free Flight Society), NIMAS (National Indoor Model Airplane Society).

2. Solicit competitor inputs, when time permits, prior to decision-making by officers concerning contest rules, Nats planning, team programs.

3. Improve public relations within AMA, to better inform the membership of existing policies, procedures, the background behind controversial decisions.

4. Continue and expand the current Associate Vice-President program, to involve more regional or special interest leaders in council business.

Need for muffler action. **Patton** outlined the problem of people looking to AMA for leadership concerning questions of noise standards and means of measuring muffler effectiveness. It was noted that clubs and Contest Directors were asking for help and that rules were being passed to require mufflers in competition but without definition as to acceptability. **Worth** presented a prototype hand-held noise meter which was to be published in a magazine in the near future. He recommended AMA development of such a meter to provide a low cost reference tool to gauge noise being produced by model airplane engines. Discussion followed on the possibility of the Academy developing standards or establishing a standard. It was generally acknowledged that it would be difficult to arrive at a universally acceptable standard since, under current noise abatement practices, the various government agencies such as cities, states, and federal government have yet to develop an acceptable universal standard on various noise-making sources. It was resolved by the general agreement of the council that the AMA should continue educational efforts on the problem and encourage development of tools and equipment which would help alleviate the problem. The council also agreed that more PR work would help in gaining greater public tolerance of noise from model activities, due to appreciation of the benefits involved. Along this line the **Courtney report on legal aspect of model noise** was praised, and it

was recommended that further reports and publications of this type should be provided to aid AMA clubs and members with their local site problems.

Contest Director upgrading and recognition. Discussion on this subject concluded with general agreement that expanding the present system was probably the best solution: One free membership to CD of a Class A meet; two free memberships to CD's of an AA meet; and three free memberships to CD's and/or category directors in an AAA meet. The new policy is to add to the existing system by permitting a CD who is not a category director to be given free AMA membership; with such membership to be designated by the CD of record. Existing controls over this membership issuance are to be maintained (requirements for CD of record to submit Contest Report).

Establishing Scale as a primary category. A presentation was made to the Executive Council by **Dave Platt**, supported by **Clark Macomber**, with arguments for creating Scale as a primary category (such as now recognized for RC, FF, CL). Copies of a petition were presented; listed were seven points stated by Platt and Macomber as to why the proposal should be adopted (details elsewhere in this issue). The presentation was followed by questions from the council and discussions of the proposal.

Platt and **Macomber** then departed and discussion was carried on further by the Executive Council concerning problems that might arise. It was generally agreed that this would create no extra HQ work, compared with usual Scale Advisory Committee business, but could cause some problems since Scale works across lines in the existing three categories. **Chilton** made a motion to table this proposal until the July council meeting for study, district investigation of interest and membership reaction; and to allow time to see if a revitalized Scale Advisory Committee would serve the same purpose. This was seconded by **Lank** and approved by vote of seven in favor. Then a poll of the members of the council was taken to obtain a general feeling of council support for the proposal. Most favored the proposal but agreed that on a question of such basic import a period of reflection and opportunity for membership response should be provided prior to final vote.

Accident vs Liability insurance. **Worth** outlined the history of AMA insurance experience to date and pointed out some of the problems which would likely come with the so-called Blue Cross type of insurance. It was pointed out that it would involve a substantial cost increase over our present insurance and could be expected to increase the HQ paperwork considerably. Another point was made that considerably more claims were likely to result and this would tend to give an unfavorable safety image to model aviation activity. Furthermore, it was noted that the basic intent of AMA insurance is to protect our members from actions involving those outside the activity rather than amongst ourselves—aside from the current member-to-member coverage. It was moved by the secretary-treasurer that consideration for additional insurance be dropped; seconded by **Cliff Telford** (IV). The vote was unanimous in agreement with the motion.

Proposal for separate RC Pattern, Pylon and Scale Contest Boards, by **Jerry Nelson**. The proposal would require designation of each interest as "primary" categories, to be compatible with current AMA by-laws. After considerable discussion, it was generally felt that such a proposal would be unworkable at this time, particularly with the tabled Scale proposal to be resolved. **Lank** moved that the proposal be rejected; seconded by **Pond**. The vote was unanimous, in agreement with the motion.

AMA Headquarters relocation. Worth reported that the current AMA lease expires in June. He noted a long history of problems in the present location, and that there was an opportunity for joint occupancy with the National Aeronautic Assn., at the latter's location in D. C. By use of common facilities and combined rental it was estimated that an annual saving of \$2,000 could be accomplished over other alternatives. In any case, an increased rental cost was unavoidable at the present site, or elsewhere in the area. The council concurred in the plan to move in with NAA on or about May 1.

Distinguished Service Awards. Morgan recommended a Distinguished Service Award for **Eva Biddle**, former council member, Contest Coordinator and Nats worker for many years. Seconded by **Bill Lank** and, after a short discussion, the award was unanimously approved by the council. Worth then recommended that a distinguished service award be presented to the **Valley Forge Signal Seekers Club** for the work put in on muffler studies. This was seconded by **Josaitis** and unanimously approved by the Executive Council. It was noted that this was the first such award to a chartered club and more such awards were to be encouraged to strengthen further the existing chartered club program.

Council recommendation to Contest Boards. This is a proposal by **Bill Boss** concerning adoption and implementation of rules affecting competition. The object is to delay effectivity of rules changes affecting model design and/or model equipment. It was moved and seconded that the council recommend to all Contest Boards that at least 6 months elapse between final vote and effective date, and not before the nearest Jan. 1 after that period. The motion was approved with all in favor except one against and one abstention.

Woods profit-sharing proposal. The meeting was adjourned until 8:00 in the eve-

Hurry to Enter Nats

The deadline is fast approaching for advance entry in the 1970 Nationals at Glenview Naval Air Station (near Chicago, Ill.), July 27-August 2. Entry forms available from AMA HQ, 1239 Vermont Ave., N. W., Washington, D. C. 20005; send stamped envelope (6c regular mail, 10c Air Mail) for priority return. The entry form contains vital information about entry, registration, processing, hours of flying, etc. Refer to June "AMA News Extra" for basic entry information.

Daily Event Schedule

Monday, Indoor: Stick, Paper Stick, Cabin, at Washington Park Armory, Chicago (90-ft. ceiling). **RC:** Pylon I and II Qual.

Tuesday, Indoor: HL Glider, Scale, at

Washington Park Armory. **RC:** Pylon I and II Qualifying.

Wednesday, FF: B Gas, Nordic Towline. **CL:** Open Rat Race, Sr. Stunt, A Speed, FAI Speed, Jr. Combat. **RC:** D Pattern Qual.

Thursday, FF: 1/2A Gas, Wakefield, Helicopter, Scale. **CL:** Jr. and Sr. Rat Race, Jr. Stunt, B Speed, B Proto Speed; Open Combat. **RC:** D Pattern Qualifying.

Friday, FF: A Gas, Unlimited Rubber. **CL:** Scale Racing, Open Stunt, C Speed, Jet Speed, Sr. Combat. **RC:** D Pattern Finals, Scale, Pylon II Finals.

Saturday, FF: FAI Power, HL Glider, Coupe D'Hiver. **CL:** Scale, Open Stunt Finals, 1/2A Speed, 1/2A Proto Speed, 1/2A Profile Proto (Jr. only), I, II and Profile Carrier. **RC:** D Pattern Finals, Scale, Pylon I Finals.

Sunday, FF: C Gas, Rocket. **CL:** FAI Team Race, J. Walker Stunt Finals. **RC:** A and B Pattern.

ning at which time a presentation was made by **Maurice Woods** on a proposal whereby AMA and AMA members might share in proceeds resulting from sales of an antipollution device manufactured by Woods' company. Promotion of the arrangement in the AMA publications and contacts by AMA members in local areas which might result in sales were basic to the proposal. The council voted not to accept the proposal on the basis that it did not approve of commercial arrangements to achieve the aims and purposes of the Academy when those arrangements are unrelated to model aviation activity.

The council adjourned following this last item of business. All those who were in attendance are mentioned above. It was noted this was the most complete council meeting attendance ever—only represen-

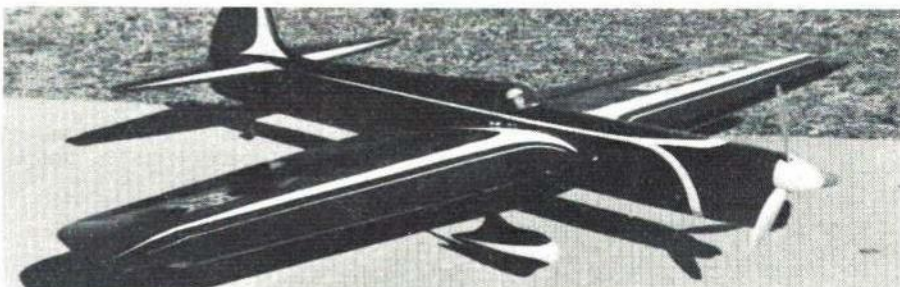
tatives from Districts I and XI were unable to attend.

This was the second annual winter council meeting. In a full day of business, it accomplished much affecting the Academy's future. The pattern has now been established that the winter meetings provide the primary occasion for AMA policy-making. Formerly the council met only at Nats time, subject to many pressures due to lack of sufficient time and conflicting schedules. Decision-making was often frantic and fatigued, with many sessions into the early morning hours. The Nats meetings are still with us, as an opportunity to catch up on loose ends in between winter meetings. The main council effort, however, is now away from the sound and fury of the flying field—a sure sign of the Academy having come of age.



Stu Richmond photo

AMA V.P. Cliff Piper, left, presented the FAI World Record certificate (RC Seaplane, 79.6 mph) to Paul DiNoto during the January meeting of AMA chartered New England R/C Modelers.



Stephen Johnston photo

Original CL Stunter by Stephen Johnston, Kansas City, Mo., is said to fly "real groovy." The 61" wingspan model is powered by a Veco 45 Stunt engine, Grish 10-6 three blade prop.



Dave Espen photo

Petite Karen Espen poses with hubby Dave's ST 23-powered rear-finned Galaxy 585. At right, Dave VTO's his TD 051 Starduster which, with a 34-min. flight total, won 1st in A FF at the big 20th Annual Southwest Regionals at Buckeye, Ariz. The Espens hail from Phoenix.



Karen Espen photo



Submitted by Michael Montrois

Michael Montrois of Hilton, N. Y., wanted to be sure his AMA number remained 10824 when he renewed for 1970 as he has some nice signs with this number mounted onto his pickup truck. Montrois is a member of the AMA chartered Radio Control Club of Rochester.



Twin brothers Roland and Robert Boucher, both from Los Angeles, made a valiant try last March to break the FAI Distance World Record for RC Gliders Over a Closed Course. But they found the effects of time, sun and chill to be almost as detrimental as the wind let-up which forced a landing of the day's longest flight (Roland's) at 51½ miles. Robert's earlier attempt, his glider ballasted to 64 ozs., stopped for a similar reason after 30 miles. The current record holder is Winfred Kaiser, Germany, 124.89 miles. Both Roland and Robert flew the Astro Flight Malibu, Robert's ballasted to 80 ozs. Upper left photo shows Roland launching his Malibu, and at right, guiding it above the slope near Gorman, Calif., where lift is produced when there is wind. In photos at left, it is plain that major problems were sun and wind chill. At right, Roland brings back the remains of his Malibu which crashed out of sight behind a hill when he sent his model out in search of lift after the wind calmed. Photos by AMA Contest Director Tom Hutchinson who was the chief official for the FAI Record Trials.



Scale C.B. Proposal

At the AMA Executive Council winter meeting last February (see report elsewhere in this "AMA News" section) **Dave Platt** of Chicago presented a proposal to establish Scale as a primary category of modeling under Article XII, Section 1, of the AMA bylaws (pp. 87-91 of 1970 AMA rule book); and to establish a Scale Contest Board. The proposal was presented on behalf of Platt and **Clark Macomber** of Winnetka, Ill., and by the signers of a petition for such action.

The council did not act on the proposal at its winter meeting. Instead, the proposal was tabled until the meeting of the Executive Council at the Nats this year, previous to which time district vice-presidents would investigate AMA member interest and reaction. The delayed action also was to allow time to see if a revitalized Scale Advisory Committee (**Claude McCullough**, chairman) would serve the same purpose.

Each AMA member (and/or each AMA chartered club) is requested to transmit his opinion on this proposal to the AMA vice-president (or associate vice-president) for his district, and send a copy to AMA HQ.

Following is a summary of the reasons, stated by Platt and Macomber, why they feel that Scale modeling should be accepted as a primary category.

1. A growing constituency large enough to justify primary category status: 200 entries in Scale events at the 1969 Nationals, more than in all other RC events combined.
2. Scale interest transcends the presently recognized primary categories. Most CL Scale contestants have more in common with RC or FF Scale contestants than with the contestants in other CL events. The

problems of Scale rules-making and judging are identical in all Scale events.

3. AMA participation in the development of Scale in international competition can best be served by such recognition. The FAI and those nations most prominent in Scale already regard Scale as a primary category.

4. Both scale modelers and judges would be better served by a Contest Board than by the present advisory committee system which may require ratification of a rule change by three separate Contest Boards.

5. The present system often fails to draw on the best Scale thinking and expertise available within AMA.

6. Some of the pressure on the present Contest Boards could be relieved by establishing a new board to handle Scale.

7. A Scale Contest Board would increase the status of this kind of modeling and involve more members in Scale matters. This should result in substantial improvement in the quality of all Scale activities, including the handling of Nats competition and organization of World Championship teams.

New Scale Advisory Committee Chairman

Although the foregoing proposal is before the AMA Executive Council to create a Scale Contest Board, the current procedure for dealing with Scale competition matters is through the Scale Advisory Committee which was established several years ago. When the rules mechanism functions properly under current procedures, Scale matters go to the S.A.C. for review and initial vote before being passed on to the appropriate Contest Board with a recommenda-

tion for final vote.

This mechanism was set up as a compromise means of improving Scale representation in rules action. FF, CL or RC Contest Board members were typically not well versed in Scale matters, yet only the Contest Boards, through the bylaws, have rule-making authority. By means of the S.A.C., however, we are able to have a Scale group look over all Scale proposals and advise the Contest Boards. This has worked well and still can. Unfortunately an incident last year, in which the S.A.C. was bypassed, caused a furor and demands for a separate Scale Contest Board. What happened was that the RC Contest Board dealt directly with a Scale problem without seeking a S.A.C. recommendation.

The result was an unpopular decision and a subsequent complaint that the S.A.C. arrangement wasn't any good. That's not really so, as the problem was simply that a proposal was submitted to the wrong group. What was needed was for the proposal to be relayed to the Scale people. Aside from that, the fact is that the S.A.C. has been revitalized with some new people, including a new chairman—**Claude McCullough**. Claude is a veteran AMA officer, having been an AMA president and a Contest Board chairman.

Claude is currently getting the S.A.C. moving on several items of Scale business, and notice has been sent to all Contest Board chairmen that any Scale proposals should be referred to the S.A.C. This is to assure that Scale interests are represented in rule-making while the larger question of a Scale Contest Board is studied prior to Executive Council review in July.

For the present, any Scale proposals should be forwarded directly to **Claude McCullough** at RR 5, Ottumwa, Iowa 52501; with a copy to AMA HQ.

AMA News Extra

CZECHOSLOVAKIA WINS INDOOR WORLD CHAMPIONSHIPS

Jiri Kalina, holder of many FAI Indoor World Records, led his Czechoslovakian teammates to the Indoor Team World Championship for his country when he won the Indoor Individual World Championship for himself. The 1970 Indoor World Championship was held April 9-12 in a huge underground salt mine at Slanic Prahova, Romania.

But that salt mine proved to be the undoing of the U.S. team (and many others), according to preliminary reports. The mine is big, 215-foot total height, and under most conditions probably is draft free. However, during the contest there was substantial drifting and down-drafts caused by the exposure of the mine's normal cool air to the heat generated by the contestants and officials, lights and electric heaters. U.S. team member Jim Richmond, who took individual second place and helped the U.S. team place second, said, "the drift in combination with walls covered with plane-catching salt crystals really devastated our armada."

Another condition encountered was the apparant temperature inversion layer which models had difficulty penetrating. Even though this was somewhat anticipated by the American team, and it is reported that they planned to use heavier rubber motors and props with less flare, peak altitude of most all of our official flights still was only half to two-thirds of the way up. One notable exception was a flight by Jim Richmond which did get way up, but it drifted into a wall and slid down for about 30 feet--later on, the model hung up on the wall at about 30 feet from the floor. This still resulted in a flight of over 32 minutes.

INDIVIDUAL RESULTS

		1st	2nd	3rd	4th	5th	6th	Total*
		Flt	Flt	Flt	Flt	Flt	Flt	
1. Jiri Kalina	Czechoslovakia	<u>37:52</u>	34:13	15:55	36:25	26:44	34:58	74:17
2. James Richmond	U.S.A.	5:34	<u>32:04</u>	31:54	<u>32:10</u>	00:14	00:27	64:14
3. Aurel Popa	Romania	25:16	<u>21:40</u>	<u>32:50</u>	00:07	<u>30:23</u>	21:58	63:13
4. András Reé	Hungary	<u>28:21</u>	<u>31:28</u>	21:08	00:11	<u>00:08</u>	18:27	59:49
5. Vilim Knoch	Yugoslavia	24:36	<u>29:04</u>	27:21	<u>27:55</u>	20:30	11:07	56:59
6. Clarence Mather	U.S.A.	24:13	27:10	22:45	<u>27:12</u>	<u>28:28</u>	15:53	55:40
12. Pete Andrews	U.S.A.	<u>27:52</u>	<u>22:11</u>	17:03	10:41	16:41	18:32	50:03

*Of best two flights, indicated by underscore

Erv Rodemsky, who attended the World Championships as an observer (and wound up helping Team Manager Joe Bilgri when he came down with a cold) indicates that there is substantial sentiment for changing the Indoor World Championship rules with the end result to be a more rugged model which, hopefully, more modelers might build. The Yugoslavs are expected to propose a rule change calling for a minimum model weight of one gram (.035 oz.) and a maximum weight of the rubber of one gram. (Some models, rubber and all, weigh hardly more than one gram.) In an informal poll of contestants by Rodemsky, he found much favor with this proposal or variations of it.

NATS MEETINGS

Membership. As provided by the bylaws, the Executive Council is calling for the regular meeting of the AMA membership during the National Contest at 6:30 pm on Wednesday, July 29. Nominating Committee will meet Wednesday at 8:00 pm. Up for nominations are the national positions of AMA president and regional vice-president positions for AMA Districts II, IV, VI, VIII and X. See May AMA News, page 62, for details. Executive Council, the policy-making body of AMA, will meet on Wednesday at 8:30 pm. Contest Boards. The FF, CL and RC Contest Boards will meet during the Nats--time and date not determined at press time.

AMA HQ RELOCATED

The move had not been made when this was written, but should be completed by the time this issue reaches newsstands. The new address is: Academy of Model Aeronautics, 806 Fifteenth St., N.W., Washington, D.C. 20005. These offices are in the heart of Washington, just two blocks from the White House. AMA's offices at the new address are adjacent to those of the National Aeronautic Assn. In fact, AMA expects to share some of the space and equipment, which should result in economies.

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.

EXECUTIVE COUNCIL

President:

John Patton, Route #5, Frederick, Md. 21701

Secretary-Treasurer:

Earl Witt, Longview Trailer Court, R.D. #3, Chambersburg, Pa.

Executive Director

John Worth, c/o AMA Hq., Shoreham Bldg., 806-15th St., N.W., Washington, D.C. 20005

Vice Presidents

I: Cliff Piper, 391 Elm St., Pittsfield, Mass.

II: Wm. Boss, 145-24 23rd St., Laurelton, N.Y. 11413

III: Ron Morgan, School for Vet Children, Scotland, Pa.

IV: C. Telford, 8612 Rayburn Rd., Bethesda, Md.

V: J. Perdue, 111 Christopher Ave., Athens, Ala. 35611

VI: Gosta Johnson, 6810 S. Crandon, Chicago, Ill.

VII: Jack Josaitis, 23663 Lawrence, Dearborn, Mich. 48128

VIII: William Lank, 3143 Rotan Ln., Dallas, Tex. 75229

IX: Stan Chilton, 446 Ida, Wichita, Kans.

X: Vic Cunningham, Sr., 4337 Hornbrook St., Baldwin Park, Calif. 91706

XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

CONTEST COORDINATORS:

I: Elvin Bowe, 101 S. Riverview, Haverhill, Mass. 01830

II: E. F. Hoffman, 158 Carpenter St., Belleville, N.J.

III: Ken Reber, Rt. #2, Shippensburg, Pa. 17257 (East)

M. Weisenbach, 4568 West 146th St., Cleveland, Ohio 44135 (West)

IV: D. L. Johnson, 3367 Sudlersville So., Laurel, Md.

V: T. McLaughlan, 4140 Fern Ct., Pine Glades, Pensacola, Fla. 32503

VI: Whalon Webb, 15722 Vine Ave., Harvey, Ill. 60426

RC: Al Signorino, 11959 Glenvalley Dr., Bridgeton, Mo.

VII: Odell Marchant, 2004 N. Hillsboro, Minneapolis, Minn. 55427 (North)

W. Hartung, 14759 Kilbourne, Detroit, Mich. 48213 (South)

VIII: M. Frank, 2933 Blankenship, Wichita Falls, Tex. 76308

IX: R. R. Combs, RR #1 Box 712, Morrison, Colo.

X: D. C. Farnsworth, 301 Carl Dr., Visalia, Calif. 93277 (North)

Lee Polansky, 880A Magnolia, Pasadena, Calif. 91106 (South)

XI: A. L. Grell, Rt. 1 Box 165, Tangent, Ore. 97389

CONTEST BOARD COORDINATOR: Don Lindley, 301 E. Elizabeth Dr., Crown Point, Ind. 46307

Bold type below indicates Chairman of Contest Board.

FREE FLIGHT CONTEST BOARD:

I: Henry Struck, R.F.D. #2, Hamburg, Old Lyme, Conn.

II: E. Fronczek, 34-14 Broadway, Long Island City, N.Y. 11106

III: Floyd Miller, 1313 Brookridge Dr., Columbus, Ohio 43211

IV: J. V. Boyle Jr., 219 Shenandoah Rd., Hampton, Va. 23361

V: G. C. Pickel, 1631 Steen Dr., Clarksdale, Miss. 38614

VI: Chuck Borneman, 1401 W. Taylor, Kokomo, Indiana 46901

VII: P. W. Klintworth Jr., 894 Brooklawn Rd., Troy, Mich. 48084

VIII: Buzz Averill, 2314 Palomas Dr., N.E., Albuquerque, N. Mex. 87110

IX: Frank Monte, 6519 Marjorie Lane, Wichita, Kans.

X: John Pond, 4135 Avati Ave., San Diego, Calif. 92117

XI: J. Lenderman, Route 2, Box 460, St. Helens, Ore.

CONTROL LINE CONTEST BOARD:

I: J. Ennis, 165 Grafton St., Brockton, Mass. 02401

II: J. G. Pallet, 30 Emerson Rd., Brookville, Glen Head, N.Y. 11545

III: Laird Jackson, 523 Meadowbrook, St. Davids, Pa. 19087

IV: Wm. Pardue, 1407 Gracewood Dr., Greensboro, N.C.

V: W. D. McGraw, 1325 Carol Dr., Memphis, Tenn.

VI: Arthur J. Johnson, 1818 Oslo Drive, Rockford, Ill. 61108

VII: Howard Mottin, 2124 Common Rd., Warren, Mich.

VIII: Leland Morton, 8614 Triton, Dallas, Texas 75227

IX: J. R. Mason, 2214 S. Pine Crest, Wichita, Kans.

X: P. Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif. 90274

XI: Keith Loutocky, 1419 S. 48th, Tacoma, Wash.

RADIO CONTROL CONTEST BOARD:

I: H. A. Thomasian, 369 Brigham St., Northboro, Mass. 01532

II: R. Noll, 96 Pine Knoll Rd., Endicott, N.Y. 13760

III: Howard Grogan, 1326 Wakeling St., Philadelphia, Pa.

IV: G. Hill, 4106 Breezewood Ln., Annandale, Va. 22003

V: Herbert Davis, 3800 River Oaks Rd., Birmingham, Ala. 35243

VI: Bud Atkinson, 734 North 6th St. Terr., Blue Springs, Mo. 64015

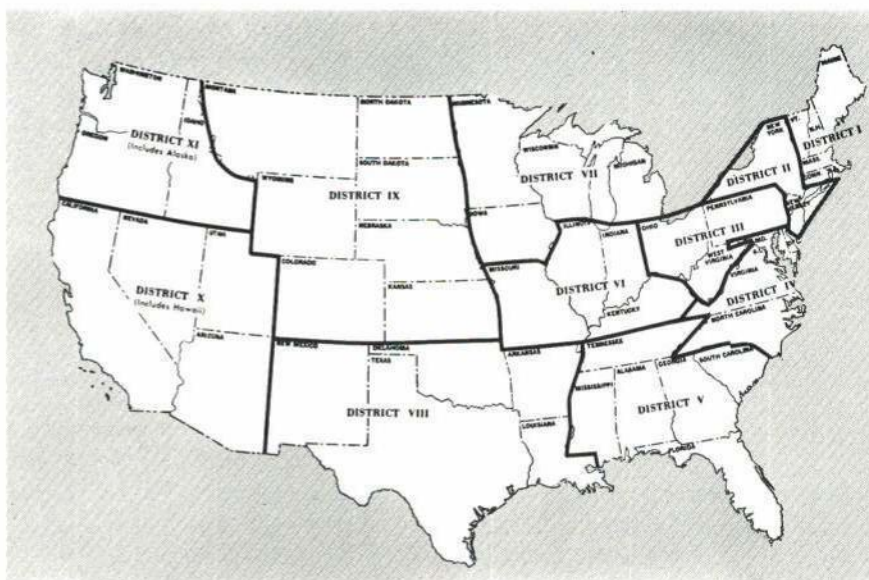
VII: Peter Waters, 31219 Kendall, Livonia, Mich. 48154

VIII: Wm. A. Knost, 6914 E. Admiral Pl., Tulsa, Okla.

IX: Loren Tregellas, 3003 S. Everett, Wichita, Kans.

X: W. C. Northrop, Jr., 9542 Hightide Dr., Huntington Beach, Calif. 92646

XI: R. Brooke, 3431 S. 194th, Seattle, Wash. 98188



HOW TO USE THIS AMA DIRECTORY

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 for your area. It is recommended that a copy of any correspondence be sent also to AMA Headquarters.

ASSOCIATE VICE PRESIDENTS:

I: J. Ross, 19 Sterling Dr., Dover, Mass. 02030

II: A. Schroeder, 18 Spencer Rd., Glen Ridge, N.J.; J. Moynihan, 123 Evergreen Dr., Tonawanda, N.Y.

III: R. DeLaVaux, 1316 Gilham, Philadelphia, Pa.; R. Pennetti, 3918 Brandon Rd., Pittsburgh, Pa.

A. Seidowski, 21480 Sheldon Rd., Brookpark, O.

IV: T. Baker, 406 Hawthorne Rd., Kings Mtn., N.C.

W. Conkling, 915 Thornbriar Ct., Hampton, Va.

V: F. Schwartz, 2400 West End Ave., Nashville, Tenn.

Jerry Wagner, 274 E. 9th St., Hialeah, Fla.

W. Lawrence, 2210 Tilson Circle, Decatur, Ga.

H. Williams, Jr., 3 Alpine Dr., Taylors, S.C.

VI: J. Blum, 2417 Glen Pl., Granite City, Ill. 62040

VII: F. Morrissey, 14100 W. Park Ave., New Berlin, Wisc. 53151

VIII: B. Kurtz, 6127 Henderson Ave., Shreveport, La.

IX: J. Kelly, 7020 E. Colfax, Denver, Colo. 80220

W. Mowrey, RR No. 2 Box 56, Kinsley, Kans. 67547

X: E. Cantrall, 863 Murray Dr., Honolulu, Hawaii

G. Nelson, 121 Madinah Pl., San Ramon, Calif.

J. Pond, 4135 Avati Dr., San Diego, Calif. 92117

SPECIAL COMMITTEES:

Safety Committee: E. Henry, Chmn., 9154 Severin Dr., Berkeley, Mo. 63134

Junior Committee: Ed Abram, Ouagadougou, N.Y. 13826

NATIONALS EXECUTIVE COMMITTEE:

J. Clemens, 1905 Greenville, Dallas, Tex. 75206

R. Morgan, School for Vet Children, Scotland, Pa.

J. Patton, Route #5, Frederick, Md. 21701

L. Peters, 3025 Hillglen Rd., Dallas, Tex. 75228

E. Shippe, c/o Vortex Models, Eng. 210 E. Ortega St. Santa Barbara, Calif. 93101

P. Sotich, 3851 W. 62nd Pl., Chicago, Ill. 60629

E. Witt, Longview Trailer Ct., R. D. No. 3, Chambersburg, Pa. 17201

John Worth, c/o AMA Hq., Shoreham Bldg., 806-15th St., N.W., Washington, D.C. 20005

FAI CIAM REPRESENTATIVES

Coordinator: M. Hill, 2001 Norvale Rd., Silver Spring, Md., 20906

RC: J. Patton, Route #5, Frederick, Md. 21701

CL: S. Wooley, 821 4th St., Marietta, O. 45750

FF: D. Linstrum, 12 Holcomb St., Simsbury, Conn.

Scale: L. Weber, P. O. Box 355, Rio Vista, Calif.

Rockets: G. H. Stine, 127 Bickford Ln., New Canaan, Conn. 06840

FAI PROGRAM ADMINISTRATORS:

CL: L. Jackson, 5231 Meadowbrook St., Davis, Pa.

FF: D. Linstrum, 12 Holcomb St., Simsbury, Conn.

Ind: C. Mather, 3880 Echochase Ave., San Diego, Calif.

RC: T. Rankin, Team Selection Comm. Chmn., 9410 N. Penfield Rd., Ellicott City, Md. 21043

RC FREQUENCY COMMITTEE:

W. Good, 9802 Parkwood Dr., Bethesda, Md. 20014

E. Lorenz, 69 Colburn Dr., Poughkeepsie, N.Y. 12603

H. McEntee, 490 Fairfield Ave., Ridgewood, N.Y.

J. Phelps, 1 Foxberry Ln., Liverpool, N.Y. 13088

P. Runge, 1107 Main St., Higginsville, Mo. 64037

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

June 6-7—Oklahoma City, Okla. (AA) TORKS 10th American RC Annual. Site: To be announced. C. Brownlee CD, 3033 Rolling Stone Rd., Oklahoma City, Okla. 73120.

June 6-7—Lincoln, Neb. (AA) Lincoln Sky Knights 11th Annual RC Meet. Site: Old Lincoln Air Base. W. Johnston CD, 531 Wedgewood Dr., Lincolnwood, Neb. 68510.

June 6-7—Valley Park, Mo. (AAA) Greater St. Louis Modeling Association FF & CL Meet. Site: Buder Park Model Field. J. Blum CD, 2417 Glen Pl., Granite City, Ill. 62040.

June 6-7—Columbia, Md. DC/RC Thermal Soaring RC Meet. Site: DC/RC Flying Site. C. Maroney CD, 3107 McComas Ave., Kensington, Md. 20795. Sponsor: District of Columbia Radio Control Club, Inc.

June 6-7—Cleveland, Oh. (AAA) Cleveland Annual Sport Race & 3rd Annual RC "500." Site: Cleveland Model Flying Field. A. Montagino CD, 3911 Daisy Ave., Cleveland, Oh. 44109.

June 6-7—Huntsville, Ala. (AAA) MACH CL Meet. Site: Old Huntsville Airport. J. Perdue CD, 111 Christopher Ave., Athens, Ala. 35611. Sponsor: Model Airplane Club of Huntsville.

June 6-7—Shreveport, La. (AAA) Louisiana State CL Model Airplane Championships. Site: Hobby Park. W. Lank CD, 3143 Rotan Ln., Dallas, Tex. 75229.

June 6-7—Spencerport, N.Y. (AA) 11th Annual N.Y. State RC Championships. Site: Salmon Creek Park. T. Salvemini, Sr. CD, 6 Valley Ln., Avon, N.Y. 14414. Sponsor: Radio Control Club of Rochester, Inc.

June 6-7—Nashville, Tenn. (AAA) 7th Annual RC Midwest Championships. Site: Percy Warner Park. B. Reuther CD, 216 Vaughns Gap Rd., Nashville, Tenn. 37205. Sponsor: Middle Tennessee RC Society.

June 7—Pittsboro, N.J. R.V./R.C. 3rd Annual Novice Meet. Site: Location to be announced. A. Schroeder CD, 18 Spencer Rd., Glen Ridge, N.J. 07028. Sponsor: Rockaway Valley RC Club.

June 7—Mankato, Minn. (AAA) Mankato Modelers CL Regional Meet. Site: Old Municipal Airport. J. Cattrysse CD, 806 Center St., No. Mankato, Minn. 56001.

June 7—Pontiac, Mich. (AA) Pontiac Open CL Contest. Site: Jaycee Park. H. Hackett CD, 3780 S. Shimmers Circle, Pontiac, Mich. 48057.

June 7—Mentor, Oh. MARCS 1/4 Midget RC Pylon Race. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Oh. 44132.

June 7—Sacramento, Calif. (AA) Northern Calif. FF Council (3) Contest. Site: Condors Field (Weagle Field). D. Foote CD, 2438 Palmetto St., Oakland, Calif. 94602. Sponsor: Oakland Cloud Dusters.

June 7—Colorado Springs, Colo. Pikes Peak Fun Fly. Site: Pikes Peak RC Club Field. B. Hayhurst CD, 1219 Oswego, Colorado Springs, Colo. 80904. Sponsor: Pikes Peak RC Club.

June 7—Bristol, Conn. (AA) Hornet's Model Classic CL Meet. Site: Elmwood School. J. Scott, Jr. CD, 265 Wilches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornet's Model Airplane Club.

June 12-13-14—Asheville, N.C. (AA) 16th RC N.C. Invitational Meet. Site: Old Asheville-Hendersonville Airport. V. Helms CD, 800 Tyvola Rd., Charlotte, N.C. 28210.

June 13—Saginaw, Mich. (AA) Tri-City Trophy RC Race. Site: SYRCC Flying Field-2240 Lone Rd. G. Gill CD, 2020 Lone Rd., Freeland, Mich. 48623. Sponsor: Saginaw Valley RC Club.

June 13-14—Pensacola, Fla. (AAA) Fiesta Five Flags FF & RC Model Championships. Site: Corry Field. FF: 8A. T. McLaughlan CD, 4140 Fern Ct., Pine Glades, Pensacola, Fla. 32503.

Continued on page 88

Fly Safely!

Follow AMA Rules

Ready-to-Fly R/C *by Lanier*

FOR YOUR FUN AND COMPETITION FLYING. ALL LANIER READY TO FLY MODELS ARE DESIGNED AND FLOWN BY THE EXPERTS!



Citron Mark II by Lanier
designed by NATIONAL CHAMPION
JIM KIRKLAND

Span: 63"
Area: 620 sq."
Sym: 17% airfoil
For 45 - 60 engines
Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN

NEW!

The CAPRICE

DEVELOPED BY
GEORGE HILL

Span: 63"
Area: 620 sq."
Sym: 17% airfoil
For 45 - 60 engines
Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN

"We still test
before we sell"

Lanier
Industries, inc.

AERO 600

49⁹⁵

Span: 65" or 48"
Area: 630 or 504 sq."
Sym: 17% airfoil
For 45 - 60 engines

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN

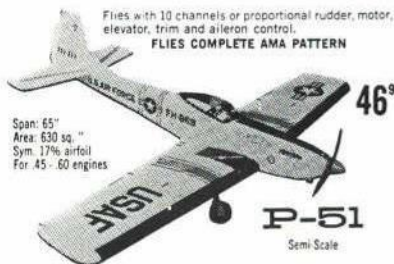
Jubilee!

34⁹⁵

Span: 48"
Area: 480 sq."
Clark "Y" airfoil
For 15 - 19 engines

IDEAL FOR THE R-C BEGINNER

Flies with motor, rudder and elevator control.



Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN

46⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

P-51
Semi Scale



Sabre
Semi Scale F-86

Span: 63"
Area: 620 sq."
Sym: 17% airfoil
For 45 - 60 engines

46⁹⁵

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN



midget

46⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

Designed for the NEW 600 sq. in. PYLON RACING CLASS... with 40 or 45 engine. Flies with rudder or proportional rudder, elevator, ailerons and motor control.

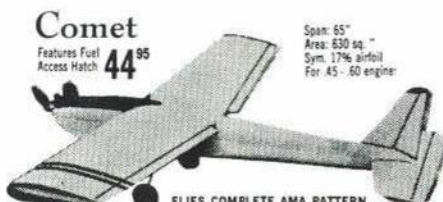


34⁹⁵

Span: 48"
Area: 480 sq."
Clark "Y" airfoil
For 15 - 19 engines

Flies with motor, rudder and elevator control.

IDEAL FOR THE R-C BEGINNER



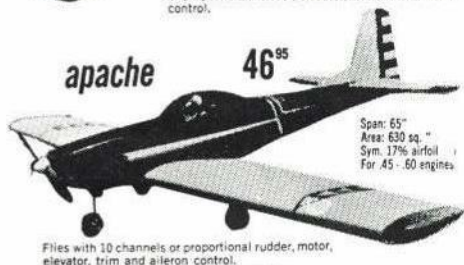
Comet
Features Fuel Access Hatch

44⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engine

FLIES COMPLETE AMA PATTERN

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.



apache

46⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN



Bronco

Standard Wing

44⁹⁵

5° Sweep Wing

46⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN



Thunder BALL

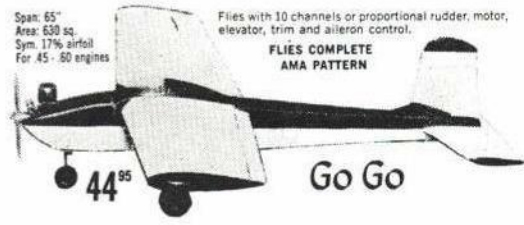
46⁹⁵

Standard Wing

44⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN



Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

Flies with 10 channels or proportional rudder, motor, elevator, trim and aileron control.
FLIES COMPLETE AMA PATTERN

44⁹⁵

Go Go

IDEAL FOR THE R-C BEGINNER
Uses 6 channels or 3-1 proportional for rudder, motor and elevator. No ailerons.



DART

46⁹⁵

Span: 65"
Area: 630 sq."
Sym: 17% airfoil
For 45 - 60 engines

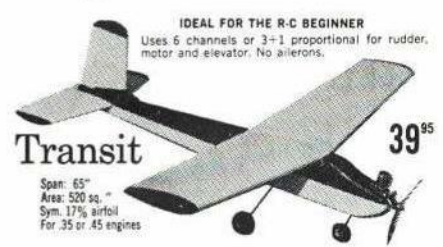
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Combat Ship Goes R/C

Continued from page 48

of ounces were in the baby pacifier tank, and the model ran out of fuel. Then the ship made a beautiful glide for a perfect landing.

At first we thought of hanging up the Winder and never flying it again. However, curiosity got the best of us. Next weekend we tried it again, with a small carb on the engine and a 9-7 Rev-Up prop put on backwards. All of the controls also were slowed down. When Denis launched it this time, it flew straight out, settled down a bit, then climbed out straight and level. A couple of turns and it flew beautifully. Next, a couple of loops, Immelmann turns and even a couple of rolls—even as slow as the throttle was set the model still moved like a demon.

Speed on the next few flights was gradually increased by turning the prop around and by using different props. Finally, an 8-9½ Rev-Up prop was used with the small carb. That performance made Goodyears look like mild pattern ships! Next we decided to use the rat racing carb and 40% nitro fuel. A streamer was added to slow the ship down and to add stability.

The engine was screaming when Denis let the monster go. It climbed out faster than any plane I've ever seen. The streamer immediately blew apart and the ship was on its own. Only the engine of a control line speed ship ever sounded like that. A Goodyear ship would lug down on the same prop, yet Winder was turning well over 21,000 rpm. Speed was estimated, roughly, at almost 200 mph. Using a prop efficiency and air rpm chart we calculated that the plane was going in excess of 180 mph. Using the same chart on a control line version of the Winder showed above 95% effi-

ciency with a 9-6 Rev-Up prop. If this amount of efficiency was being achieved on the 8-9½ prop, the plane was going over 190 mph.

By cowl the engine and cleaning up a similar plane, speeds of well over 200 mph seem possible, and the world speed record could be broken.

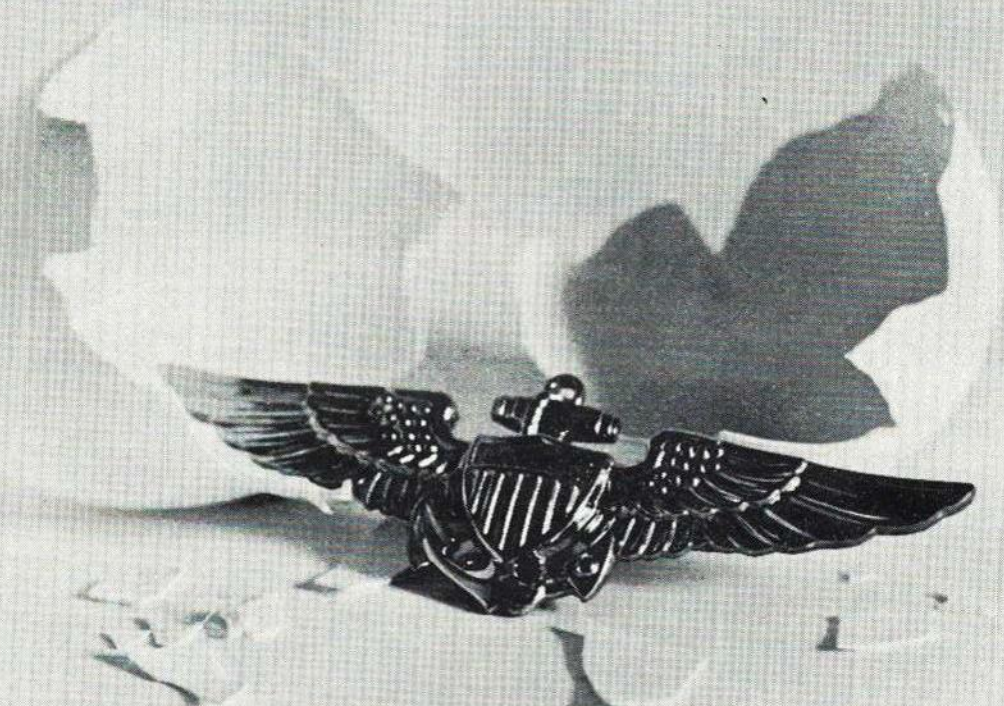
The Frantic Junkster

Continued from page 28

Champ was airborne with a monstrous hole in the right wing and still climbing. It had gained possibly 200 feet altitude when it slid around in a flat turn to the left. The crowd was spellbound to see whether the Champ could make it around again and attempt a landing. It made a full circle in a slipping, sliding, mushing trajectory back in front of the crowd. You could hear, "He's gonna make it!" coming faintly from the worried spectators.

At this point the Champ nosed toward the runway, gaining a little bit of speed for the landing. As it neared the runway, it careened upward and over on its back into a loop! Screams rose from the crowd as the engine sputtered and backfired at the top of the maneuver. The Champ hung motionless for a moment, swung down the back side and headed for the runway. It leveled off with room to spare and made for the blue again—straight up into a stall, falling off on the left wing in a knife-edge slip to the deck. Kicked straight, wheels bouncing off the grass into another vertical climb. A hammerhead to the right and back to the runway with the left wing tip not eight inches away from terror-firma. A turn to the left with the wing still dragging and just barely up and over the wind tee.

The crowd was alternately gasping and laughing at the gyrations of this rambling



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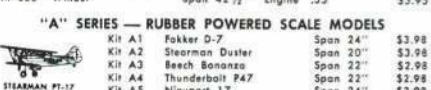
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shambles as it went through snap rolls, square loops, Immelmann's, and some unidentifiable contortions. The act ended with an "engine failure" and a snap roll to the right which continued into a five-turn spin. The pull-out, of course, was on the deck and proceeded into a tight dead-stick loop. Out of the loop into a 180 degree slip-turn around to the runway.

A "one-legged" wheelie effected the landing which progressed into a controlled tail high ground loop in front of cheering crowd. Chuck Driskell again had defied the experts.

One never knows what will happen from one air show to the next. Airplane re-assembly can be done in three hours of ridiculous tomfoolery (where sometimes birds fly out of the cowl or short test hops are made sans rudder) or in 20 minutes of Chinese Fire-drill activity. It will fit whatever the show requires. The airplane isn't a hopped-up show machine either. It is a stock 65 hp Aerona Champion minus one aileron — no special rigging, no beef-up, and no hot engine. Just \$600 worth of junk flying in loose formation (most of the time).

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This act pokes fun at serious flying and aviation in general and it is a real crowd pleaser. A refreshing change of pace in this modern, shiny, serious world. Who knows, it might set aviation back 40 years.

Suds

Continued from page 25

Hobbypoxy or resin. Inflate and force a medium-size Hobbypoxy balloon over the entire block. Let the epoxy set up. Remove the balloon and clean the glass-covered nosepiece to remove all traces of residue. Lay up another layer of cloth and use plenty of epoxy again. Cover it with the balloon and wait.

Remove the balloon and carefully trim the excess flush with the back side of the block. The cowl should lift off easily with the Saran Wrap. It should now over-fit the nose of the fuselage accurately. Anchor it in place with No. 4 sheet-metal screws into the resin behind the firewall.

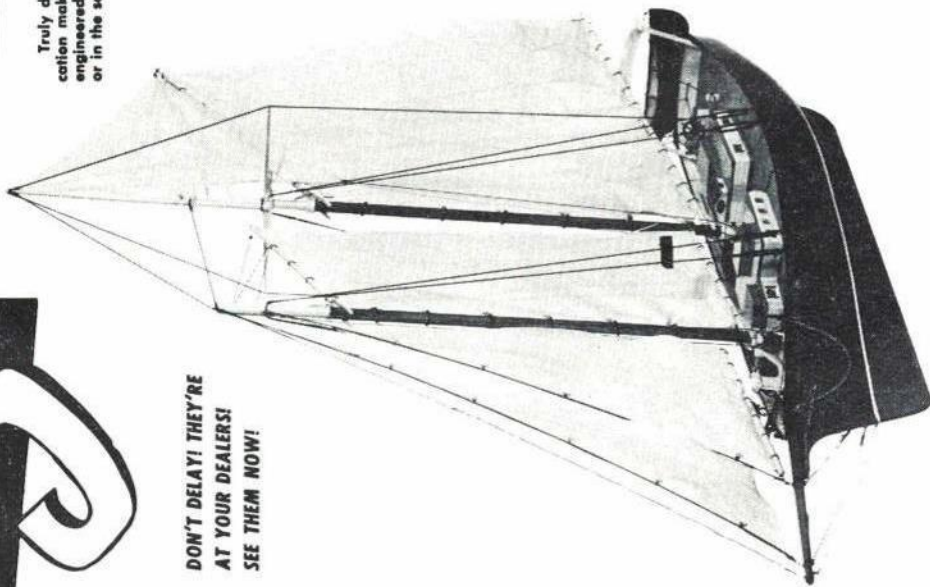
Fuselage: Pin two 1/8 x 4 x 36" matched grain medium balsa sheets together and cut sides to shape, including the wing slot.



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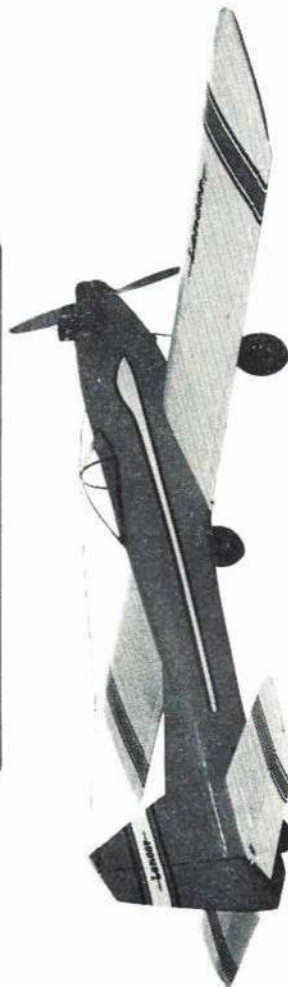


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Contact cement rear doublers. Set sides upside down on flat surface and glue F-1, F-2, and F-3 in place. Glue front bottom $\frac{1}{4}$ "-sq. stringers in place. Tack glue $\frac{3}{4} \times 3$ " block A in place, making sure it extends forward far enough if balsa nose is used. Glue $\frac{3}{32}$ " ply and balsa planking in place from rear block A to F-3. Allow to dry 30 minutes. Turn over, glue $\frac{1}{4} \times \frac{3}{8}$ " top stringers in place.

Tack glue block B in place. (Block B is one piece at this time.) Tack glue $\frac{1}{4}$ " short piece of balsa sheet from block B to F-3 in place. Glue H-2 in place. This holds block B and short piece of $\frac{1}{4}$ " sheet together forming hatch. Allow to dry 30 minutes. Glue rear of fuselage together. Finish planking bottom. Turn over, glue rest of $\frac{1}{4}$ " planking on top with the grain running lengthwise. This has slot cut in for vertical fin, but fin is removed until fuselage is finished. When glue has dried, round off blocks A and B, as well as the $\frac{1}{4}$ " planking. Sand the fuselage thoroughly.

Place front of fuselage on $\frac{1}{8}$ " ply and copy firewall pattern. Remove block A, hollow out from F-2 forward, glue back in place. Remove block B; remember short piece of $\frac{1}{4}$ " sheet now is part of block B. Hollow out block B. Cut short section from front of block B as shown on plans and glue into place. Trim $\frac{1}{8}$ " from front of block B. Place front of block B on $\frac{1}{8}$ " ply and draw pattern for H-1.

Glue H-3 in place, also $\frac{1}{4}$ "-sq. vertical stringers in front of F-2 and F-3. At this time $\frac{1}{4}$ "-sq. rear bottom fuselage stringers are glued in place. Glue firewall and H-1 in place. Allow fuselage to dry thoroughly; then set on its nose. Pour approximately $\frac{1}{4}$ in. of resin or Hobbypoxy behind firewall, adding scraps of fiberglass. Allow to set up. This bonds the front of fuselage together making a strong firewall.

Place hatch on fuselage, drill hole through

firewall into H-1, also drill through rear of hatch into H-3. Remove hatch. Epoxy nail into firewall, 6/32 blind nut in H-3, also the four 4/40 blind landing gear nuts in place. The fuselage is now finished. It is important to run a 4/40 tap through 4/40 blind nuts, if 4/40 x $\frac{3}{8}$ nylon bolts are used to hold the gear in place. Should the gear be broken off these bolts will shear off even with fuselage making it necessary to use an X-acto blade to extract broken bolts. If the bolts fit properly, gear can be replaced in matter of minutes.

Stabilizer and rudder are cut out of sheet balsa, shaped and sanded. Temporarily assemble the fuselage with wing, stab, and rudder in order to check and correct the alignment of the wing slot and stab platform.

Disassemble and paint, cover, and paint the fuselage, stab, and rudder, using your choice of methods and materials. Do not trim with color dope until after final assembly.

Begin assembly by attaching the landing gear and tail wheel bracket. Glue the wing in place, taking care to get a good fillet of glue around the wing at the joint inside and out. It must be right the first time! Mark center of stabilizer and position it on the fuselage with pins. Align the stab relative to wing by measuring the distance from wing trailing edge to stab tips. These measurements must be identical. Then glue the stab. Cut slot in top sheet for the fin, glue it and the dorsal fin in place.

Remove landing gear and tail wheel mount to put on the final coats of clear dope and color trim. Don't forget to finish and paint the control surfaces. All control surfaces on my planes were mounted with strip nylon hinge material. With these hinges, the control surface fits the fixed surface snugly and leaves almost no air gap. The less air gap, the better the control effect.

Continued on page 72

IS MONOKOTE REALLY MORE EXPENSIVE?

We, at Top Flite, are so convinced of MonoKote's superiority over the silk and dope method of covering and finishing, that we find it difficult to understand why every model builder doesn't cover his plane with MonoKote. Therefore, we hired a research organization to find the answer.

Over 800 model builders and dealers were questioned, and the results of the study indicated that the only reason more builders weren't switching to MonoKote was its "presumed high cost." The majority of those builders who objected to the cost, however, had never used the product. Many of the dealers, on the other hand, expressed the opposite point of view. They indicated that economy was one of MonoKote's major benefits.

LET'S LOOK AT THE COST FACTS!

A typical example of comparative costs came from Mr. Al Fuchsen, owner of Al's Hobby Shop—129 W. First Street, Elmhurst, Illinois. To compare the cost of MonoKote with an equivalent covering and finish using silk and dope, Al selected an average size plane, Top Flite's TOP DAWG. He explained his reason for selecting this plane, "if there is a cost difference, the larger the plane, the greater the spread."



MATERIALS NEEDED TO COVER THE TOP DAWG WITH SILK & DOPE

1/2 Pint Filler Coat**	1.00
1 Pint Clear Dope*	1.65
1 Pint Color Dope*	1.65
1 Pint Thinner *	1.35
1/2 Pint Trim Color*	1.00
2 yds. Silk @ \$1.79/yd.	3.58
Sandpaper	.15
Masking Tape	.25

Also needed: brushes, trim decals, rubbing compound, wax, etc.

*Based on quart size prices

**Based on pint size prices

\$10⁶³

MATERIALS NEEDED TO COVER THE TOP DAWG WITH SUPER MONOKOTE

6 feet SUPER MONOKOTE @ \$1.35	8.10
1 Trim Sheet @ .89¢	.89

\$8⁹⁹

CONCLUSION:

MonoKote is actually *less* expensive than silk and dope. And, when you consider its ease of application; the tremendous amount of time you save... allowing you more time for flying... that there are no penetrating, offensive odors; no mess to clean up; that even if you're a novice, you get a professional-looking finish the first time and every time you use MonoKote; a weight savings of about 1/4 pound on a plane the size of the TOP DAWG; its puncture resistance and high tensile strength; we leave it to you... how can you afford not to use MonoKote!

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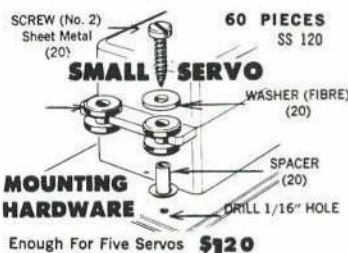


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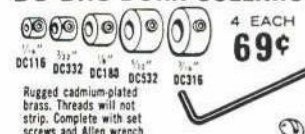


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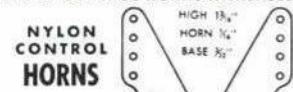
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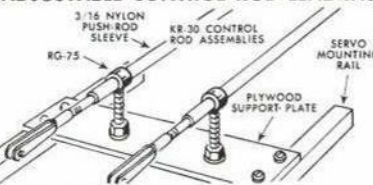
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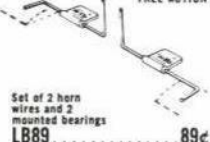
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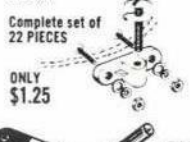
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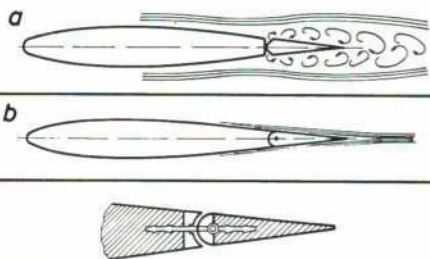
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Re-install the landing gear with wheels. If you are to use the fiberglass cowl, mount the engine with the exhaust facing downward. If you use the built-up nose, mount the motor upright. Don't forget the shim on the plans. Next the canopy is glued in place, attaching it to the hatch only. I used the Williams Brothers full-length rigid canopy. Remember to drill a hole through the canopy for access to the hatch hold-down bolt.

Radio installation is detailed on the plans. The elevator, aileron, and rudder servos are located side-by-side, inset into the wing just in front of the rear spar. A strip of plywood is used to anchor the servo hold-down screws. Engine servo located on the left side of the fuselage helps offset the weight of the engine cylinder. Glue a piece of spruce to rear of F-2 for hold-down screws at one end of servo and a block faced with spruce at other end glued to the wing. Servo mounting tape also can be used. Locate batteries below the fuel tank, on the left side to offset the engine cylinder. (If you use the upright engine, locate batteries and engine servo on opposite sides of fuselage.)

Last step is most important. Check the model for balance at the CG indicated. One wing (or side) must not be heavier than the other. Be sure the control movements are as indicated on plans—check attachment of pushrods to control horns.

The model should weigh between 4 1/2 and 5 1/2 lbs. depending on the engine, radio. Use of downthrust will be determined in flight tests, but it is a matter of preference. On takeoffs, hold up-elevator for the first several feet of ground roll, then ease toward neutral elevator and Suds will be ready to take off. Be sure to take off and land into the wind until you get the hang of having a conventional gear.

It is important to use the engine which suits your skills, for you will find Suds unlike any RC model you have been flying. It offers a delightful realm of experiences.

Larson 5RS System

Continued from page 43

contributes to small receiver size. The wiring harness terminates at a PC board which is protected by a tough plastic cover held solidly in place by the switch mounting screws. At first glance, this arrangement with all wires running from it seems to present a jumble to hide in the airplane. Not so! When mounted in the airplane, all leads form a natural flow to their respective servo, receiver, or battery pack. This permits a minimum of wire bundle leading to the receiver, thus reducing vibration transmitted to the receiver. ITT plugs having gold-plated pins are used for the connectors. Charging is via the power harness. The airborne battery pack is composed of four 500 mah nickel-cadmium cells arranged in a flat pack.

Two servo options are offered. The characteristics of the Orbit PS-4D servo were described in the review of that system in the March 1970 AAM. The Orbit PS-4D servo is modified simply by changing the reference generator timing to match the nominal 5 RS pulse width.

The Digimite-type servo-mechanism features the use of a harmonic drive gear system (under license from American Shoe Machinery Corp.) which has to be seen to be believed! It provides maximum gear reduction in minimum space. The entire gearing for this servo is contained in a 3/16-in. thick disc which is equal to the diameter of the servo motor. A gear reduction of 227 to 1 is achieved in a package that is several times quieter than the normal servo gear train. There is absolutely no backlash and it is impossible to drive the servo motor "back-through" the gearing. Don't try it,

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something will have to give and I suspect it would be the output arm. Gear bearing surface is so great that stripping is just not going to occur as it can in the conventional gear train.

Physically, the harmonic drive looks like this: The servo motor shaft engages three Delrin rollers in a friction drive which, in turn, bear against the inside diameter of a flexible circular nylon spline having teeth on its outer dimension. The 85 teeth on the spline engage teeth on the inner diameter of the drive housing. There are 88 teeth on the housing, 3 more than on the spline. The gear ratio is the ratio of the difference in number of teeth on the housing or about 29 to one. The remaining reduction derives from the ratio of motor shaft-to-delrin rollers and roller diameter to spline diameter.

The outer housing is retained by the servo motor and a molded pin about which the housing rotates. A crankpin on the housing engages a slot in the servo output slide arm. This slide carries the feedback pot wiper on a vernier screw which permits adjustment of servo mechanical center. A linear wirewound feedback pot is used.

Output of the servo is linear and may be reversed simply by switching the servo

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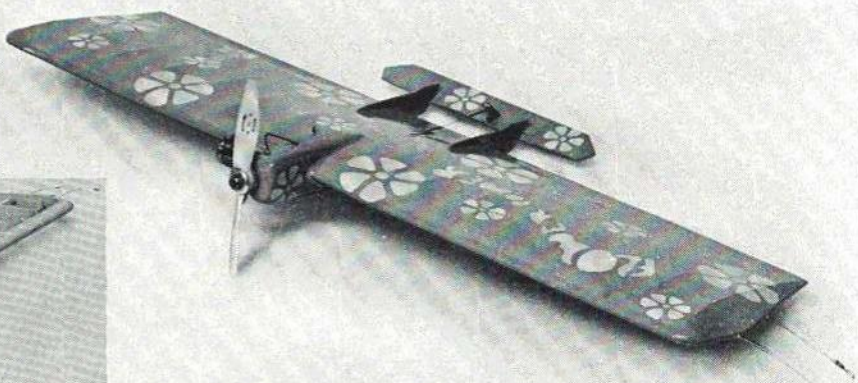
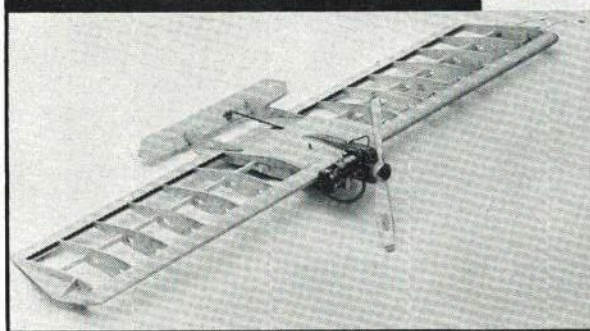
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end-for-end. Symmetrical mounting provisions are incorporated in $2\frac{7}{16} \times 1\frac{13}{16} \times 1\frac{1}{2}$ " Nylon case. Two screws allow the case to be divided for removal and bench operation of the entire inner servo. Servo output is at least four lbs. Weight is about 2 oz.

Workmanship throughout was excellent with top-notch performance even in extremely cold weather. No abnormalities were encountered. The airborne set is innovative and outstanding. Experienced and competent servicing provided by the manufacturer.

After the first flights in the Trainer Master, the system was flown and further tested in the Dee Bee Beta shown in the photo. This model is made with vacuum-formed vinyl parts and thick vinyl covering over cut styrofoam wings. Although vinyl is more vibration-resistant than ABS plastic, we fiber-

glassed the inside of the nose and used Silastic glue to anchor the plywood parts to the fuselage interior. Also the control hookups were put inside the fuselage at the elevator and rudder. The rudder area was slightly increased. In assembling the wing, we tried a new system for getting flaps and aileron action at the trailing edge without in-the-wing bellcranks. The system permitted using the Larson system's fifth channel for landing flaps. Engine is an old Merco 61. Completed plane weighs only $5\frac{3}{4}$ lbs. Light radio and light plane make this possible.

The servo response in the Larson system is very accurate. The Beta is a responsive model and the servo accuracy is essential. First, we found that we did not need the flaps; the airfoil of the Dee Bee plane permits slow gentle landings. Second, we prob-

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diagram: R.C. installation No. 122 set of accessories. VARIOPROP R.C. installation No. 119 set of accessories. DIGITAL RX 14 R.C. installation.

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	288. Republic P-47	347. Kawasaki Ki-84
	289. Republic P-47	348. Kawasaki Ki-84
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	302. Republic P-47	361. Kawasaki Ki-84
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You Said It

Continued from page 10

me, the way you glorify U/C stunt and speed. Those are not the only U/C events. You still haven't published a combat model: the last one was the Specter (1968). I say that combat draws the biggest crowd and is the most exciting. You have recently added a new department, "Where the Action Is,"—why isn't anything going to be written on combat? There are plenty of experienced men for the job.

Joseph Flannery, Bergenfield, N. J.

OK, why don't you guys submit some good combat designs? —Publisher

Getting Started in R/C

Continued from page 42

IF transformers frequently are the culprits. The oscillator crystal is another delicate part—one that should always be suspect after a crash (even if the receiver appears to be undamaged). Transistors are rugged mechanically but can be ruined instantly by voltage extremes or reverse voltage. These factors suggest it is vital to shock mount the receiver carefully—and to use utmost care with battery and charger connections!

F-84 Thunderjet

Continued from page 17

signia would be. Tape these down, two at a time, on a smooth surface. Then tape an accurate tracing of each insignia item down on top of its proper color tissue. After that, it is an easy job to cut out the decorations by slicing down right through both the patterns and tissue.

Attach the cut-out tissue insignia to the airplane with clear dope. Position each tissue item in the right spot and hold it down temporarily with one hand while lightly brushing thin clear dope over the cut-out. The dope penetrates right through the tissue paper and glues it firmly in place.

The bubble canopy, rudder, aileron, and flap outlines are all drawn on the model lightly with a soft pencil. Ink over the pencil lines with India ink or ballpoint pen. The red nose and the dark green anti-glare

areas are painted on the model with colored dope. Lastly, the U. S. Air Force and 92026 on the vertical tail are decals. These can be bought at the hobby shop.

With an ordinary needle sew the elevators to the stabilizer. Add the music wire push-rod. (It can be kept from falling off by wrapping a few turns of thread around the wire where it sticks through the bellcrank and the control horn. Keep the thread from coming off by coating it with clear dope just before winding.)

For power, we used regular fishing rods. A seven-ft. fiberglass rod was less than five dollars at a discount store. Even inexpensive toy rods work fine. My son David got a five-ft. steel fishing rod free from a neighbor. We made still another whip pole out of a six-ft. length of bamboo, using the bottom parts of three big safety pins for the line guides. (Fasten the guides to the pole by wrapping them tightly with heavy thread, and then brush a couple of coats of clear dope over the windings.)

The fishing rods don't need reels, and it's not necessary to alter them. For stunt flying it is helpful to keep the control lines from twisting together as they pass through the rod guides. To do this, I added separators on my own pole. The easiest and neatest way is to tie a piece of nylon thread across the opening of each guide, dividing the round hole into two equal D-shaped areas.

For the control handle and the lines I use Carl Goldberg's little red plastic handle for 1/2-A models. It comes with a spool of dacron cord for the lines. At the pilot's end, I attach the lines to the two holes closest to the middle of the Goldberg handle. Then the lines go through the fishing rod guides, out toward the airplane. (Before the lines are fastened to the model, decide how long they should be. The shorter the lines, the more positive the control over the model will be, especially in a wind. But this limits stunting and the pilot may get dizzy from having to spin around pretty fast. Longer lines make flying more interesting and challenging, but then a helper is needed to hand-launch the model.)

About 15 or 16 feet of line between the control handle and the fuselage of the airplane is a good length to start with. That's short enough to launch and fly the model without a helper, and yet not too short for doing stunts. At the airplane, both control lines go through the one hole in the left wingtip tank. Then the up line (the one from the hole in the control handle just above center) is tied to the rear hole of the bell-

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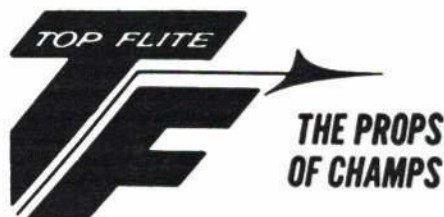
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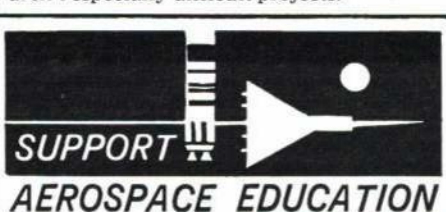
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crank. Thread the cord through the bellcrank hole and tie a loop an inch or so long with a square knot. Don't tie the knot right on the bellcrank because it may snag in the fuselage slot when the model is flying. Also, put a drop of glue on the knot to secure it. Dacron cord is stiff and springy, and even a tight square knot will work loose eventually if it's not cemented.

The other control line — the down line — is tied to the front hole in the bellcrank. It's a little tricky to tie the knot at just the right spot. Both control lines must be exactly the same length and, when the control handle is held straight up and down, the Thunderjet's elevators must be flat and even with the stabilizer. This is really quite an important detail, so it's best to be patient. When hand-launching the airplane, don't toss it into the wind. A control line ship of any type should always start off downwind, so that the wind won't blow it in toward its pilot before it picks up full flying speed.

A wingtip weight and an offset rudder don't seem to be necessary on whip-control models. The control lines are swept forward from the bellcrank instead of aft because, in flight, the tip of the whip pole points ahead of the airplane. If the lines were swept back, as they are on an engine-powered U-control model, the whip-control ship would yaw outward far too much to fly or be controlled properly. As can be seen from this little Thunderjet, whip-powered models aren't especially difficult projects.



Pennyplane

Continued from page 14

are easy to build and handle because of the heavier structure (similar size conventional indoor models would weigh between one-fifth and one-fourth as much). In previous discussions, some felt the models would be larger — about a 25-inch span. After this first trial, several fliers agreed that larger models certainly would be in order in sites larger than the 28-foot high school gym which was used for this meet.

Cessna A.W.

Continued from page 40

cemented on top of the rib bottom pieces. The upper parts of the ribs are then added. Since upper ribs are the same except for length, only one size needs to be cut from sheet balsa. These basic ribs are cut to fit by shortening them at the trailing edge end. If the rib does not fit because the spar is slightly too high, notch the spar so the rib will fit.

By this time the first fuselage side will be dry and the second side can be built. It is built directly on top of the first side while it is still on the plan. This assures that both sides have an identical contour.

The center section of the wing can now be made. Pin down the leading and trailing edges and the rib bottom piece opposite from the wing panel already built. The panel that is completed should be unpinned from the board and tilted up from the tip until the spar contacts the rib bottoms just installed. The wing panel should be blocked in this position while the cement is drying. The shape of the wing spar determines the exact amount of dihedral.

While the wing center section and fuselage side are drying, work can begin on the

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tail surfaces. Both the elevator and rudder are separate, movable pieces and are held in place by copper wire hinges.

Remove the fuselage sides from the plans and, using a razor blade, carefully separate the two sides from each other. Then join the sides at the tail. Install top and bottom crosspieces that are located approximately at the trailing edge of the wing. Carefully align the fuselage so that the sides and crosspieces form right angles when viewed from the front. Set the fuselage aside and let the cement dry thoroughly.

The remaining wing panel can now be built. Both the first wing panel and the center section will be off the board when the spar is cemented to the rib bottom pieces in this wing panel. Add the gussets to the dihedral breaks at the center section.

The fuselage should be dry by this time and the remaining crosspieces can be added now. Note that, in the vicinity of the cabin, some of the crosspieces go only on the bottom. This is because the uprights are at angles, thus forming part of the window outlines and incidentally corresponding closely to the structure of the full-sized airplane. The sides should be "cracked" at the point where the first crosspieces were installed. This gives a sharp change in contour as shown on the plans rather than a gentle curve. The sheet on the sides of the nose and the upper and lower nose section blocks now can be added.

Bend the landing gear wire as shown on the plans, using $\frac{1}{32}$ " music wire. The landing-gear front and rear struts should be bound with thread (but not cemented) to fuselage crosspieces before soldering them together with the cross strut. Once soldered, cement the gear wires to the fuselage.

Laying the fuselage against the plans, mark the location of the three stringers on each side with a ballpoint pen and then cement the stringers in place. The stringers form the upper and lower window outlines. The upright edges of the window are made from $\frac{1}{16}$ "-sq. balsa added at this time. Tack glue the wing in place and trim the upper part of the cockpit to fit the wing leading edge. Add the one cockpit crosspiece but not the V-shaped part of the windshield which should be installed after covering.

The dummy engine parts are made from scraps. On a model this small, wrapped thread effectively simulates cylinder fins. The exhaust collector ring is bent from heavy, insulated housing wiring. This may seem heavy but weight is needed in the nose for proper CG location.

Both models used regular six-in. plastic rubber-power propellers. In both cases the propellers were out of balance when bought. Sanding with fine sandpaper will balance the propeller and also take off the shine; therefore, sand both blades so that they look uniform. The propeller-shaft bearing in the nose block is a drop of epoxy glue on either end (front and rear) and drilled for the propeller shaft. Drill so that a slight amount of right- and down-thrust results. The thrust bearing consists of a small washer, a glass bead and another washer.

Go over every glue joint with a second coat of glue to form tiny fillets. When the glue has dried, carefully sand the structure with fine sandpaper. Remember that rough structure will show through the covering.

Clear dope the fuselage structure inside and out. This protects the wood from rubber lube. Also dope all wing and tail edges to which the tissue will be attached. Cover with lightweight tissue. The indoor model was covered with Jap tissue and the outdoor model with flower-making tissue. Flower-making tissue is available in many arts and crafts stores and is very colorful and inexpensive. Do not cover the underside of the wing where it mounts on the fuselage. Cement the wing to the fuselage be-

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fore water-tightening the tissue.

After the tissue is tightened give the air-
plane one coat of clear dope. When it is dry
add the license numbers, aileron and door
outlines, all cut from black tissue. The doors
are on the right-hand side of the fuselage
only. Add such remaining parts as the wind-
shield frame, tail, struts, etc., then give the
entire model two more coats of thinned
clear dope. Add the final details, such as
windows, engine cylinders, landing-gear
fairings, tail skid and wheels. Care in these
details pays big rewards in appearance of
the model.

Before trying to fly the model, carefully
check for warps. Absolute trueness is es-
sential. Whenever one of the two models
misbehaved it was because the wings were
warped. This will often happen for the first
few weeks on a new model until the cover-
ing has finally stabilized. Removing warps
is easy if the part is twisted against the
warp while it is held over the spout of a
steaming teakettle.

Flying is relatively easy. Be sure that the
airplane balances at the center of gravity
position shown on the plans with rubber
installed. Use clay to make it balance. Do
not try to trim out a nose- or tail-heavy air-
plane by adjusting the tail surfaces. When
balanced try a hand glide over grass. Take
out gentle dives or stalls by adjusting the
elevator but use very small deflections since
the elevator area is quite large. Turns should
be taken out with slight rudder deflections.
If it takes more than 1/16-in. rudder deflec-
tion to straighten the glide, check again for
warps. Once a good, straight but not float-
ing glide is achieved, try about 50 turns on
the motor. The airplane should climb
straight or slightly to the right. If it goes
to the left add a little right rudder or a little
right thrust. When properly adjusted, the
model will fly in gentle turns to the right
under power and glide either right or left.
Remember that good performance can be
achieved only by careful adjustment and
tuning.

Unlike a contest rubber-powered model,
this type of model should not climb steeply.
It should have a gentle climb and a long
period of cruising under power. This may
require some experimenting with the rub-
ber motor. A shorter motor will give a
higher rate of climb than a longer one of the
same rubber size. It is good to take a short
sample of rubber to see how many turns
per inch it will take before breaking. For
normal fun flying don't exceed 60-70% of
this amount because, while you can get
maximum turns once, the motor will prob-
ably break if it is wound to maximum turns
again without a several hour rest period.
Always lubricate the rubber with rubber
lube.

Built with reasonable care the AW will
give big returns in flying pleasure for a
minimum cost and time investment.

Contender

Continued from page 25

In time we may even get used to its looks!

Editor's Note: Dave Platt, the author,
elected to concentrate his text on the origins
of the Contender, its features, and charac-
teristics. A reader should find no difficulty
in constructing the model without a de-
tailed construction text. The plans show all
the parts in planform and with cutaways
illustrate how the parts go together.

It is helpful to make the wing first. In
doing so, assemble and shape the leading
and trailing edge parts first, as illustrated.
Cut ribs with the building tabs and the wing
can be made, with no possible warps, on a
flat board. The fuselage is built upside down
on the top edge of the fuselage sides. Pre-
assembly F4, F3 and the motor bearers.
With these parts properly aligned, install
the motor temporarily and epoxy this as-
sembly together. Then build the rest of the
body around it.

Dave Platt offers two practical variations
in the fuselage. Hard 3/16-in. balsa can be
used for the sides and the plywood doubler
eliminated. He also prefers the better ap-
pearance of an inverted engine installation.
See drawing.

Top Flite Models tells us that a kit of the
Contender is planned for release in the
summer of 1970, sometime after this article
appears. This kit is designed so that con-
struction, finishing and radio installation
can be completed and the model ready to
fly in one week.

Broadhurst on F/F

Continued from page 35

FF Contest Board. One asks that the pipe
be permitted for a period of not less than
five years in AMA gas classes A, B, and C,
with such models to be hand-launched only
and with engine runs to remain at the pres-
ent 12-sec. limit. The other proposal asks
that pipes be permitted in FAI Power events
at AMA-sanctioned contests, with engine
runs to be restricted to not less than eight
sec. nor more than nine sec., at the option
of local contest directors.

Meantime, Luigi Bovo of Genova, Italy,
has advised that Dave Linstrum's proposal
to impose an eight-sec. engine-run handi-
cap and to permit piped models at the 1971
FF World Championships in Sweden comes
too late to be made effective next year.
Bovo, chairman of the FF Subcommittee of
the Committee for International Aeromodel-
ing (CIAM), suggests it is better to wait for
"any eventual experience" with the handicap
approach at contests in the U.S., before at-
tempting to re-introduce the pipe in world
FF competition. "Personally I was very un-

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happy with the CIAM decision (to ban the pipe)," Bovo declared, "but there is nothing to do, at the present moment, against it."

That's precisely the point. There is something to do, and that is to experiment with pipes. For this reason the above two proposals have been submitted to the FF Contest Board. Linstrum, by the way, is the U.S. member of the CIAM's FF Subcommittee....

180 Club: This is the name tentatively selected for a new group formed to sponsor FAI FF activity in the Northwest, according to WMC Patter. Bill Gaiser of Portland was elected club coordinator for a two-year term. Two FAI invitational meets are scheduled this year along with the development of materials for publication. The club will also take responsibility for organizing qualifying trials and semi-finals during FAI years. Membership is open to any AMA member interested in FAI FF in Oregon....

Auto Stab Hookup: Here's how "Tullahoma Ben" Cleveland's auto stab rig for a Seelig Timer works. A small aluminum plate is filed to shape and attached to the DT string holding the stab down. The notch and slot in the plate engage the DT and function wire of the timer, and an L-shaped wire protruding from the fuselage prevents the plate from falling off. When the function wire releases, just after the engine cuts, the plate slides rearward until the forward end of the slot contacts the DT wire, permitting the stab to raise to the glide position. (The amount of positive incidence cranked into the stab is directly proportional to the length of the slot in the plate.) Finally, the DT wire releases, the plate falls free allowing the stab to raise to the DT position....

Nats Rule Dropped: The flight-before-noon rule will be eliminated at the Nats this year! That's the word from editor Jim Perdue of *Mach News*, newsletter of the Huntsville, Alabama MAC. "Hooray! Hoo-

ray!" says Jim, who is also AMA District Five VP. The rule, requiring one official flight before noon, was initially adopted as a means of reducing long lines of people waiting to fly their models late in the day. But all it succeeded in doing was to create a massive jam-up before noon. The National Free Flight Society promoted the idea that the rule should be abandoned....

Stalick on F/F

Continued from page 35

is in perfect alignment, as specified on the plan. When dry, additional glue fillets around the wing are desirable. The finish is preceded by filling the wood grain on the wing with several coats of clear dope/talcum powder, sanded well between each coat. Two coats of Sig Lite Coat then cover the whole model. Burnishing the wing with the back of a sheet of wet or dry sandpaper will shine it up, and a good coat of wax over all will give a durable, water-proof and smooth finish.

Balance as indicated and then hand glide and check for turn. Hand-launch gliders use cross adjustments—right launch, left glide (or vice versa for lefties). Glide turn is best adjusted by a bit of clay on the left wing tip or a slight bit of stab tilt. Climb is best adjusted by adding or reducing elevator in conjunction with adding or reducing nose weight.

The best feature of hand-launch gliders is the small investment in time and money. This makes it easy to experiment with them. Try one and see!

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10-6	1.25	10-6	1.25	10-6	120¢	10-6	120¢
11-6	1.50	11-6	1.50	11-6	140¢	11-6	140¢
12-6	1.75	12-6	1.75	12-6	160¢	12-6	160¢
13-6	2.00	13-6	2.00	13-6	180¢	13-6	180¢
14-6	2.25	14-6	2.25	14-6	200¢	14-6	200¢
15-6	2.50	15-6	2.50	15-6	220¢	15-6	220¢
16-6	2.75	16-6	2.75	16-6	240¢	16-6	240¢
17-6	3.00	17-6	3.00	17-6	260¢	17-6	260¢
18-6	3.25	18-6	3.25	18-6	280¢	18-6	280¢
19-6	3.50	19-6	3.50	19-6	300¢	19-6	300¢
20-6	3.75	20-6	3.75	20-6	320¢	20-6	320¢
21-6	4.00	21-6	4.00	21-6	340¢	21-6	340¢
22-6	4.25	22-6	4.25	22-6	360¢	22-6	360¢
23-6	4.50	23-6	4.50	23-6	380¢	23-6	380¢
24-6	4.75	24-6	4.75	24-6	400¢	24-6	400¢
25-6	5.00	25-6	5.00	25-6	420¢	25-6	420¢
26-6	5.25	26-6	5.25	26-6	440¢	26-6	440¢
27-6	5.50	27-6	5.50	27-6	460¢	27-6	460¢
28-6	5.75	28-6	5.75	28-6	480¢	28-6	480¢
29-6	6.00	29-6	6.00	29-6	500¢	29-6	500¢
30-6	6.25	30-6	6.25	30-6	520¢	30-6	520¢
31-6	6.50	31-6	6.50	31-6	540¢	31-6	540¢
32-6	6.75	32-6	6.75	32-6	560¢	32-6	560¢
33-6	7.00	33-6	7.00	33-6	580¢	33-6	580¢
34-6	7.25	34-6	7.25	34-6	600¢	34-6	600¢
35-6	7.50	35-6	7.50	35-6	620¢	35-6	620¢
36-6	7.75	36-6	7.75	36-6	640¢	36-6	640¢
37-6	8.00	37-6	8.00	37-6	660¢	37-6	660¢
38-6	8.25	38-6	8.25	38-6	680¢	38-6	680¢
39-6	8.50	39-6	8.50	39-6	700¢	39-6	700¢
40-6	8.75	40-6	8.75	40-6	720¢	40-6	720¢
41-6	9.00	41-6	9.00	41-6	740¢	41-6	740¢
42-6	9.25	42-6	9.25	42-6	760¢	42-6	760¢
43-6	9.50	43-6	9.50	43-6	780¢	43-6	780¢
44-6	9.75	44-6	9.75	44-6	800¢	44-6	800¢
45-6	10.00	45-6	10.00	45-6	820¢	45-6	820¢
46-6	10.25	46-6	10.25	46-6	840¢	46-6	840¢
47-6	10.50	47-6	10.50	47-6	860¢	47-6	860¢
48-6	10.75	48-6	10.75	48-6	880¢	48-6	880¢
49-6	11.00	49-6	11.00	49-6	900¢	49-6	900¢
50-6	11.25	50-6	11.25	50-6	920¢	50-6	920¢
51-6	11.50	51-6	11.50	51-6	940¢	51-6	940¢
52-6	11.75	52-6	11.75	52-6	960¢	52-6	960¢
53-6	12.00	53-6	12.00	53-6	980¢	53-6	980¢
54-6	12.25	54-6	12.25	54-6	1000¢	54-6	1000¢
55-6	12.50	55-6	12.50	55-6	1020¢	55-6	1020¢
56-6	12.75	56-6	12.75	56-6	1040¢	56-6	1040¢
57-6	13.00	57-6	13.00	57-6	1060¢	57-6	1060¢
58-6	13.25	58-6	13.25	58-6	1080¢	58-6	1080¢
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67-6	15.50	67-6	15.50	67-6	1260¢	67-6	1260¢
68-6	15.75	68-6	15.75	68-6	1280¢	68-6	1280¢
69-6	16.00	69-6	16.00	69-6	1300¢	69-6	1300¢
70-6	16.25	70-6	16.25	70-6	1320¢	70-6	1320¢
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72-6	16.75	72-6	16.75	72-6	1360¢	72-6	1360¢
73-6	17.00	73-6	17.00	73-6	1380¢	73-6	1380¢
74-6	17.25	74-6	17.25	74-6	1400¢	74-6	1400¢
75-6	17.50	75-6	17.50	75-6	1420¢	75-6	1420¢
76-6	17.75	76-6	17.75	76-6	1440¢	76-6	1440¢
77-6	18.00	77-6	18.00	77-6	1460¢	77-6	1460¢
78-6	18.25	78-6	18.25	78-6	1480¢	78-6	1480¢
79-6	18.50	79-6	18.50	79-6	1500¢	79-6	1500¢
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83-6	19.50	83-6	19.50	83-6	1580¢	83-6	1580¢
84-6	19.75	84-6	19.75	84-6	1600¢	84-6	1600¢
85-6	20.00	85-6	20.00	85-6	1620¢	85-6	1620¢
86-6	20.25	86-6	20.25	86-6	1640¢	86-6	1640¢
87-6	20.50	87-6	20.50	87-6	1660¢	87-6	1660¢
88-6	20.75	88-6	20.75	88-6	1680¢	88-6	1680¢
89-6	21.00	89-6	21.00	89-6	1700¢	89-6	1700¢
90-6	21.25	90-6	21.25	90-6	1720¢	90-6	1720¢
91-6	21.50	91-6	21.50	91-6	1740¢	91-6	1740¢
92-6	21.75	92-6	21.75	92-6	1760¢	92-6	1760¢
93-6	22.00	93-6	22.00	93-6	1780¢	93-6	1780¢
94-6	22.25	94-6	22.25	94-6	1800¢	94-6	1800¢
95-6	22.50	95-6	22.50	95-6	1820¢	95-6	1820¢
96-6	22.75	96-6	22.75	96-6	1840¢	96-6	1840¢
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F/F BUD TENNY Specialist Correspondent INDOOR

Information Exchange: Part of the fun in modeling is the exchange of information with others who have similar interests. With your help, a list of clubs and individuals in the U. S. and Canada who fly indoor models can be compiled and published to encourage contact with other groups. If interested, send your name (or club name) and address, tell what kind of indoor models you fly and what kind of site you fly in, to me, at Box 545, Richardson, Tex. 75080. ...

Indoor Postal Meets: A past column on indoor postal meets explained how ceiling height differences are averaged out with "fudge factors." Two such continuing postal meets within NIMAS (the National Indoor Model Airplane Society) are the Top Ten Easy B and the Top Ten Ceiling Dodgers.

The first event uses standard Easy B models in the usual postal meet fashion and is open to all indoor fliers. The Ceiling Dodgers event is limited to NIMAS members, and the goal is to see whose model can log the highest time without touching the ceiling. Any indoor model is eligible, but those of microfilm get the highest times.

Both Top Ten events work about the same way: flights are made according to AMA Rules with either an AMA Contest Director or a NIMAS member as witness. The ceiling height and flight time is submitted to Bob Putman, 507 Darlene, Arlington, Tex. 76012. Bob summarizes each month's results which are then published in *Indoor News and Views* (monthly NIMAS newsletter). Easy B models must conform to AMA Rules with these additional restrictions: (1) Paper covered only (condenser paper or Jap tissue); (2) Motor stick and tail boom must be solid wood except for thrust bearings, wing sockets and rear hooks; (3) Bracing of flight surfaces is not permitted. ...

More Volunteers: Additional instructors have volunteered to assist beginners in indoor flying. All names and addresses are available by requesting the F/F Instructors List from the Editor of AAM. ...

Condenser Paper Warpage: A frequent question about indoor techniques concerns covering paper stick models with condenser paper. It is very sensitive to moisture and often shrinks enough to warp the model. The problem is moisture; the solution is to insure that the paper is completely dry when it is attached to the model. Thus, when the relative humidity is high, the paper will sag a bit, but when it dries out the model will still be unwarped.

Numerous methods have been devised to prevent condenser paper warpage, including preshrinking the paper, but a covering "hot box" is the only way to ensure that the paper is completely dry. The hot box, with one side open for access, can be any box big enough to hold the model parts. Cover the opening with clear plastic and heat the box with a heat lamp mounted inside. Leave the model parts and the paper inside the container for half an hour. Then open the plastic cover and attach the paper to the model (work inside the box). This will ensure that the model will remain warp-free unless the paper actually gets water on it.

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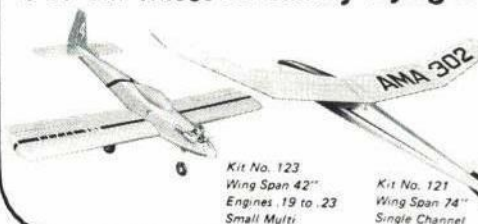
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Meuser on F/F

Continued from page 34

Lou Willis's Nats-winning Topper (see plan) weighed 21.5 oz. on each of the three officials. Lou thinks it is capable of 27 or 28. High thrust at low forward speed is the idea behind prop selection. That means moving lots of air, which requires a large-diameter low-pitch prop which holds the rpm down way below the power peak. But it is not the power into the prop that counts, it is the power output. Lou's one-blader makes sense. Lou feels that his win with a model built from old parts emphasizes that "we should have at least one free-flight event where luck is at a minimum."

Molding Laminated Props: Those who can overcome a masochistic compulsion to carve rubber model props long enough to try molding a laminated one may never go back. Carving a form to fit the underside of the blade takes about one fourth as long as carving a prop.

Bob Wilder's method is simple — molding and gluing is done in one step. Cut four sheets of medium-weight balsa, a little larger than the prop outline, for each blade. Soak in warm water for a few minutes, blot with a towel, and paint with water-thinned Franklin Tite-Bond glue. Strap the four sheets to the form with strips of 1/4-inch rubber or an elastic bandage — not too tightly. Let dry for four days. Voila! Trim to the final outline and sand the top surface to shape — the bottom surface is ready-made. From that point finish just like a carved blade.

Bob's version has the grain of each lamination set about 20 degrees off the centerline to give a slight plywood effect which should hold the airfoil true. The pitch on Bob Wilder's props decreases as the motor unwinds! Bob manufactures a torque meter

that sells for \$12.50, postpaid. Write him at 2010 Boston, Irving, Tex. 75060. . . .

Formica Cutting Board: Everybody knows that if balsa is stripped on a wooden cutting-board the razor will follow the grain and the result is wiggly strips. "Indoor" modelers cut on a sheet of glass, which lasts about ten minutes in most shops. Bob Lonseth — after his convalescence following an attempt at cutting balsa on his mom's formica counter-top — found that a formica-covered piece of plywood, a sink cutout, was inexpensive. With one edge milled straight, it serves as guide for sanding dihedral joints on hand-launch gliders. . . .

Mooney on F/F

Continued from page 35

model of the first Wright Flyer. Although it didn't place first, this beautiful model, flying in graceful circles, was most pleasing. Frank Rodgers did a wonderful job of building and flying. Even the propellers were scale. The rubber band motors and no pilot were the only deviations.

Doug Gordon, flying a Nieuport 11, was first in Junior Peanut. Fernando Ramos' 1920 Cessna took Peanut in the Open Class. Bill Watson's Supercub won Junior rubber scale, and Forest Allen won Open rubber scale with a partially scale Curtiss Robin. The Flightmasters score one point per second flight-time for the first minute, half a point per second for the second, a quarter point per second for the third, etc. Since a perfect model can earn at most 100 points in the scale judging — and no model came up to this difficult standard — flying points were quite important. Forest's model can really fly. He would probably have done as well in the scale judging if he had called his plane a Ryan M-1; the flying still would have carried it off. Fernando Ramos' superb 1920 Cessna in rubber scale hit the rafters

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in about a minute and then refused to recover from the ensuing dive. His was probably the only ship that could compete on a flight-time basis with Allen's Robin.

Other models of interest were: Sperry Messenger, Kinner Envoy, Isaacs Fury, Pilon JP-30, Blackburn All Steel, SE5, Mr. Mulligan, Fokker F II, D. H. Chipmunk, Miles M-18, Bellanca, Porter, Fairchild PT-19 and 24, ME-109, and half a dozen Volkspilanes. Even during the judging fun flying went on with models that had not been entered, among them an autogyro by Bill Hannan, and a helicopter by Bill Watson. With a single main rotor and a belt-driven anti-torque tail rotor, the helicopter flew quite well for about 15 sec.

Bill Hannan had Dave Stott's original Peanut Scale Waterman racer which took fourth at the last Nats, and it managed to take fourth again here.

McEntee on R/C

Continued from page 39

pilot can have a lot of fun with it. It's easy to bring a R.O. plane down — just hold a steep turn to develop a spiral dive. A towline and thermals should take care of going up. The Soaring Associates also engage in slope activity; here again, a rudder-only craft will provide a lot of flying. . . .

Tustin Model Club Trails: FAI record attempts will be sponsored by the Tustin (Calif.) Model Club, May 29-30, at El Mirage Dry Lake. This site provides a perfectly flat area, five miles by two miles. The club will provide winches, Hi-Starts and official FAI 300-meter towlines. Full-sized chase aircraft equipped with portable barographs for the altitude tries will be on hand. Sponsors will also be set up to record straight-line distance flights. Dust devils and therm-

als can be seen here up to 10,000 feet during most summer days. Temperature climbs well above 90 degrees. Dale Willoughby, CD, can supply information; write him, c/o Tustin Model Club, 14695 Candada Pl., Tustin, Calif. 92680. Trials will be AMA-sanctioned.

RC Gliders at Nats: A dozen or more glider enthusiasts met during the Toledo RC Conference to discuss rules, sites, etc., for an unofficial glider meet to be held during Nats week this summer. While close to Glenview N.A.S., it will be far enough away to obviate interference problems. Meet rules, drawn up by Dave Burt and Dan Pruss, were accepted by all present. There will be two classes — one for gliders with total wing area (wing plus stab) under 700 sq. in., and the other for those over that size — will participate. A contestant may fly in both categories if desired. Length of flights, set by the CD, will depend upon conditions. Unstretched Hi-Start length max is 492 feet; no hand-towing will be allowed.

Flights are to be scored for duration and negative points included. For example, if a ten-min. max is set, points will be subtracted for time in the air after the max. Points will also be given for spot landings. Contestants may have to take turns at timing, depending upon number of participants. Complete set of rules may be had from Dave Burt, 3048 Central Ave., Evanston, Ill. 60201.

Dan Pruss stresses that not many glider bugs were invited to the meeting at Toledo — simply because he didn't have many names on his list. He and Dave would be happy to hear from all glider groups and interested individuals, so that latest info on Nats glider competition may be more widely disseminated. While preliminaries will definitely be held at a field within reasonable driving distance of Glenview N.A.S., it is possible that the glider finals may be held on the air base — perhaps in the evening. . . .

RC Glider Rules: Currently half dozen or more sets of rules proposals for glider competition have been offered by clubs all over the country. We refer especially to rules for RC duration — spot landing competition, accomplished over flat country. Some points are generally agreed upon, but on most widely divergent views are held. Since an active RC glider competition season is coming up in many areas, a modeler going to half a dozen meets in various locations may have to accommodate himself to half a dozen sets of rules!

Hopefully, by the end of this flying season, it is likely the different views can be gathered together, possibly to the extent of setting up official AMA rules for gliders. Although most rules have been based upon the newly-official FAI regulations, most U.S. groups feel the FAI towline (or unstretched Hi-Start) length is too short. They would allow a much longer towline — up to 300 meters in several cases (FAI line length max is 150 meters, or 492 feet). Any official U.S. rules probably will permit this longer length — at least for one category.

Scoring generally differs from FAI specifications too; although there seems to be reasonable agreement on FAI glider size and weight maximums. Comment favors at least two glider size classes — divided either by wing span (over and under 100 feet has been suggested) or by wing area. Some rules prohibit use of RF telemetry of air current information from the glider (so-called "thermal sniffers" working via radio) — others don't. All in all, looks like a lively season coming up!

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TECHNICAL ITEMS
AERODYNAMICS

27 MHz vs. 72 MHz: Tom Rygasewicz asks what are the advantages vs disadvantages of the 72-76 MHz band compared to 26-27 MHz.

The presence of advantages or disadvantages is not the reason for existence of 72 MHz systems. The explanation lies in a brief chronology of RC frequency availability. In the early days of active RC, flying was done almost entirely on the 50-54 MHz Technicians Band, thus by a rather small, select group. The first Citizens Band operation was permitted on 27.255 MHz and the license was, and still is, examination-free. As RC became popular, the number of slots allocated to RC was expanded to include 26.995, 27.045, 27.095, 27.145 and 27.195 MHz, in addition to 27.255 MHz. Superheterodyne receivers were quickly developed to permit operation on these frequencies.

In addition, the RC operators in the 50-54 MHz band voluntarily adopted five frequencies requiring superheterodyne receivers, plus two superregen frequencies.

As the 27 MHz band became unbearably crowded, the quest for new frequencies was carried on by the AMA, through a select committee of RC flyers. Individuals and clubs contributed to an AMA frequency fund. By these efforts, the five frequencies in the 72-76 MHz band were secured. These efforts still need support by contributions to the frequency fund (mail to AMA headquarters, designate for the frequency fund). Many other people are interested in trying to capture these frequencies.

No advantages of 27 vs 72 MHz are overriding. However, 72 MHz is limited to model aircraft only; it is illegal to operate a boat, or other surface vehicle, with a 72 MHz system. Some problems have been encountered with the 75.64 MHz (Green-White Flag) frequency in certain metropolitan areas. If one is to operate in that frequency in known problem areas, a high-power transmitter in the region of 800 mw is recommended.

The crystals for 72-76 MHz are slightly more expensive since they must be ground to a closer tolerance. The added cost is absorbed by the manufacturers in new sets and the only time it becomes a factor is in replacement of a broken receiver crystal. It amounts then to an increment of only about \$4.00.

The low RF amplifier power output of 72 MHz vs 27 MHz is occasionally questioned. This is relative in that, while the output of most RF amplifier transistors if used at both 27 and 72 MHz will be less, the 72 MHz sets can use a full wavelength antenna for more efficient radiation than the loaded one-quarter wavelength antenna, normally used at 72 MHz. . . .

Encapsulated Servo Amplifier: An encapsulated IC servo amplifier the size of a sugar cube? Yes. A brief visit to the Orbit Electronics plant, complete with guided tour by Bob Dunham, revealed the continuing development in RC. Most striking was a completely encapsulated integrated circuit servo amplifier for the 1970 line of Datatron equipment (which now includes Micro Avionics). The leads for power, feedback pot and servo motor drive are the only discrete connections. Any integrated circuit promises a reliability increase of 100 to 1 over its discrete component equivalent. The Orbit IC amplifier is an integrated version of their PS-4D amplifier. While it offers a reliability increase, it is not repairable. Any internal failure is corrected by total replacement. A local electronics expert can do no more than the factory — replace the IC block at a fixed cost.

Vintage Aircraft Machine Guns

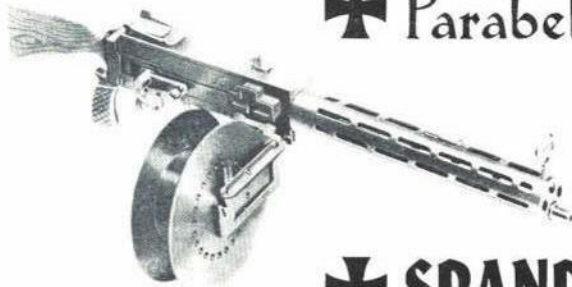
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SPANDAU



The SPANDAU was one of two Aircraft Machine Guns used on German fighter and reconnaissance aircraft. It was the favorite weapon of the Red Baron, the Ace of Germany's Air Corps. With an inline engine they were usually mounted in pairs, one on each side. On planes with a radial engine they were mounted side by side on top.

LEWIS



The American made LEWIS Aircraft Machine Gun was used on Allied fighter, bomber and observation aircraft during World War I. Employed singly, in pairs and in conjunction with other guns it generally was mounted at the rear cockpit for defense of tail by observer. Also used on pusher planes to put gun up front.

VICKERS



England's contribution to aircraft firepower was the VICKERS Aircraft Machine Gun. It was used extensively on Allied fighter and reconnaissance planes of World War I. It was mounted as a forward firing weapon, operated by the pilot, and synchronized, to fire between the propeller blades.

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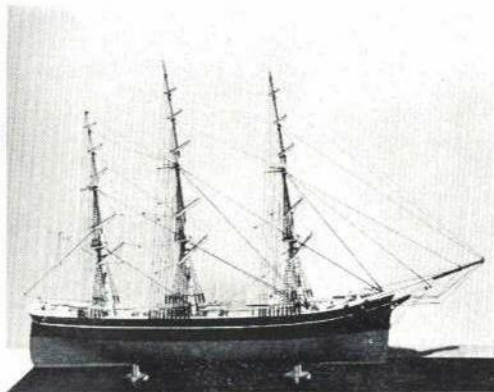
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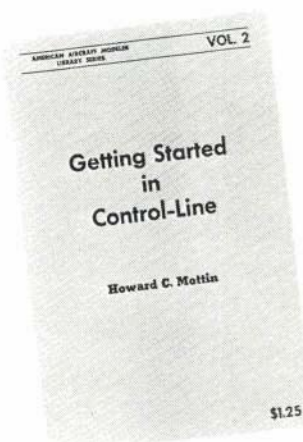
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Siposs on R/C

Continued from page 39

in second, with Roy Moody's immaculate roadster third.

In the accessories department, Indy R/C Specialties had tires and racing fuel to offer; Stihlman Engineering displayed an inertia starter. Tatone mufflers and gas tanks were on most cars, and even electric starters (Sonic-Tronics) were shown.

The car demonstrations drew the crowds to a nearby micro-midget track, an ideal spot to run cars before an always-packed grandstand.

There is no doubt that RC cars have arrived. With flying fields becoming scarce and more and more neophytes drifting into the hobby, model cars seem to be the answer to the average male with time on his hands and a desire to race. This year large scale club races will be conducted in each region every month. For a local schedule, write the nearest representative of the Radio Operated Auto Racing Association: Robert Valyou, 42 High St., North Billerica, Mass. 01862; David Palmetter, 5728 Fontana Dr., Fort Wayne, Ind. 46805; Robert Blair, 5572 Stanford, Garden Grove, Calif. 92641. . . .

ROAR Racing Rules: During the Conference, ROAR officers met and reached complete agreement on national racing rules. Car specifications, racing rules and track specs are all well-defined and are aimed at good, clean, close racing.

Those just becoming interested in this exciting new hobby should get a copy of REVUP, ROAR's official monthly bulletin. For a fully illustrated issue in newspaper format, send 50 cents to R.O.A.R., 2855 Velasco Lane, Costa Mesa, Calif. 92626. . . .

Please send me, in care of this column, shop hints, sketches and RC car humor. Both positive or negative experiences are needed, since the hobby is new and an exchange of views helps others.

Lowe on R/C

Continued from page 38

quired to recognizably (1) do touch and go landings from right- and left-hand pattern, (2) three consecutive inside loops, (3) three consecutive outside loops, (4) spin, (5) three consecutive axial rolls, (6) Cuban eight, (7) horizontal figure eight crossing over TX inverted, and (8) fly pylon course for five laps, and Exhibition Pilot—required to demonstrate complete AMA pattern.

All old members, at the beginning of the program, will be classified as sports pilots until they demonstrate more—or less—ability. New members will be classed as dual pilots until checked. This fine idea gives club members something to shoot for and promotes safety. It would seem that every club should have at least some minimum flying proficiency requirements to promote safety and reduce the hazard of losing flying sites. . . .

Navajo RC Needs Help: A plea from Art Brown who is teaching teenage Navajo Indians in the heart of the Navajo Reservation, Many Farms, Arizona, should not fall on deaf ears. Art's students have become fascinated by RC modeling through reading old model magazines and trying to fly Art's battered 1/2A RC planes. The kids have formed a school club and want to hold building and flying classes, but Art's resources and theirs are extremely limited. The group numbers 15 now, six times that many had to be turned away. These students and their families are poor; most are on welfare. For them, Art is making a plea for model magazines, excess airplanes, hardware, parts, wheels, engines, plans, and radio equipment. Kits, fuel and batteries and anything in the RC modeling line would be gratefully accepted. What better use could you make of that spare kit or

engine or engine or radio or — ? Contact Art Brown, Many Farms Elementary Boarding School, Many Farms, Ariz. 86503. . . .

Gimmicks and Gadgets: Wayne Groth has had trouble with dirt and debris in his fuel. He writes: "A couple of weeks ago I filtered almost a gallon of fuel. I was appalled by the debris, especially grass. If the manufacturer sent clean fuel, the debris got into the fuel can from the cap which had been on the ground while I filled my fuel bulb. I modified the fuel container (I prefer a plastic container so that I know how much fuel is left) to eliminate the dirt problem; Two $\frac{1}{8}$ " x $\frac{1}{2}$ " brass tubes were cut. One tube had a small brass lip soldered to it. A hole was drilled in the lip. These two tubes were roughened and epoxied into the container cap. Caps for the $\frac{1}{8}$ in. tubing were made of $\frac{3}{32}$ x $\frac{1}{2}$ " tubing. A small piece of sheet brass was soldered over one end of each cap tube. A lip was left to provide an attachment point for a piece of wire so the caps will not be lost. Holes were drilled in the cap lips. A piece of surgical tubing long enough to reach the bottom of the fuel container was slid onto one of the tubes. A clunk filter was slid on the other end of the tubing. I also use a filter on my airplane. This arrangement works well."

Mufflers are catching on. More clubs are requiring their use. An inexpensive and apparently effective home remedy by Bruce Sunseni is made from an empty 30-06 shell. He simply makes a cutout on the side of the shell to fit the particular engine and straps it on. . . .

Michael Jones' idea for vibration isolation of servos is a variation on the foam tape idea modelers have used for some time. He uses strips of $\frac{1}{16}$ or $\frac{1}{8}$ -in. tape (sticky on both sides) between the servo mounting flange and a plywood mounting tray. Additional isolation can be achieved by mounting the plywood tray to hardwood fuselage cross-

pieces with the same kind of tape. I believe that Maynard Hill used this basic idea in his FAI record-attempt speed jobs to isolate the excessive vibration of huge engine in a small airplane.

The effect of engine vibration on servos is probably the largest single cause of equipment failures. Receivers, batteries and wiring are easy to vibration-isolate, but servos must be firmly installed to transmit the necessary control forces.

McCullough on R/C

Continued from page 39

Buy brands you know or check results before ruining a light colored model. Masking with paper tape is often disappointing in other respects. For a really sharp, un-fuzzy line and little leakage, try ordinary Scotch transparent tape. It is harder to remove, often tears, requires some cleanup of fragments of edge not pulling loose, but the trouble is worth it. Pulling the tape over itself helps cut through the dope film. For heavy thicknesses of dope, trace around the tape with a new, sharp No. 11 X-acto before removing. Curved lines can be cut into the tape on the model if care is taken.

Scale Data Sources: Imperial War Museum, Lambeth Road, London S.E. 1, has an extensive WW I and WW II photo collection of all British aircraft and some Allied and enemy types. List wants, and Photographic Librarian will supply photo numbers and descriptions. For air mail reply include International Reply Coupons. Reasonable prices: $3\frac{1}{2}$ x $5\frac{1}{2}$ " — 20 cents, 4 x 6" — 35 cents, 6 x 8" — 45 cents, 8 x 10" — 75 cents, 12 x 15" — \$1.05, 20 x 24" — \$2.15. Black and white transparencies: 35 mm. — 35 cents. Postage extra. Money may be remitted to England by personal check or money order.



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BILL BOSS is "General Correspondent for C/L." He will be supported by JOHNNY SMITH on FAI and Speed, including Racing Events; with JOHN BLUM on Carrier and Stunt. The General Correspondent will also cover Scale, Sport and Technical items.

RADIO-CONTROL

DON LOWE is "General Correspondent for R/C." He will be supplemented by the following specialists: HOWARD MCENTEE on Gliders and FAI activities; FRED MARKS on Technical Items, including Electronics and Aerodynamics; CLAUDE MCCULLOUGH on Scale; BOB MORSE covering Formula I and II and Open Pylon; GEORGE SIPOSS on R/C Model Car Racing and Sport; JIM MOYNIHAN ON R/C Boating. Again, the General Correspondent covers Sport and also Competition Pattern.

GET "WHERE THE ACTION IS"

This feature department is for you, the reader. AAM encourages YOU to submit to us ideas, photos, commentary, rules suggestions, questions, drawings, sketches, reports of your local meets, etc. Address your letter to one of the experts or a General Correspondent, c/o AAM's editor, 733 Fifteenth St., N.W., Washington, D.C. 20005. Letters will be reviewed and forwarded to the appropriate correspondent.

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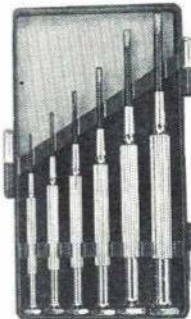
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Blum on C/L

Continued from page 37

to the situation, the UC fraternity could do well to promote its own study. Mufflers are being used by some Stunt fliers but meet with considerable opposition in Carrier. Individual complaints seem to parallel those in the VFSS survey. Mufflers will be required in FAI Stunt in 1971. . . .

Midwest USAF Event: The U. S. Air Force will hold its Internationals Competition July 15-19, at Scott Air Force Base near Belleville, Ill. Entry is open only to Air Force personnel who have qualified through individual base eliminations. Winners of the Scott events will form the Air Force team which goes to the Glenview Nationals. . . .

Full Competition Power: Bill Johnson uses a full-competition power setup on a Guillow Trainer for experimentation and demonstration only. AMA rules do not permit this type of engine and fuel system in Profile Carrier event. Note the auxiliary crank at each side of the engine-mount platform. Inboard crank is shorter than the outboard one to create more throw for the slide. Each has a series of holes located vertically to permit relocation of pushrods for maximum efficiency and better adjustments.

Set up on the K&B 40 is Bill's fuel-metering device located just above the venturi. This permits finer adjustment of increased fuel flow on low-speed and is operated by the lower pushrod on the outboard crank. Each crank is connected by 1/16-in. axle and is activated by the Roberts Crank.

Boss on C/L

Continued from page 36

and Jim Bisson, third. This year promises to be just as exciting. Interested combat fliers should contact Ron Malcom, CD, Acton Hi-Flyers ACE, Box 815, Acton, Ont., Canada. . . .

Correction: To correct a goof made in the '69 Nat's Combat coverage in the January column, it was Flite-Line Products, rather than Top Flite, that put out the Nat's winning Vampire. This many-time (1966-1969) Nat's winner has foam wing construction, and the new Vampire kits now use a Foamskin self-sticking covering—all to make the building faster and easier.

Scale Item: Last month's column outlined the procedure for making scale rudder pedals. Here is a basic control system to make them operational. Positioning of the rudder-pedal pivot and control rods is illustrated in the first sketch. The method used to fasten the rudder pedal pivot to the cockpit floor and the distance from the pivot to the control rods depends on the scale size of the plane and the type of cockpit floor. Final installation is up to the builder.

The second sketch shows a basic rudder-pedal hookup for a single-seater plane. This system can be expanded for a two-seater by adding another set of pedals at the appropriate location on the main control rod. As shown, the pedals can be operated when the plane is equipped with a Roberts-type unit for throttle control. As the plane is put in low speed, the cable attached to the throttle control rod operates the rudder to the outside of the circle. This in turn causes the rudder pedals to be actuated as indicated by the directional arrows.

This system not only gives operational rudder pedals, but also provides the benefit of rudder operation for keeping good line tension during low-speed flying. The spring attached to the bellcrank provides a positive return of the rudder to its neutral position. Experiment to find the proper spring tension. The entire system is mounted on the cockpit floor—with the possible exception of the flying control unit, which can

be mounted on the cockpit floor or in the wing. . . .

Ideas, Please: Readers no doubt have many ideas or special methods used in building scale craft. Why not share them with other scale modelers? Let's hear from you.

London To Paris With Scale Model Planes: The St. Louis *Globe Democrat* is sponsoring a 60th Anniversary London to Paris Commemorative Air Race in cooperation with the Greater St. Louis Modeling Association. To be held Sunday, Sept. 27, the race is based on the movie, *Those Magnificent Men and Their Flying Machines*. Most models will probably be 2" scale (RC models), however, any scale is acceptable.

The *Globe Democrat* would like to know how many entries to expect; therefore, anyone interested in participating should write to Albin R. Signorino, 11959 Glenvalley Dr., Bridgeton, Mo. 63043, to list the intent to enter and the type of plane to be flown.

Planned to be more fun than competition, the race will be over a closed course or an easy overland route. However, winners will be determined and awards given. In addition, a WW I (Scale and Semi-Scale) Fly-For-Fun event, with prizes, is planned. An Antique Vintage and WW I rubber-powered contests, as well as a similar UC event, may also be held the same day at the same site, Buder Park in Valley Park, near St. Louis.

AMA Contest Calendar

Continued from page 62

June 13-14 — High Point, N. C. (AAA) 1970 S.E. CL Model Championships. Site: Exchange Model Air Park, L. Underwood, Sr. CD, 1507 Whitehall Dr., High Point, N. C. 27262.

June 13-14 — Houston, Tex. (AA) Houston RC Club RC Contest. Site: Houston RC Field, L. King CD, 3303 Ripplebrook, Houston, Tex. 77045. Sponsor: Houston RC Club.

June 13-14 — Fort Worth, Tex. (AAA) Texas State CL Championships. Site: Boaz Model Park, B. Davis CD, 1613 Carl, Fort Worth, Tex. 76103.

June 13-14 — Spokane, Wash. (AAA) Spokane FF, CL & RC Internats. Site: Spokane Int'l Airport, R. Hepker CD, Wash. Air National Guard, Spokane Int'l Airport, Spokane, Wash. 99219.

June 13-14 — Kansas City, Mo. (AA) KCRC Annual Meet. Site: Lake Jacobo, B. Drummond CD, 9115 Charlotte, Kansas City, Mo. 64137. Sponsor: Kansas City RC Assn.

June 14 — Johnsville, Penn. (AA) FF Fling. Site: Johnsville N.A.D.C. T. Kerr CD, 7825 Lexington Ave., Philadelphia, Penn. 19152.

June 14 — Queens, N. Y. (AA) 2nd Annual Forest Park CL M.F.C. Site: Flushing Meadow Park, F. Howard CD, 91-18 108 St., Richmond Hill, N. Y. 11418.

June 14 — Ohio City, Oh. (AA) Club RC Contest. Site: Club Field, D. Kraner CD, RR 1, Ohio City, Oh. 45874. Sponsor: SHOO Flyers MAC, Inc.

June 14 — Westfield, Ind. Hamilton County Fly for Fun Meet. H. Vandiver CD, 28 Wilson Dr., Carmel, Ind. 46032. Sponsor: Hamilton Flying Modelers.

June 14 — Endicott, N. Y. (AA) 5th Annual Northeast RC Pylon Racing Championships. Site: Tri-Cities Airport, R. Noll CD, 96 Pine Knoll Rd., Endicott, N. Y. 13760. Sponsor: Aeroguidance Society, Inc.

June 14 — Riverdale, Ill. (AA) Chicago CL Model Masters Meet. Site: Kickapoo Forest Preserve, A. Kelley CD, 4616 S. Harvey, Western Springs, Ill. 60558. Sponsor: Chicago Model Masters.

June 14 — Van Nuys, Calif. Flightmasters 1st Annual RC Scale R.O.W. Contest. Site: Lake Elsinore, J. Bailey CD, 11161 Mansel Ave., Inglewood, Calif. 90304. Sponsor: N.A.R. Flightmasters.

June 14 — Dayton, Oh. (AA) Buzzards Spring CL Fly-in. Site: Municipal Flying Circles, J. Martin CD, 551 Aberdeen, Dayton, Oh. 45419. Sponsor: Dayton Buzzin' Buzzards.

June 14 — Council Bluffs, Iowa (AAA) 7th Annual CL Midwestern Model Airplane Meet. Site: Iowa School for the Deaf, D. Hutcheson CD, 317 Spencer, Council Bluffs, Iowa 51501. Sponsor: Balsa Busters.

June 20-21 — Oilville, Va. (AA) R.A.R.C. 10th Annual RC Meet. Site: Oilville Field, F. Gregg CD, 12709 Richmond St., Chester, Va. 23831. Sponsor: Richmond Area Radio Control Club.

June 20-21 — Dallas, Tex. (AA) Sun & Run FF Rally. Site: Preston Rd., N. B. Chenault CD, 5906 Jim Miller Rd., Dallas, Tex. 75228. Sponsor: Cliff Cloud Climbers of Dallas.

June 20-21 — Denver, Colo. (AA) 12th Annual Mile Hi RC Contest. Site: Lowry AFB, H. Geller CD, 6920 E. Exposition, Denver, Colo. 80222. Sponsor: Mile Hi Radio Control Club.

June 20-21 — Dayton, Oh. (AAA) Wright Brothers Memorial 8th Annual RC Meet. Site: Wright-Patterson A.F. Base, D. Lowe CD, 5936 Clarvon Dr., Dayton, Oh. 45430. Sponsor: Western Ohio Radio Control Society.

June 20-21 — San Jose, Calif. Wavemasters Annual RC Contest. Site: Wavemasters Field, K. Wilson CD, 728 Bolivar Dr., San Jose, Calif. 95123. Sponsor:

San Jose Wavemasters RC Club, Inc.

June 20-21 — Davenport, Iowa (AA) Davenport RC Society 2nd Annual RC Meet. Site: Scott County Park. W. Kroeger CD, 3820 Homestead, Davenport, Iowa 52802.

June 20-21 — Wallops Island, Va. (AA) MARKS Annual RC Meet. Site: Wallops Station. H. Jones, 59 Aighurth Ave., Towson, Md. 21204. Sponsor: Mid Atlantic Radio Control Society.

June 20-21 — Kent, Wash. (AAA) EMA Model Aeronautics FF, CL & RC Scholarship Contest. Site: Boeing Aerospace Center. J. Crosetto CD, 14809 SE 54th, Bellevue, Wash. 98004.

June 20-21 — New Orleans, La. (AA) Crescent City Spring RC Contest. Site: C.C.R.C. Club Field. G. Myers CD, 808 Mystic Ave., Gretna, La. 70053.

June 20-21 — San Jose, Calif. (AA) Wavemasters Annual RC Contest. Site: Wavemasters Field. K. Wilson CD, 728 Bolivar Dr., San Jose, Calif. 95123. Sponsor: San Jose Wavemasters RC Club.

June 20-21 — San Jose, Calif. Wavemasters Annual RC Contest. Site: Wavemasters Field. K. Wilson CD, 728 Bolivar Dr., San Jose, Calif. 95123. Sponsor: San Jose Wavemasters RC Club.

June 20-21 — Ft. Worth, Tex. National Fun Fly Championships. Site: Thunderbird RC Field. B. Luter CD, 6029 Walraven Cir., Ft. Worth, Tex. 76133.

June 21 — Westhampton, L.I., N.Y. (AA) Suffolk Falcons' "Early Flyers" RC Scale Meet. Site: County Rd. 31, North Side and adjacent to Suffolk A.F.B. Fence. D. McGovern CD, P.O. Drawer E, 140 Wagon Ln., W. Centereach, L. I., N. Y. 11720. Sponsor: Suffolk Falcons Club.

June 21 — Urbana, Ill. (AA) Aeronaut's 8th Annual Model Plane CL Meet. Site: Illini Airport. J. Fruit CD, 406 E. Newkirk, Tuscola, Ill. 61953. Sponsor: Champaign-Urbana Aeronauts.

June 21 — Portville, N. Y. Olean MAC Fly for Fun RC Meet. Site: Rt. 305 South off Rt. 17. E. Evans CD, Box 87, N. Main, Richburg, N. Y. 14774. Sponsor: Olean Model Airplane Club.

June 21 — W. Suffield, Conn. (A) Nor-East Air RC Races. Site: Peterson Farms. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Conn. Radio Control Club.

June 21 — Salem, N. H. (AA) Salem CL Model Fair. Site: Salem High School. R. Sherman CD, 408 River Rd., Tewksbury, Mass. 01876. Sponsor: Lawrence Air-Istoerats.

June 23-24-25 — Taft, Calif. (AAA) S.A.M. FF Old Timer Championships. Site: Gardner AFB. J. Pond CD, 4135 Avati Dr., San Diego, Calif. 92117.

June 27-28 — Des Moines, Iowa (AA) Des Moines Modelaires RC Scale & Pylon Rally. Site: Des Moines Model Field. J. Bonanno CD, 201 S.E. Rose, Des Moines, Iowa 50315. Sponsor: Des Moines Modelaires.

June 27-28 — Detroit, Mich. (AA) 18th Annual Great Lakes RC Championships. Site: 18 Mile & Mound Rd. H. Mottin CD, 2124 Common Rd., Warren, Mich. 48092. Sponsor: Radio Control Club of Detroit.

June 27-28 — Greenville-Spartanburg, S. C. (AAA) S.C. RC State Championships. Site: W.C.R.C. Flying Field. J. Nicholson CD, 105 Greenbriar Rd., Spartanburg, S. C. 29302. Sponsor: Western Carolina RC Club.

June 27-28 — Wichita, Kans. (AAA) Midwestern 10th Annual FF, CL & RC Championships. Site: Beech Field. J. Finley CD, 5217 E. Murdock, Wichita, Kans. 67208. Sponsor: Wichihawks.

June 27-28 — Winter Park, Fla. Rendezvous 10th Anniversary RC Meet. Site: RCACF Field. T. Drake CD, 12222 Via Estrella, Winter Park, Fla. 32789.

June 28 — Cook County, Ill. (AA) Skylarks 3rd Annual "A & B" w/scale RC Meet. Site: Forest Preserve. R. Swindell CD, 90 N. Wolf Rd., Wheeling, Ill. 60090. Sponsor: Skylarks RC of Illinois.

June 28 — Valley Park, Mo. "Spirits vs. Chasers Challenge" Meet. Site: Buder Park Field. T. McGinnis CD, 7491 Amherst, University City, Mo. 63130. Sponsor: Spirit of St. Louis RC Club.

June 28 — Cahokia, Ill. (AA) McDonnell Spring FF Contest. Site: Parks Air College. N. Burgdorf

CD, 9822 Whitcomb Ln., St. Louis, Mo. 63123. Sponsor: McDonnell FF Club.

June 28 — Chicago, Ill. (AAA) 5th Annual Aero Angels Model CL Meet. Site: Irving & Cumberland Forest Preserve. D. Hardt CD, 7371 N. Lincoln, Lincolnwood, Ill. 60466. Sponsor: Chicago Aero Angels, Inc.

June 28 — Boise, Idaho (A) Summer CL Fly-In. Site: Ann Morrison Park. G. Prouty CD, 3117 Redway Rd., Boise, Idaho 83704. Sponsor: Boise Model Airplane Association.

June 28 — Hempstead, N. Y. (AA) Meroke 6th Annual RC Meet. Site: Mitchell Field. R. Geyer CD, 913 Washington St., Baldwin, N. Y. 11510. Sponsor: Meroke RC Club.

June 28 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W. Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

June 28 — St. Clair Shores, Mich. (AA) St. Clair Shores Modelers 16th Annual CL Meet. Site: Kyte Monroe Playfield. T. Craft CD, 19525 Williamson Dr., Mt. Clemens, Mich. 48043. Sponsor: St. Clair Shores Modelers.

June 28 — Muscatine, Iowa (AA) First Annual Skylarks CL Contest. Site: Muscatine Airport. F. Brewer CD, 706 Walnut St., Muscatine, Iowa 52661.

June 28 — Canton, Oh. (AA) Canton RC's 10th Annual Pattern RC Contest. Site: Club Field. G. Villard CD, 3001 23rd N. W., Canton, Oh. 44708.

June 28 — Rochester, N. Y. (AA) United Pylon Racing Circuit RC Meet. Site: Monroe County Model Airport. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215. Sponsor: Radio Control Club of Rochester.

July 4-5 — Ayer, Mass. (AAA) Yankee FF Championships. Site: Ft. Devens. R. Harlan CD, 15 Happy Hollow Rd., Wayland, Mass. 01778.

July 4-5 — Sebring, Fla. (AAA) Confederate FF & CL Nats. Site: Sebring Air Terminal. R. Myers CD, 3935 SW 12th Ave., Miami, Fla. 33165.

July 5 — Mentor, Oh. (AA) MARCS All RC Pylon Day. Site: Club Field. F. Vidmar CD, 26500 Zeman Ave., Euclid, Oh. 44132.

July 11-12 — Oak Corners, N. Y. Sky Rovers Hobo RC Fun Fly Meet. Site: Club Field. H. Ford CD, 11 Stephens St., Clifton Springs, N. Y. 14432.

July 11-12 — Oklahoma City, Okla. (AAA) Sooner State FF & CL Model Aviation Championships. Site: North Western & Memorial Rd. F. Miller CD, 1900 Rolling Ridge, Bethany, Okla. 73008.

July 12 — Marysville, Oh. (AA) Pay-Load Cargo-Rubber Cargo FF Competition. Site: Lee Farm & Airstrip. W. Chambers CD, 3041 Atwood Terr. Columbus, Oh. 43224. Sponsor: Central Ohio Free Flight Club.

July 12 — Ohio City, Ohio (A) RC Club Contest. Site: Club Field. D. Kraner CD, RR 1, Ohio City, Oh. 45874. Sponsor: SHOO Flyers MAC, Inc.

July 12 — Columbus, Oh. (AA) 5th Annual Northland CL Championships. Site: Northland Shopping Center. C. Hemmerly CD, 5607 Sandalwood Blvd., Columbus, Oh. 43229. Sponsor: Capital City Controllers.

July 12 — Davenport, Iowa (AA) 13th Annual Model Airplane CL Meet. Site: Davenport Airport. R. Mairet CD, 3009 Westmar Dr., Bettendorf, Iowa 52722. Sponsor: Davenport MAC.

July 12 — Hastings, Minn. (AA) MMAC Summer FF Meet. Site: Webers Airstrip. H. Langevin CD, 4854 Aldrich Ave., S. Minneapolis, Minn. 55407. Sponsor: Minneapolis Model Aero Club.

July 12 — Hadley, Mass. (AA) Hampshire Showdown RC Air Races. Site: 1/4 Mile N. of Coolidge Bridge. R. Barkowski CD, 32 Lyman St., Easthampton, Mass. 01027. Sponsor: Hampshire County Radio Controllers.

July 18-19 — E. Meadow, L.I., N.Y. (AA) 3rd Annual Nassau Aero Guidance Society RC Meet. Site: Mitchell Field. H. Goldkian CD, 49 Ave. "O", Brooklyn, N. Y. 11204.

July 19 — Jamestown, N. Y. (AA) United Pylon Racing Circuit RC Meet. Site: Winch Rd., Lakewood, N. Y. H. DeBolt CD, 3833 Harlem Rd., Buffalo, N. Y. 14215.

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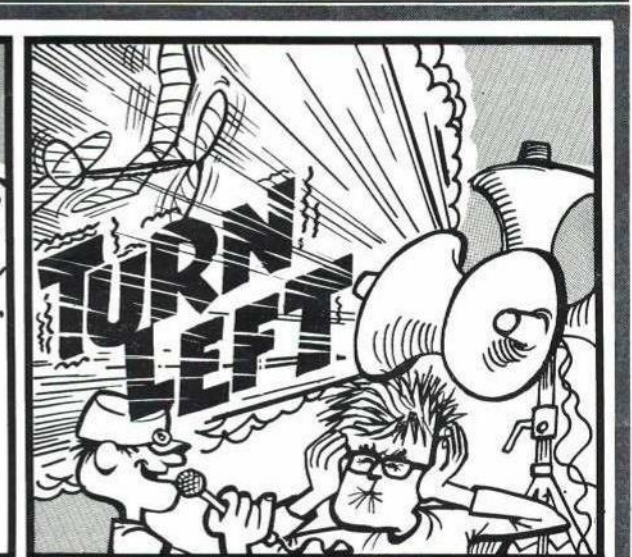
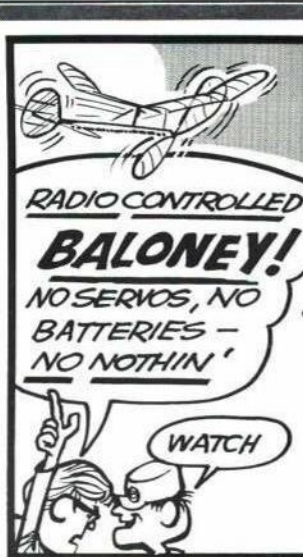
July 19 — W. Suffield, Conn. (A) Nor-East RC Air Races. Site: Peterson Farms. B. Williams CD, 347 Southwick Rd., Westfield, Mass. 01085. Sponsor: Northern Conn. Radio Control Club.

July 26 — Eugene, Ore. (AA) Eugene Model CL Aeromeet. Site: Mahlon Sweet Airport. R. VanDell CD, 869 Armstrong, Eugene, Ore. 97402. Sponsor: Eugene Prop Spinners.

July 26 — Fresno, Calif. (A) Fresno's Monthly FF Contest. Site: Near Kerman, Calif. F. Gallo CD, 1725 Kenmore Dr., W. Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

July 27-28 — Glenview, Ill. Nats Week RC Glider Event. Site: To be announced. D. Burt CD, 3048 Central St., Evanston, Ill. 60201.

July 27-Aug. 2 — Glenview Naval Air Station, Ill. (AAAA) National Model Airplane Championships. Traditional Events. For a Nats entry form send a self-addressed, stamped envelope to: Academy of Model Aeronautics, 1239 Vermont Avenue, N. W., Washington, D. C. 20005.



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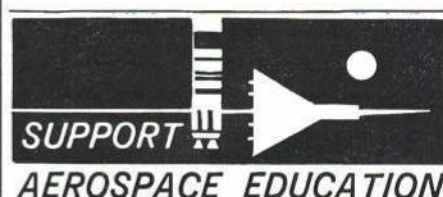
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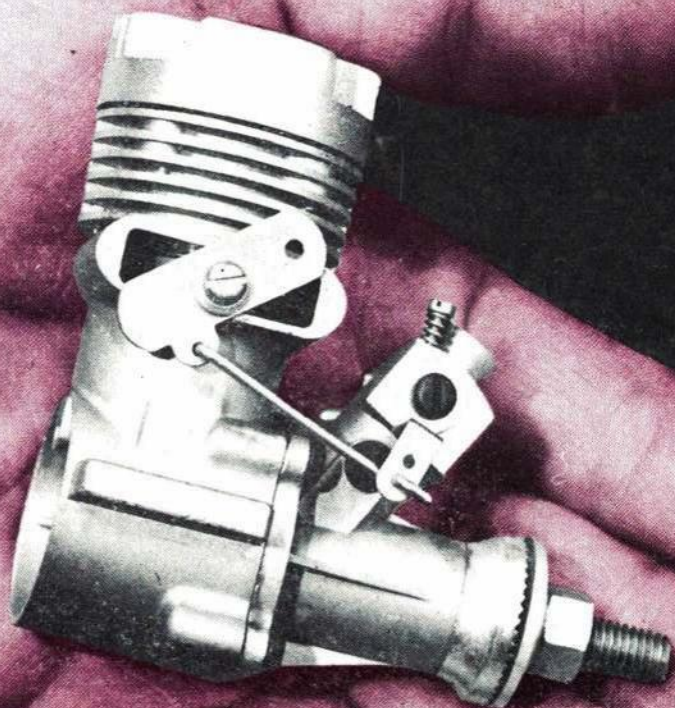


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