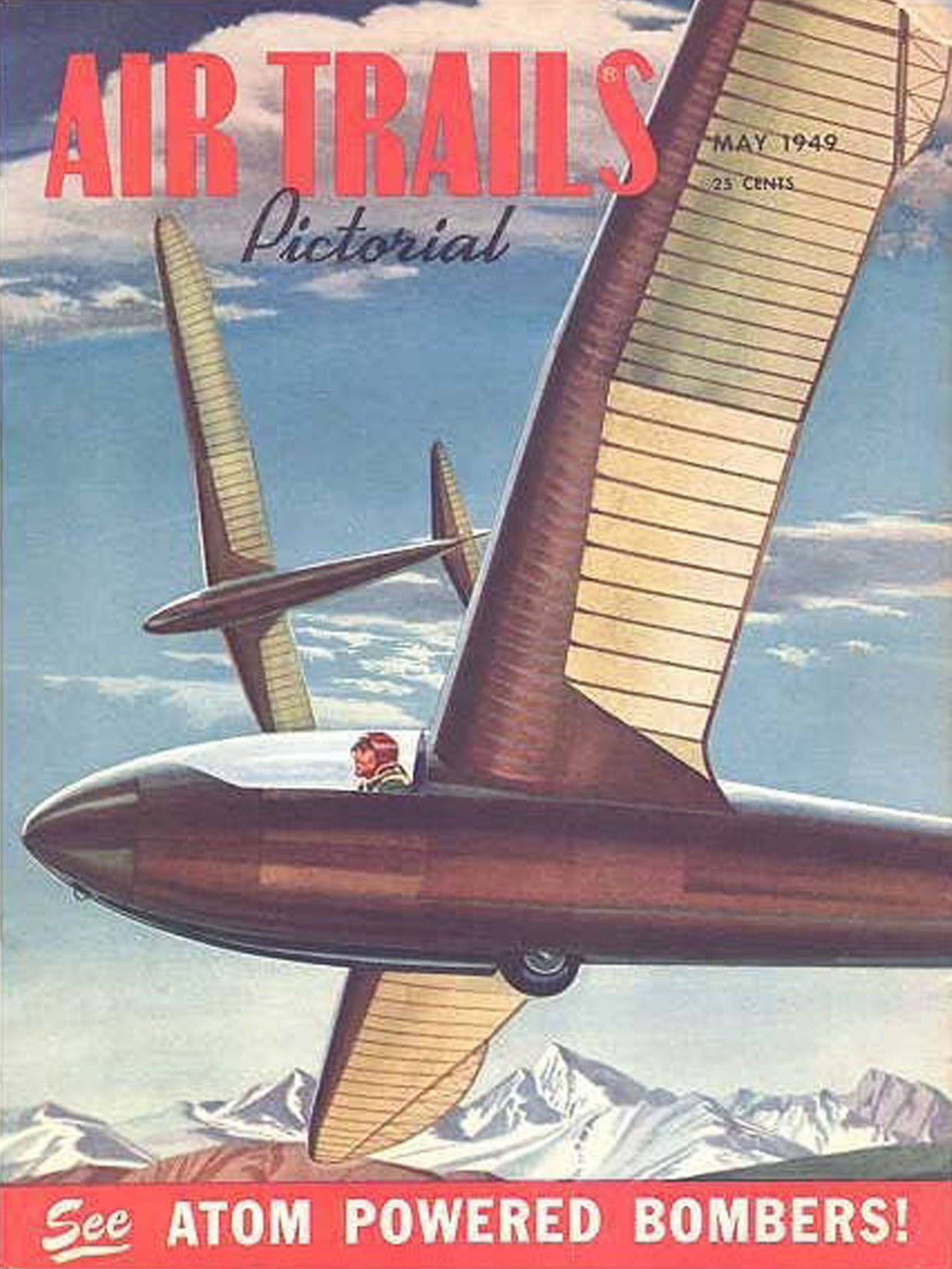
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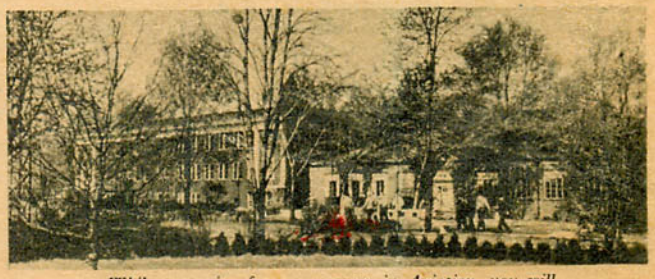

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AIR TRAILS Pictorial

MAY, 1949 • VOL. XXXII, NO. 2

The two sailplanes illustrated on this month's cover are soaring on the "standing wave," a condition discovered fairly recently in mountainous terrain. By utilizing it, motorless craft can reach extremely high altitude. Standing wave is recognizable by peculiarly shaped clouds suspended in the lee of mountain ranges.

THE READERS WRITE:

CAP Assist

Sirs:

We are in receipt of numerous letters, forwarded by your office, from air enthusiasts interested in becoming members of the California Wing of Civil Air Patrol, and we wish to extend our sincere thanks for your thoughtfulness and courtesy in forwarding these letters to our office.

The work of Civil Air Patrol in creating and maintaining a keen interest in aviation among civilian populations, and providing a pool of trained aviation personnel is recognized as vital, and your splendid magazine is helping along the invaluable endeavor of creating in young America the desire to fly, and aiding in the task of providing the huge reservoir of pilots and trained personnel which will keep America to the fore in the world of aviation.

D. E. CARSON
1st Lt., CAP, Wing Adjutant
Los Angeles, Calif.

Long Trip to Newsstand!

Sirs:

I have been threatening to write you for some time and express my feelings toward your magazine. Words can hardly express the thorough enjoyment I receive from it . . .

By the (letter) heading you have probably noticed the Lima, Peru, address. I have been down here almost 2 years and find things quite hard to purchase and also few substitutes. But I still keep going at it. One of the planes I fly regularly is the Upstart model with a McCoy 60, another is the Beelzebub. Both are good, consistent flyers. I have also made other of your models and every one of the plans has been satisfactory.

Oh, yes, maybe I should mention that I have been a pilot for 11 years and am now flying with P. I. A. (Peruvian International Airways). I pick up Air Trails in Panama (as that is as far north as I (*Continued on page 9*)

Letters to the Editors
All communications to the Air Trails editorial offices should be sent to Air Trails, Box 489, Elizabeth, N. J.

IN THIS ISSUE:

DEPARTMENTS

• AIR TRAILS PICTORIAL published monthly by Street & Smith Publications, Inc., at 775 Lidgerwood Ave., Elizabeth, N. J. Re-entered as second class matter August 16, 1948, at the post office at Elizabeth, N. J., under the Act of March 3, 1879. Authorized as second class mail, Post Office Dept., Ottawa. Copyright, 1949, by Street & Smith Publications, Inc. General and executive offices at 122 East 42nd St., New York 17, N. Y. 25c per copy—$2.50 per year. $2.75 per year in countries of the Pan-American Union; $3.00 per year in Canada; $3.25 per year elsewhere.

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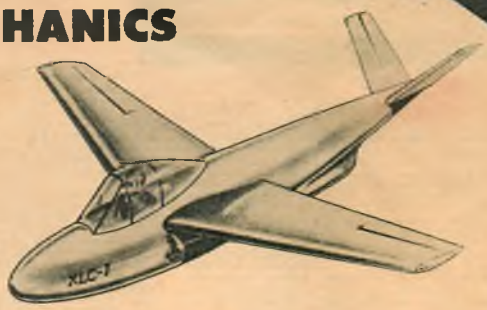

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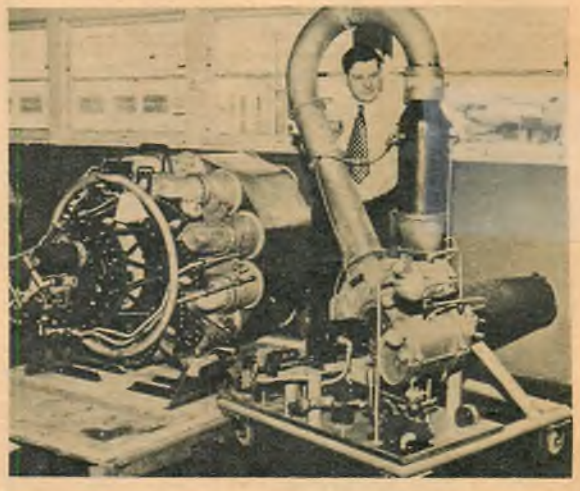

CAL-AERO STUDENTS ACTUALLY DESIGN ORIGINAL MIDGET JET PLANE — IN ADDITION THEY HAVE DEVELOPED AND ARE BUILDING ITS JET POWER PLANT

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Universal Needle Valve ... .50
Flexible ..... .75
Needle Valve Exten. Flexible .35
Log Book ..... .10
Extension Shaft 4½" 2.00
Bolts & nuts, ¾" 1"; 1½"; 12/ .20
D-E Fuel Shut-off Valve .. 1.00
Plastic Fuselage 19" set of 2 .50
Tissue (most colors) 20"x24" .05
Silkspan, light 18"x24" (white) .05
heavy 24"x36" (white) .05
Red, Blue, Yellow 24"x20" .10
Bamboo paper, 25"x16" - white, blue, green ..... .10
Silk per yard 1.50
Brushes ..... 10¢, .20
Cement (tube) ..... 10¢ & .25
Wood Stripper ..... .25
Wood Control handle ..... .25
Metal Handles ..... 1.00 & 1.25
Wood Control Reel 5½" 1.25
E-Z Wood Control Handle .. .25
Simplex Handle & Reel 1.25
Metal Flight Reel 1.25
Reel, Handle, Crank kit 1.00 & 1.25
Stunt Bellcrank & Flev. horn. .25
Contr-Assem. (bellcr. & horn) 1.25
Elevator control horn .... .25
Horns (bellcr.) 2"-10¢, 4" .. .15
Speed Indicator Tables .... .10
Elevator hinges 4 for .... .10
Swivels, small 15psi; large .20
Adjustable Push Rod set .. .25
Take-off Dolly kit 1.00
2 Speed Relay 2.00

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Sea Bird Hydroplane 24" BCD	4.95
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3 Ready-to-run Leaders

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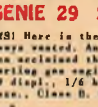

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With features that step-up power, give longer life with lighter weight. Class B, .292 displ., 1/6 h.p. 6800 rpm, weight 4¼ ozs.

DUAL RAM INCL. GLO PLUG $6.95

Landing Gear Wire /Ft. 1/32"	.05
1/16" - .06; 3/32" - .10; 1/8"	.10
Landing Gear J-bolts, 4 for	.25
Landing Gear washers 3/32", 1/8" 12 for	.05
Celluloid 8" x 10"	.10
Ball Bearing Washers 1/4, 3/8, 10	
Plastico Rce	.15
Fillet Fill	.35
Wheel Collar & Rub. pr. ..	.25
Copper Tubing 1/8" OD, per ft.	.20
Brass Tubing 1/16", 3/32", 1/8"	.25
Sheet Aluminum (sq. ft.) .919"	.35
.020" - 55¢; .032" - 75¢; .064"	1.25
Sheet Brass (3"x12") 1/64"	.30
1/32"	.35
(12"x12") 1/64"	1.10
1/32"	1.80
Plywood (6"x12") 1/32" -	.20
1/16" - 25¢; 1/8" - 30¢; 1/4"	.35
Masking Tape 1/4"x3 ft. ...	.10
3/4"x30 ft. ...	.29
Sandpaper, assorted pack.	.10
Soldering Set	2.25

U-CONTROL ACCESSORIES

Aristrol Plastic Handle ..	.75
Stainless Steel Wire 100 ft.	40 ft. .50
Stranded Speed Wire	55 ft. .50
70 ft. 1.35; 100 ft. 1.85; 200 ft.	3.00
Ferrycraft Swivel Tach ...	2.00
U-Ready Contr. -7.50; cable	8.50
U-Ready Remote	12.50
Jem Contr. Handle (pistol grip)	2.50
Wood Gas Contr. Handle, Reel	2.85
Thumb-it Control Handle ..	1.95
Control-it Elev. Contr. Unit	1.95
Delphin 21" A-B	6.50
Comanche 30" A-B	5.95
G-Gee Hydropl. 28" C-D	5.95
G-Gee Built-up 28" C-D	10.95
Chris-Craft Cruiser 36" C-D	5.50
Owens Yacht 26" B-C-D	5.50
Marco 25" B-C-D	5.50
Chris-Craft Runabout 25" RCDS	5.50
Chris-Craft Express 25" RCD	5.50
Marine Drive unit for 5 size	2.75
Jeeno Hydropl. 27" C-D	12.50
Buckeye prefab. 17" A-B-C	4.95
" Cabin Cruiser 17" ABC	5.95
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Speedster Assem. ready-to-run including Torpedo Engine 29	
Queen Elizabeth 24" (elec.)	4.95

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Marco Conversion Unit ...	1.95
Arden Conversion Unit	4.95
Mary's Conversion Unit ..	3.00
Cox Drive Unit	3.95
Cox Arden Gear	1.00
Cox Drive Shaft	1.95
Prone T.D. Tank	.95
Veco Semi-Pneum. tires (pr)	
Free running 2"-1.20; 2¼"- 1.35; 2"	1.75
Cox Front Wheel	.75

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Anderson Spitfire . (D)		24.95
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Arden .099 B B .... (A)		15.50
Arden .199 ..... (A)		18.50
Bullet ..... (B)		7.95
Cannon 400 ..... (B)		19.75
Cannon 358 ..... (B)		14.95
Circle 30 ..... (B)		14.95
Cobra 45 ..... (C)		12.50
Contestor ..... (D)		11.95
DeLong 30 ..... (B)		15.50
Dennymite ..... (D)		6.95
Forster 29 ..... (B)		14.85
Forster 305 ..... (C)		14.85
Forster 99 ..... (E)		24.75
Fox ..... (D)		29.95
Genie 29 ..... (B)		6.95
G. H. Q. ..... (D)		9.95
G. H. Q. Kit ..... (D)		6.95
Hornet 60 ..... (D)		24.48
Judco Kit ..... (B)		6.95
K & B Torpedo 29 .. (B)		18.50
K & B 24 ..... (B)		16.50
McCoy 19 ..... (A)		10.95
McCoy 29 ..... (B)		19.50
McCoy 49 ..... (C)		25.00
McCoy 60 ..... (D)		27.50
Mohawk Chief ..... (B)		6.95
Ohlsson 19 ..... (A)		9.93
Ohlsson 19 Rotary . (A)		10.95
Ohlsson 23 ..... (B)		9.93
Ohlsson 29 Rotary . (B)		13.95
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Ohlsson 60 Kit .... (D)		10.95
O.K. Bantam ..... (A)		11.95
O.K. Super 29 ..... (B)		11.95
O.K. Super 60 ..... (D)		11.95
O.K. Twin ..... (E)		49.00
Phantom P-30 ..... (B)		13.95
Pierce 'J' ..... (B)		6.95
Pierce 'R' Kit ..... (B)		6.95
Pierce 'B' ..... (B)		12.95
Rae ..... (B)		8.75
Rogers 29 ..... (B)		9.95
Super Cyclone Dual. (D)		13.95
Super Cyclone ..... (D)		12.95
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Thor Kit ..... (B)		6.95
Torpedo ..... (B)		18.50
Triumph 49 ..... (C)		20.00
Triumph 51 ..... (C)		20.00
Vivel 35 ..... (C)		12.30
Vivel Twin ..... (D)		30.00
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Aero Diesel	(B)	16.50
Drone Diesel	(B)	14.95
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Buss CO2 incl. Tank		4.95
Campus A-100 incl. Tank.		5.95
O.K. CO2		4.95

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Glo-Devil	(B)	17.50
K & B Glo Torp 24 .	(B)	14.95
K & B Glo Torp 29 .	(B)	14.95
K & B Glo Torp 32 .	(C)	14.95
K & B Infant	(A)	7.95
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McCoy 19 Race	(A)	10.95
Mighty Midget GF ..	(C)	14.75
Mohawk Chief Glo ..	(B)	7.50
Ohlsson 19 Glo	(A)	9.95
Ohlsson 19 Glo Kit.	(A)	8.95
Ohlsson 23 Glo	(B)	9.95
Ohlsson 23 Glo Kit.	(B)	8.95
Ohlsson 29 Glo	(B)	12.95
Ohlsson 29 Glo Kit.	(B)	11.95
O.K. Bantam Glo ...	(A)	9.95
O.K. Hot Head	(B)	9.95
O.K. Super 60 Glo .	(D)	9.95
O.K. 60 Race Glo ..	(D)	12.95
Sportsman Sr.	(C)	16.95
Triumph 49 Glo	(C)	18.00
Triumph 51 Glo	(D)	18.00

JET ENGINES

Dyna-Jet	24.50
Dyna-Jet Redhead	35.00
Minijet	35.00

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Plus **OVER 75 ACCESSORIES including:** Wilco Quality Coil ● Everlast Condenser ● 12" High Tension Lead ● 18" Insulated Ignition Wire ● ‡ 100 ft. U-Control Wire & Reel ● Rubber Wheels ● Formed Landing Gear ● Correct Size Propeller ● Large Tube Cement ● ‡ Control Handle ● Ignition Slide Switch ● Metal Battery Box ● 3-way Spark Plug Wrench ● Champion Spark Plug & Gasket ● ‡ Bellcrank & Pushrod ● 4 Mounting Bolts ● Wiring Lugs ● Speed Indicator ● Presto Engine Starter ● Plug Gauge Set ● Motor Cover ● 50 pg. Book: Gas Engine Theory ● Control Liner or Construction Book ● Insignia ● Flight Log ● Complete Engine Instructions ● Complete Plans for Building Plane ● "Pro" All-Metal Knife ● No. 70 Oil ● Coil Holder ● ‡ Bubble Canopy ● Sandpaper ● Membership in Modelcrafters of America ● 4 Mounting Nuts ● Engine Adjustment Chart ● Plane Identification Tags ● Postage ● Packing ● Insurance ● 24 pg. Giant 2-color Catalog. (‡ included in U-Control only) Ignition parts not needed with Glo-Plug engines are omitted where Glo-Plug engine is ordered.

YOU WON'T GET ANOTHER BARGAIN LIKE THIS SOON!

Complete RACE CAR OUTFIT

COMPLETE OUTFIT AT ABOUT ⅓rds THE ACTUAL COST IF ITEMS WERE PURCHASED SEPARATELY!!

with BUZZ $10.50

with OHLSSON $15.50

(both glo engines)

Everyone is racing the new Thimbledrome race car, the little 10" model that cannot be beaten for realism, craftmanship, speed and lasting pleasure. Speeds from 15 to 70 miles per hour. You can race this car in a school-yard or any small, level space.

HERE IS WHAT YOU GET:

Your choice of two well-known engines, ready to run. Glo plug for new, quick-starting gas combustion. Metal fuel tank. Neoprene gas line. Complete engine instructions. Battery connecting wire. Mounting bolts. Mounting nuts. Motor cover. Propeller to glo finish. Plug wrench. Thimbledrome race car complete, includes rubber race-car tires. Complete instructions for installing and running engine. Motor mounting bracket. Flywheel. Yoke. Tether cord. Membership in Modelcrafters of America. Postage. Packing. Insurance. Full A. H. C. Guaranty. 24 Page Giant Catalog.

Everything you will need except a 1½ volt Battery, fuel and a small file for cutting away parts of the body to install the engine. In addition, mounting and motor shaft holes must be drilled.

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Scoop! Infant Torpedo OUTFIT

FOR ONLY $9.95 COMPLETE!

YOU SAVE PLENTY WHEN YOU BUY THIS COMPLETE FLYING UNIT. HERE IS WHAT YOU GET: The brand new sensational K & B Infant Torpedo glo engine. The size of a match *but what power!* Easy to start--no ignition troubles! You can fly it in the backyard, the wide open spaces or even indoors. Rotary valve, turns up to 10,000 rpm.

Your own choice of the Circle King U-Control kit (30" span, a snap to build and fly, complete parts for mounting Infant motor A Scientific Kit) *OR* the new Profile Powerhouse (24" span version of record setting Korda Powerhouse. Die-cut fuselage, ribs, carved & notched wing leading & trailing edges)

Plus all accessories

You get the same accessories listed in our other flying outfits(excluding those not needed in a glo engine, of course)plus a sturdy aluminum prop designed for the engine.

Complete CO2 FLYING OUTFITS

$6.45 

BUZZ CO2 ENGINE (includes refillable tank, capsule charging unit). Costs only 2c per flight to run. Plus Cavecraft Stinson kit with all parts Cava-Cut (kits are completely precut, ready to assemble).

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O.K. CO2 ENGINE (largest CO2 engine made) with choice of Megow CO2 Special (completely ready to fly —no gluing) or the contest CO2 Powerhouse kit.

$7.95 

CAMPUS A-100 (CO2) ENGINE (smallest CO2 engine made, includes refillable tank). Costs only 1c per flight to run. Choice of Cavecraft Aeronca kit with Cava-Cut parts, completely prefabricated, ready to assemble or SE-5 kit.

For the younger set, their Fathers and big brothers, there's nothing like the thrill of CO2 flying. You don't need much space for free-flights (100 feet square on windless days), and less than a twenty foot circle for tethered flying.

THERE'S NOTHING TO LEARN AND PLENTY OF FUN!

HERE IS WHAT YOU GET:

1. CO2 Engine, ready to run.
2. CO2 Capsule holder.
3. 2 CO2 Capsules.
4. Correct propeller.
5. Complete engine instructions.
6. Complete suitable airplane.
7. Landing gear.
8. Wheels.
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(*Continued from page 4*)

go) and guard it with my life each month until it is dirty and dog-eared. You have a truly wonderful mag.

Being a pilot I also enjoy your articles that cover the whole aircraft field. I was a test and ferry pilot during the war and later flew the South Pacific to Japan. Your article "North Pole Storm Chasers" gave me an insight into one type of flying I have not been able to do.

WARNER C. LINCAHI

Lima, Peru

Original Designs

Sirs:

When I looked at the Airmen of Vision design competition in the March issue I was greatly surprised to see what won first prize. I think you gave the prize to the wrong person. Instead . . . you should have given the prize to Martial and Scull, noted industrial designers, because the design bears too great a resemblance to one that was designed by Martial and Scull. This design was featured in a book entitled "Rockets and Jets" by Herbert Zim.

I consider the first prize a whittled-down version of the Martial and Scull design, except the latter has the fins over the buried fuselage, has more than double the speed and a greater sweep-back. The designer of the first prize (plane) has the elevons over and under the turbojets, the elevons a reproduction of those on the Navy's newest jet fighter, the Chance Vought XF7U-1. In other words . . . this is not an original design but a copy.

CHRISTOPHER HURST

N. Waldoboro, Maine

● Air Trails disagrees. As aviation progresses planes designed by different individuals and concerns begin to look much alike. This is a situation similar to the automotive field. In the fields of sub-sonic, sonic, and ultra-sonic flight, "look alikes" will become more common as time passes.

Photo Credit

Sirs:

Looking through the February issue of Air Trails I was surprised to find a story with photos in C.A.P. News that I took for the Civil Air Patrol. I took these pictures while stationed at Lowry Field, Denver, Colo.

As I am trying to build up my name in magazine photography before being discharged from the service, I would appreciate any credit I could possibly get for this series.

Cpl. EARL D. MARFARD

Mississippi City, Miss.

● Military policy is not to credit individual photographers, hence photos when received by Air Trails bore no credit line for photographer. We are happy to give credit when the photographer is known; Cpl. Marfard's series on a breakfast flight was best we've seen to date.

Fan

Sirs:

I have read your magazine for years and I have yet to find a fault with it. The only thing I can find wrong with it is that it is not published often enough. I wish it came out every two weeks. . . . How about having a Model "Airmen of Vision"?

BOBBY TAYLOR

Semora, N. C.

Pylon Lover

Sirs:

This is a gripe. I have been reading Air Trails for quite a few years, and every now and then (almost every month) I happen to come across an article by someone who must have escaped from somewhere. These so-called people always seem to suggest that the A.M.A. make rules concerning the type of model that should be flown (free-flight). They are always ranting and raving about the sheer beauty of one certain type of F.F. model. Now A.M.A. rules are all right—I have no objection to having them. In fact, they are probably the best things that ever plagued modelers. They can tell me how much my plane should weigh, or how long it should be, but *no one* is going to tell me what my model is going to look like! I like pylons. *I love pylons.* Why should model airplanes look like real planes? If you want realism, for heaven's sake keep it out of contests. Only in pylons may the model builder find the perfect free-flight—looks, efficiency, climb, glide, ease of adjustment. Long live the pylon!

ROBERT TALLEY

Baton Rouge, La.

Showcase

See your hobby shop for the items shown here. Both the price and specifications subject to change.

Jet Job→

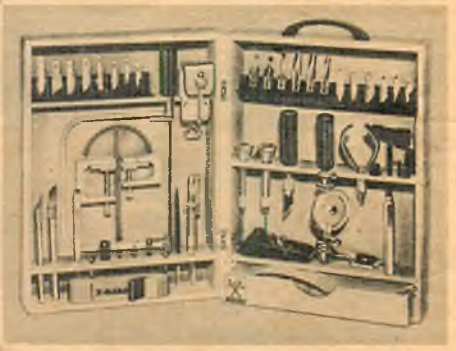
Jetex is a new, small jet power unit which gives modelers opportunity to power small scale models of full size jet aircraft. Gives 1 ounce constant thrust for 20 seconds. Weighs ⅝ oz. Solid fuel capsules weigh ¼ oz. Diameter, 1". Distributed in Canada by Model Craft Hobbies, Ltd. (66 Wellington St., West, Toronto); in U. S. by Polk's, 314 5th Ave., N.Y.C.

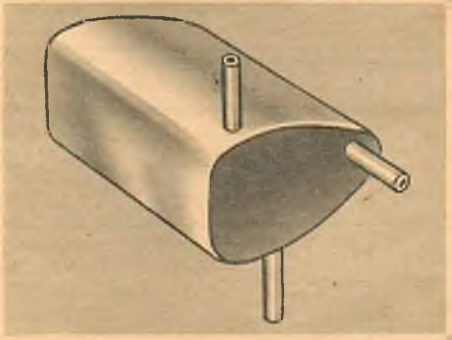
←Speedee

A new series of rubber-powered flying models known as Speedee-Bilt kits has been developed by Monogram Models, Inc. (225 N. Racine Ave., Chicago, Ill.). Each has completely finished parts including Mono-Foil wing, pre-fabricated fuselage sides, molded plastic cowling and propeller. Models in line sell for 75c each; can also be used with CO_2.

Forty-Niner→

X-Acto Crescent Products, Inc. (440 4th Ave., New York City) introduces new compact fitted tool chest selling for $25. Chest contains 49 tools, including blades. Each tool has its place in a blondwood chest, 14" high, 10" wide, 3½" deep. A feature is the new X-Acto safety spiral saw blades which cut in any direction. Smaller, efficient adaptation of larger chest.





←Dale Tank

A line of stunt tanks selling for 65c each, assembled and ready for use, is put out by Dale Modelcraft Specialties, Inc. (203 Roma Ave., New Dorp, Staten Island, N. Y.). Designed for stunting models, the small tank measures 1½" long by 1¼" wide by ¾" high; the small-L tank is 2¼" long by 1¼" by ¾" high; the medium size tank is 2¼" long x 1⅞" x ⅞".

Sprayer→

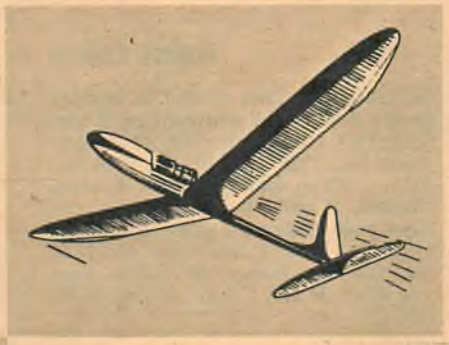
New aid for modelers is the Burgess Vibro-Sprayer which requires no motor, compressor or other extra equipment. Operates on 110-125 volts, 50-60 cycle A.C. Sprays enamel, dope, lacquer, varnish, shellac, light oils, liquid wax. Model VS-500 sells for $12.95 complete. Molded phenolic pump housing; 25 oz. Mason jar type paint container handy when working.

Showcase

Try your nearest hobby shop for items presented here. Write the manufacturer if you can't find it.

Jasco's Jet→

Jasco Jet is new kit by Junior Aeronautical Supplies Co. (JASCO—203 E. 15th St., New York City 3). Retails for 60c (70c by mail). Flown with Jetex 100 power unit. Weighs 2 oz. Rudder and wing ailerons adjustable. Model features simple construction. Concern also has complete line of rubber-powered and glider models, hand-launched and towline.



←Vagabond

New flying scale control-line model of Piper Vagabond lightplane is offered by F-B Model Aircraft (1832 Broadway, Boulder, Colo.). Sells for $3.95. Takes engines from .19 to .49 cu. in. displacement. Wing span is 36", chord is 6". Features F-B Nu-Way semi-built fuselage, grooved and shaped leading edge, shaped and notched trailing edge. Parts are cut.

Model "T"→

Talk about Torpedo streamlined bodies! Here's the 1910 Model "T" famous Torpedo Ford which was considered quite sporty in its day with its long rakish fender and body design. 'Twas the college boy's hot rod of the racoon coat era. Length is 8"; it's ¾" scale. Sells in kit form for $2.50. By Scranton Hobby Center (315 Adams Ave., Scranton 10, Pa.).

←Race Stuff

A special engine designed for the race car field is the McCoy 19 manufactured by Duro-Matic Products Co. (Hollywood, Calif.). This engine comes equipped with special pinion gear, disc rotary valve and two ball bearings. Uses Hot Point glow plug ignition. Designed to fit the Thimbledrome and other small racing cars; with g.p., pinion gear, $10.95.

Acme Tank→

Acme Model Engineering Co. (8120 7th Ave., Brooklyn 9, N. Y.) has tanks available in prefabricated form. All parts are brass, ready for soldering together. Holes are already made. Can be assembled to fit motor to fly in either direction. Small, medium or large sizes 35c each. These same tanks, ready for use, may be had for 69c each. All soldered.

Showcase

See your hobby shop for the items shown here. Both the price and specifications subject to change.

Comet Cub→

Suitable for Class A and B engines is the Piper Cub control-line model (kit T15) from Comet Model Hobbycraft Inc. (129 W. 29th St., Chicago, Ill.). Wing span is 35½". Prefabricated, it sells for $2.95. Concern also sells famous Zipper free-flight model as a 32" Class A job for $2.50 and as the larger 54" wing span for Class B and C size motors, $5.95.

←Aero Gloss

For use on model airplanes, race cars and boats, Aero Gloss dope is fire resistant, proof against hopped up fuels and offers a high gloss finish. Aero Gloss, along with "7700" cement, "Plastic Balsa" and "Balsa Fillercoat" is made by Victor Aerosearch Co. (251 S. Mednik, Los Angeles, Calif.). Aero Gloss is described as tough, strong, lightweight.

Tanks, Friend→

Shake-proof tanks are new product of Darwin Model Aircraft Co. (Ann Arbor, Mich.). Outfit makes 12 sizes of tanks including a mini-model for Infant type engines. Largest type is "L" series; intermediate is "S" series; smallest is Pee-Wee series. Filler tubes on each tank are soldered together and engine tube is soldered inside tank. For all flying.

←New Powerhouse

Something new in Powerhouse is the Profile version by Berkeley Models, Inc. (140 Greenpoint Ave., Brooklyn 22, N. Y.). This 24" model has been designed for the new small engines between .009 and .030 cu. in. displacement. All parts are ready-made. Fuselage, tail surfaces cut from balsa. Wing has notched leading and trailing edges. Also for CO_2. $1.

Vineyard "40"→

Latest in the line of power boat models from Dumas Products (2222 N. Farwell Ave., Milwaukee, Wis.) is the 25" construction kit of Vinyard Shipbuilding Company's 40-ft. cruiser. Has complete interior layout. Can be used as a display model or can be powered by gas or electric motors. Literature on the Vineyard and other craft available from mfr.

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DEVELOPMENT HIGHLIGHTS

● Record-breaking Beechcraft Bonanza in which pilot Wm. Odom recently established a new world distance record for this type of craft in a flight from Honolulu to Teterboro, N. J., in 36 hours. Tip tanks, only modification of plane, give it a 5,000-mile range.

● British torpedo-fighter, the Blackburn Firecrest. Craft resembles the Firebrand, has higher rudder and inverted gull-wing. Power plant is Bristol Centaurus rated at 2,475 hp equipped with a five-bladed propeller. Maximum speed, 380 mph at 19,000 ft.

● Temco TE-1A, designed and built by Texas Engineering and Manufacturing Co., Dallas, Texas, to serve as a military trainer. Plane is similar to company's other product, the Swift; has tandem cockpit, wings and rudder like AT-6. Powered by 145-hp Continental engine.

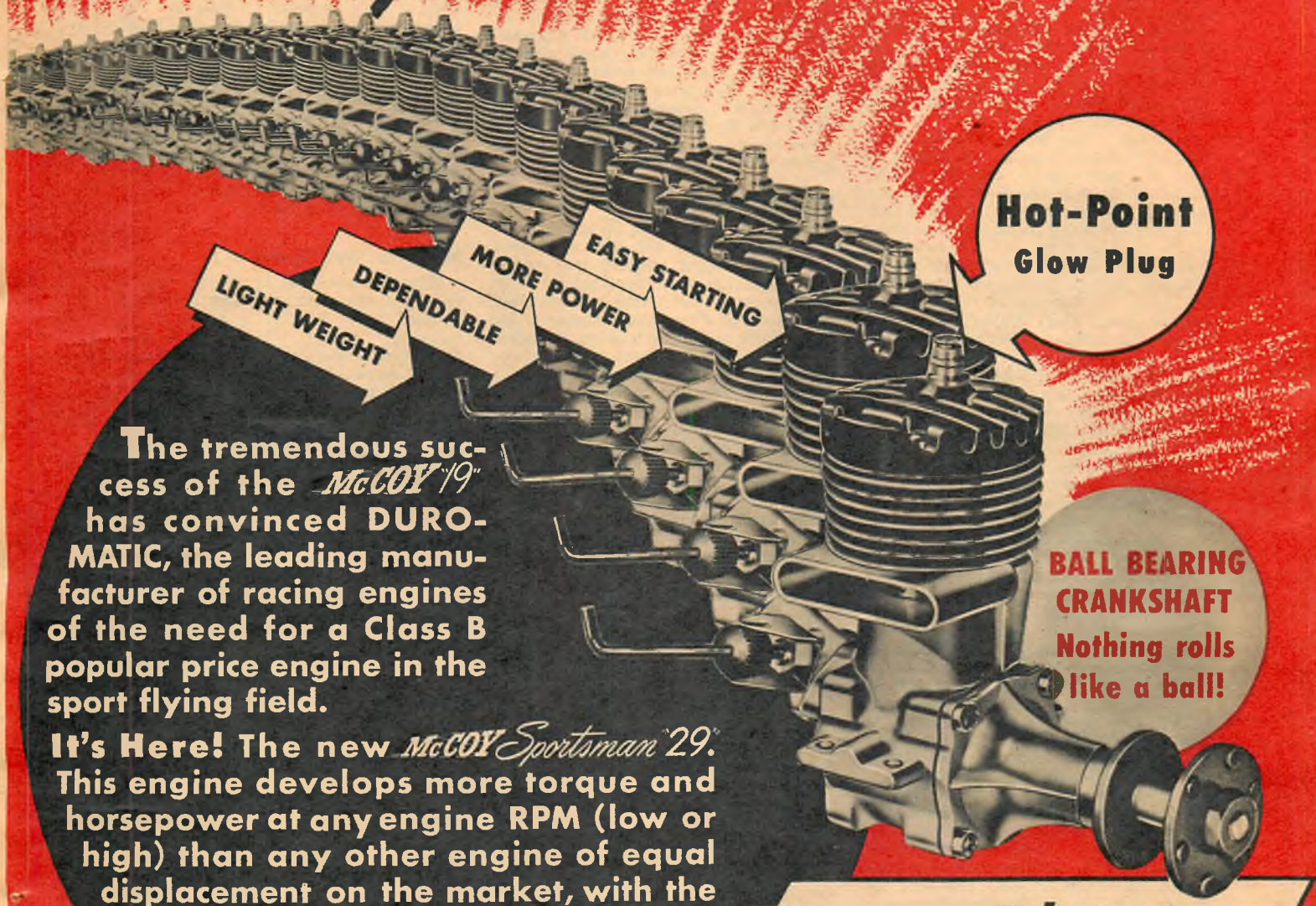
● Packing the fire power of a man-of-war, the Martin AM-1 Mauler carries the heaviest load ever flown off a carrier deck by a single-engine plane. Armament consists of three 2,200-lb. torpedoes, twelve five-inch rockets and four 20-mm cannon. Payload, over 9,000 lbs.

● England's latest personal plane, the Satellite, of exceptionally clean design. Carries four in luxuriously appointed cabin. Craft is constructed from welded magnesium sheets. Engine drives propeller in rear through extension shaft. Top speed is 208 mph.

● Kaman K-190, designed specifically for agricultural and industrial use. Aircraft features intermeshing type rotors using servo flaps on blades which greatly simplify construction of rotor hub by eliminating complex control mechanism. Power, 190-hp Lycoming engine.

DURO-MATIC

It's here! New McCOY Sportsman "29"



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Air Notes

AVIATION TODAY AND TOMORROW

Changing USAF:

The Air Force, which changed its plans early this year to fit President Truman's 48-group 1950 budget, may be changing back by the time this is printed to fit an air-minded Congress' larger allotment for perhaps as many as 57 groups. In any case, there'll be new emphasis on heavy bombers and fast all-weather jet fighters, as shown by recent contract reshufflings.

Bombers: The heavy bomber force will be doubled, with an increase from two to four B-36 groups. USAF staunchly defends the B-36 as "longest ranging, highest flying" bomber available, despite much criticism. Existing B-36's will be improved. A new ten-engine B-36 version for strategic reconnaissance is to be developed. The RB-36 will have the normal six reciprocating engines plus four Allison J-33 jets mounted in pairs in underwing nacelles. This will give a power potential of 40,000 horsepower at altitude. The jets will be used mainly for take-off and for speed in combat. Range of 10,000 miles will not be affected, as jet take-off will allow for weight of more fuel in outer wing panel tanks.

B-36 funds came from cutback of other bombers—the last 51 of 180 North American B-45's, and all 30 of the Northrop eight-jet Flying Wings. USAF will still acquire 10 jet wings, however, with conversion to jets of the B-35 Flying Wings, which never worked too well with piston engines.

Fighters: Recently ordered with funds from North American F-93 cutbacks were two new all-weather jet fighters, the Northrop F-89 and Lockheed F-94. The F-89 is a glossy-black two seater with a swept-up tail assembly, giving it something the appearance of an immense scorpion, appropriate enough since it is a jet-propelled successor to the famous wartime F-61 Black Widow. The first experimental model, flight testing since last August, is credited with spectacular but undisclosed performance records . . . Lockheed's F-94 is converted from the TF-80C two-seat jet trainer now in use, so should require minimum time for production to get under way.

Still newer and faster ships are due to be unveiled in '49. Prototypes of the Lockheed F-90 and Republic F-91, are nearing completion. They will make initial flights in secrecy at Muroc, where the Convair F-92 project already has a developmental model flying.

Trainers: USAF will buy new primary trainers as soon as a competitive evaluation of planes is finished. Beech and TEMCO have come up with trainers to challenge the Fairchild, T-31 (AF) or NQ (Navy), which both Air Force and Navy had planned to order. Beech entry is the Model 45 Mentor, trainer version of the Bonanza. TEMCO's is the TE-1A, an all-metal tandem two-seater developed from the Swift.

Newest thing in trainers now in production is North American's T-28 primary-basic trainer to prepare pilots for high-speed jets, winner of another recent design competition . . . Convair is building 36 T-29 navigator trainers on the design of the commercial Convair-Liner, which won a stiff contest with the Martin 2-0-2 for the order.

Others: Following budget announcement, USAF dropped its production plans for 30 Northrop C-125 Raiders, three-engine transports, and for 10 Kellett H-10 helicopters.

Missile Research:

The U. S. is stepping up its research in guided missiles and may soon have ready for testing missiles that travel more than 150 miles horizontally from the launching spot. This was revealed when the Air Force asked Congress for $200,000,000 to build a long-range rocket proving ground for joint use of Army, Navy and Air Force. Secretary Symington emphasized that "certain other nations" already are working hard toward weapons of "inter-continental" range.

The Air Force has announced for the first time two of its guided missiles—the 32-foot Convair 774 and the 13-foot North American NATIV test missile—which are to be used in a new training program for Air Force guided missile launching crews.

Foreign Interest:

Great Britain is reported negotiating for purchase of 150 B-29's now in USAF storage to bolster the RAF bomber command . . . TEMCO says several foreign governments have expressed interest in the new TE-1A primary trainer . . . Canadian aircraft plants want licensing agreements to produce top USAF planes. An arrangement on the North American F-86 is most likely. Also under consideration are rights to the Fairchild Packet. Canadian production would help standardization of RCAF and USAF equipment for hemisphere defense. The Canadians would also hope to sell American-designed products to British Commonwealth markets that are closed to U. S. because of the dollar exchange problem. But a hitch might come with possibility of foreign sales to USAF at cheaper prices than our own manufacturers can quote because of lower labor costs outside the U. S.

Buzz-Bomb 'Copter:

A new military pulsejet helicopter which uses buzz-bomb type engines at the tips of its rotors has been unveiled by the American Helicopter Company at Manhattan Beach, California. It has two seats, can carry 685 pounds in addition to the pilot, with a range of 200 miles and top speed of 75 mph. Designers say it will double the payload carried by conventional helicopters of equal weight on short-range flights.

Navy Shifts:

There'll be a new look in Navies in 1950, too. USN is now in the process of cutting back its active aircraft from 8,183 to 7,765, to reach by June 30 a size comparable to that allowed by the President's budget. Nine naval air stations will be inactivated. Patrol aircraft may enjoy new emphasis, since anti-submarine readiness is to be a 1950 keynote. Carrier fighters are likely to be reduced. The carrier force is being cut back from 11 to 8. But Navy will go ahead and start its new 65,000-ton carrier, the CVA-58, which will be named the U.S.S. United States.

Midgets Get Speedier:

Midget plane racing which sprang to popularity with the first Goodyear Trophy Race in 1947 is yielding increasingly higher speeds. This was dramatically shown by the 1949 Miami All-American Air Maneuvers, where Steve Wittman won the Continental Motors race with a speed of 176.867 mph. This is seven miles an hour faster than the winning time in the 1948 Goodyear race and 11 miles an hour speedier than the winning 165.8 in the first Goodyear contest.

Even faster speeds are promised for 1949, not only by individual racer-builders but also by an aircraft manufacturer who will put into production the first commercial plane to be developed from one of the homemade midget racer designs. The ship is the Midget Mustang to be built by Schweizer Aircraft Corporation of Elmira, N. Y., from a design by Dave Long, Piper-Stinson engineer, which flew in the 1948 Goodyear and placed fourth at Miami early this year. Schweizer will sell the plane as a combination personal transport and racer for under $5,000.

British Jets:

Ten de Havilland Vampire V jet fighters have been ordered by the South African government. South Africa's air force thus becomes the tenth to adopt the Vampire, following the lead of Sweden, Switzerland, Norway, France, India, Canada, and Australia, besides the RAF and the Royal Navy . . . The de Havilland Goblin Mark 4 jet engine, a further development of the engine which powers the Vampire, has been announced . . . The Vickers-Armstrong Viscount, first airliner in the world to be powered solely by turboprop engines, is now undergoing flight tests. The four kerosene-burning propeller-turbine Rolls Royce Dart power plants cause little vibration and provide smooth, quiet travel. The Viscount is a 32-passenger airliner with an operating speed of 350 miles an hour. One British expert terms it "from the passenger viewpoint, by far the most pleasant airliner we have ever flown in."

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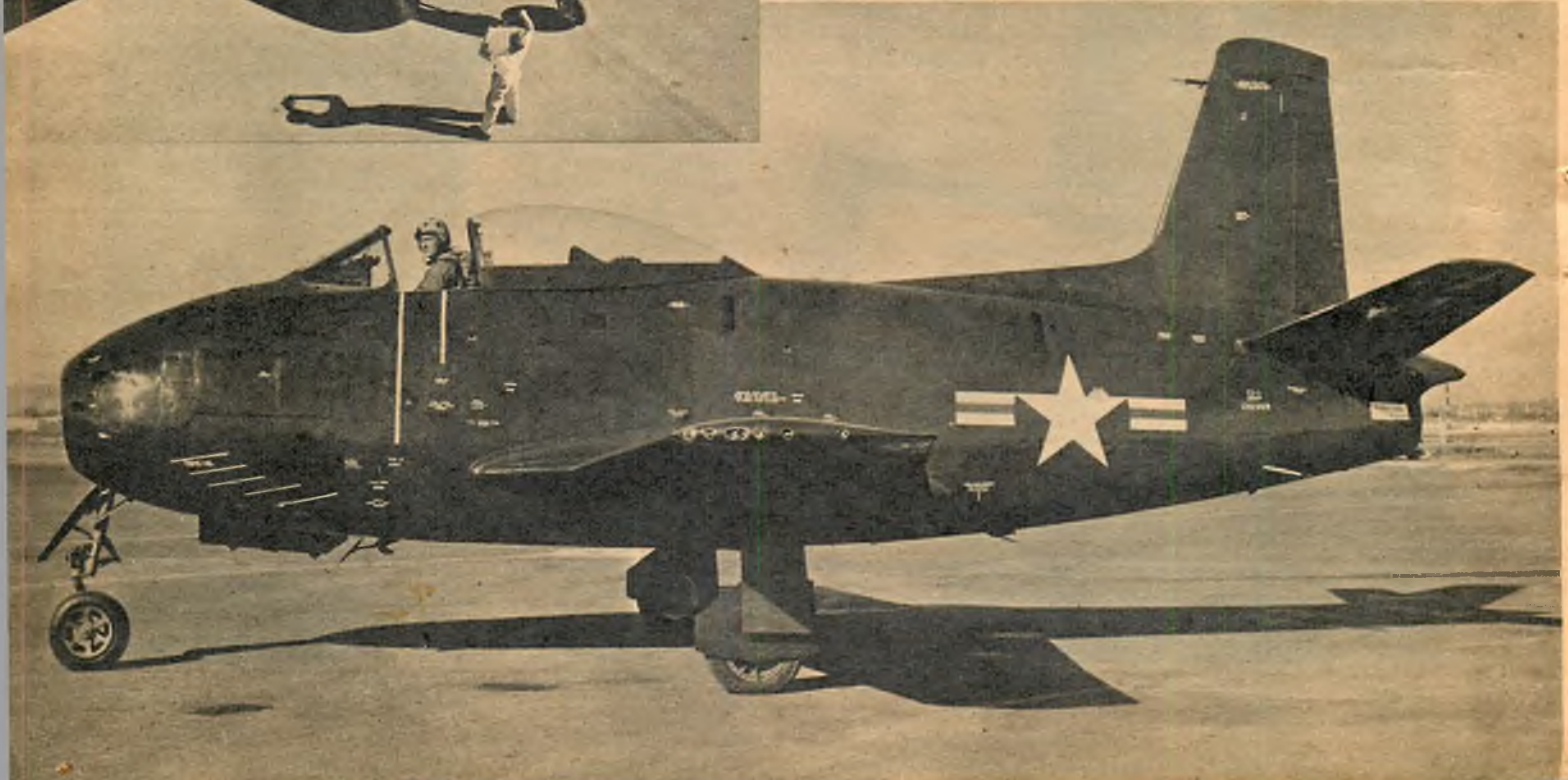
Fury!

STANDARD Navy carrier fighter, the North American FJ-1 Fury has amassed a number of impressive cross-country records piloted by members of 51st Fighting Squadron. One was the 1,135-mile flight from Seattle, Wash., to San Diego, Calif., in two hours, thirteen minutes. In order to deflect the hot gases of its 4,000-lb.-thrust Allison J35-A5 engine away from personnel or any aircraft parked to its rear on the flight deck of a carrier, the Fury is equipped with a kneeling device on its nose gear. The compact fighter has a wing span of 38′ 1″, the fuselage length is 34′ 6″. Fully loaded it weighs close to 15,000 lbs. Maximum speed is around 550 mph, range about 1,500 miles.



AIR TRAILS
MAY 1949

Atom Powered Bombers

By WILLIAM WINTER

Airplanes with unlimited range, even moon rockets are possible with atomic energy

ATOM-POWERED BOMBERS! How soon? How big? What shape? Will we see such aircraft in our time, or are they many years away?

Let's look at the record.

"In the event of war, or in any international situation likely to lead to war," declared the Congressional Aviation Policy Board in its report, *National Aviation Policy*, "nuclear energy for the propulsion of aircraft would be comparable in significance to the atom bomb itself." Both the Congressional Board and President Truman's Air Policy Commission urgently recommend that every resource and facility be devoted to the early accomplishment of atomic propulsion.

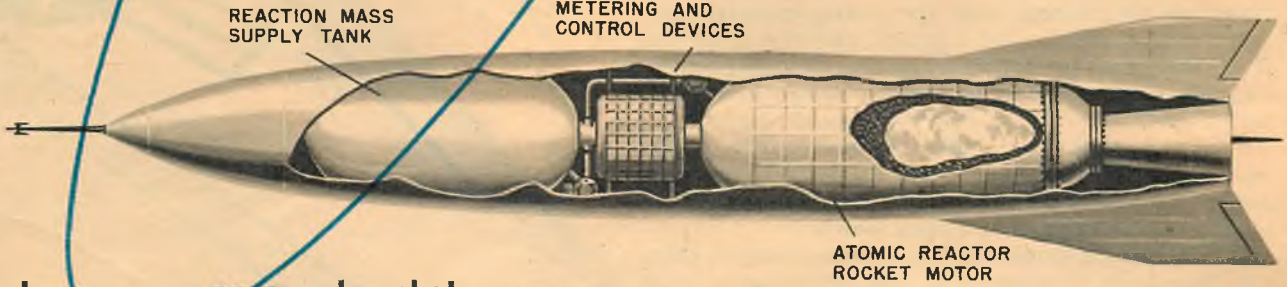
Because the means of delivering the atom bomb is as important as the bomb itself, the bomb would be worthless if its carrier did not have the reach to threaten objectives however distant, or the speed to foil all possible defenses which, in time, can be expected to counter any subsonic airplanes and missiles. Real speed with long range, designers say, can be provided only by the nuclear power plant whose fuel, per unit of weight, is 2,000,000 times as powerful as gasoline and whose duration, therefore, is virtually unlimited. But is atomic propulsion possible?

We can not only say that the nuclear engine is possible, but can describe within broad outlines how such a power plant will operate and can risk a rough estimate of the size bomber it might drive. It is possible to show the place of atomic power in the intercontinent, even space, rocket. Since all this is in conflict with the many statements that atomic propulsion is impossible due to the great weight of the shielding, it is encouraging merely to review the status of the NEPA (Nuclear Energy Propulsion For Aircraft) Project, at Oak Ridge, Tennessee.

"The possibility of employing atomic energy for the propulsion of aircraft and guided missiles," said the President's Air Policy Commission, "is sufficiently important to warrant vigorous action by the Atomic Energy Commission, the Air Force, the Navy, and the NACA. Some work of a preliminary nature has already been done by the AEC, the Air Force and its NEPA project."

Having begun operation on May 28, 1946, as an Air Force project, NEPA is administered by the prime contractor, Fairchild Engine and Airplane Corporation. Located in the old Fercleric plant at Oak Ridge, this project also involves the NACA, various private laboratories and universities, and nine other power plant companies: Allison, Continental, Frederic Flader, Lycoming, Menasco, Northrop, Pratt & Whitney, Wright, and Westinghouse. NEPA cooperates closely with the Carbide & Carbon Chemical Corporation, operators of Oak Ridge National Laboratory, formerly Clinton Laboratories.

"Theory is 99 percent complete," David M. Poole, an engineer at Oak Ridge, was quoted recently in The New York Times. "The job now is up to the slide rule men with the drawing boards and working models." Head of the Thermodynamics Group, Poole explained that the scientists have thought out a way to tap the power of an atomic pile and that now the engineers must make the idea work, designing and building the engine, the plane, the controls, and working out the protection for pilots and crew. Andrew Kalitinsky, Chief Engineer of Fairchild's



Nuclear energy powered rocket

NEPA Division, admits that an atomic power plant has not yet been manufactured, and explains that the practical development of atomic energy calls not so much for new discoveries as for a great deal of engineering work.

Surprisingly enough, several basic types of power plants can be adapted for use with nuclear energy. Since the energy of fission is released mainly as heat, these all are thermal power plants, such as the steam or mercury turbine, the turbojet, the ramjet and the rocket. The source of heat, the nuclear reactor, is a relatively small atomic pile, through which the working fluid, that is air, water, or some chemical fuel, is passed for heating. In the case of the turbojet, as an example, the nuclear reactor simply replaces the familiar combustion chamber.

While the idea of the atomic power plant is beautifully simple in principle, its problems are actually enormous. To the man in the street, the riddles are seemingly insoluble. Typical teasers are these two: How can the heat within the pile be transferred to the working fluid without contaminating that fluid, endangering life and health, or, on the other hand, without causing corrosion of the magic material; and, how can the crew be protected from deadly radiations without making the shielding load hopelessly heavy. This last consideration becomes a real baffler when you realize that the working fluid, to be heated, must be admitted into the reactor *within the shielding* without permitting the escape of rays and particles deadly to humans.

While NEPA certainly won't divulge any vital facts and figures on anything as important security-wise as atomic propulsion, the many fascinating bits and pieces so far revealed, can be put together into several highly interesting pictures. Which is the one that counts? Here again there are clues, so the final answer to the plane—if it is a plane!—and its power plant is largely a matter of putting down your money and taking your choice.

Exhibit A is the modern bomber. Because it depends on chemical fuels, its required gross weight increases with both range and speed. At some given speed, its gross weight increases rapidly with added range as the fuel load assumes staggering proportions. Beyond a point—nearly reached as aerial refueling suggests—range cannot be increased regardless of size. If more speed is demanded, then range must be reduced. Atomic power is capable of both high speed and, for all practical purposes, unlimited range.

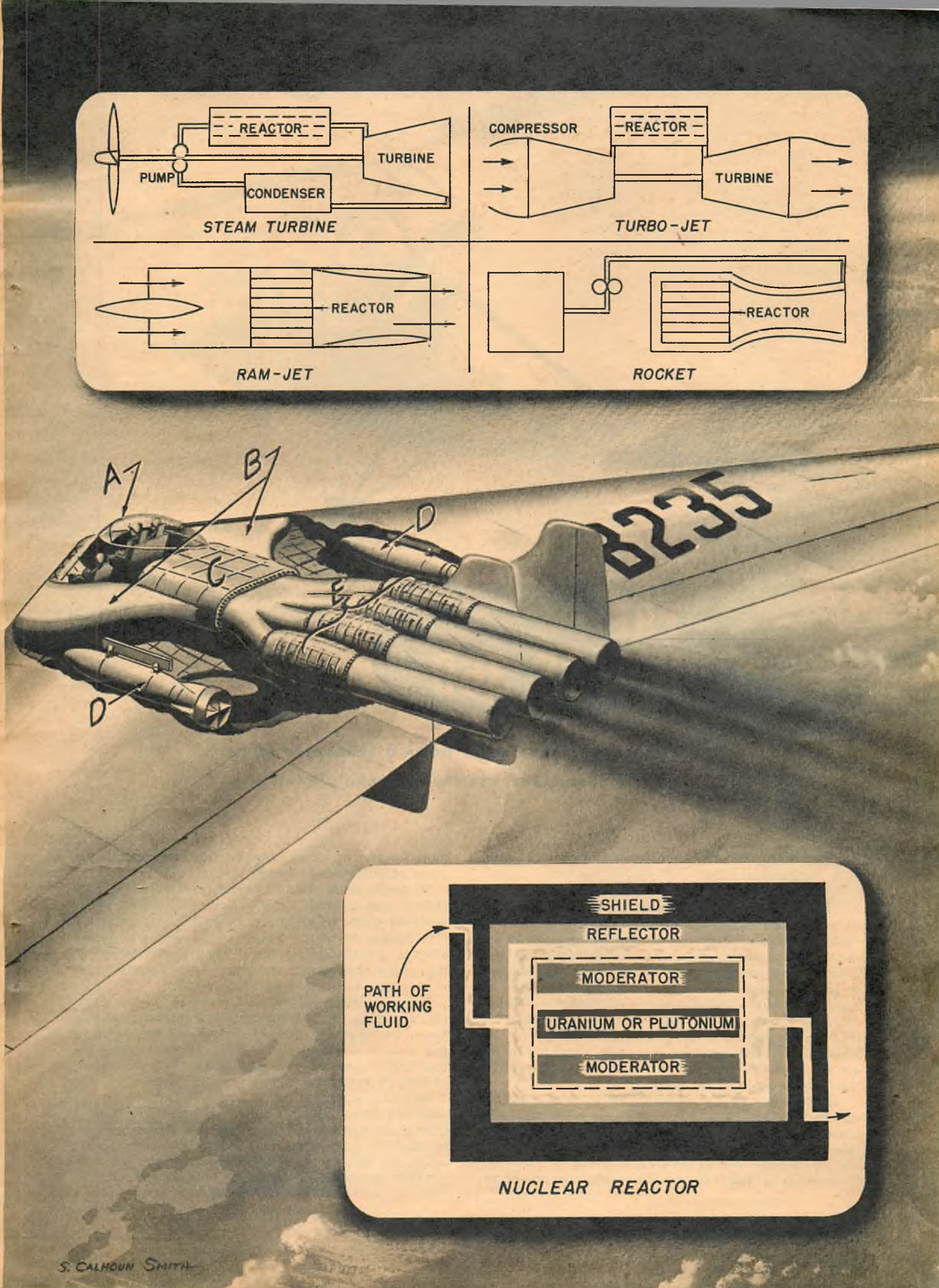
It is possible, of course, that the initial airplane might be one of less spectacular performance, being intended to demonstrate a nuclear power plant with a minimum of complications, such as would abound in a really fast, large airplane. A rough analogy would be the relationship between the Airacomet, first American jet, slower than the piston-engined Mustang, to the service jet fighters like the F-80 and F-84. But in all probability, the first atomic-powered airplane will be as fast as current design knowledge safely permits. Any service type would have to be fast or run increased risks of interception. "The atomic-powered airplane," says Kalitinsky, "must be designed for very high speed to take advantage of the special characteristics of atomic power."

By all current standards the atomic-powered plane will be unique. Capable of at least 600 miles an hour, already reached by the B-47 Stratojet, it also will be a large craft in order to carry its many tons of shielding and a worthwhile pay load. Late in 1946, Doctor Luis Alvarez, famous nuclear physicist, was reported to have estimated a 25,000-horsepower motor would require 75 tons of lead shielding. This, he estimated, would mean a ship several times the size of the B-36, now the biggest plane in service. Dashing hopes of spectacular weight reductions in shielding through the use of miracle materials, Alvarez had stated, in effect, that there was no hope of finding a material with the magic property that a thin layer would absorb radiation. However, that was 1946. That other avenues of progress are open is indicated by a paper read before a Detroit meeting of the SAE in which Dr. Kalitinsky pointed out that there is considerable room for weight reduction by ingenious design.

If, perhaps, dozens of tons of lead shielding make the atomic plane sound unlikely, a comparison with current large bombers indicates that 50 tons or more of this deadweight is by no means an impossible obstacle. The weight of the power plants, the fuel and the fuel tanks of the conventional airplane can be compared accurately with the weight of the engine—be it turbojet, turbine or any other type—and the nuclear reactor with its shielding. The reactor and its shielding can be of a weight roughly the equivalent of that of the fuel and tanks of the orthodox airplane. The weight of fuel and tanks in some large airplanes already has exceeded fifty tons, the B-36 for example, boasting a tank car capacity for gasoline. It is likely, therefore, that a large, fast airplane atomically powered can be designed and built. The question is: How big?

Again, the failings of the present day bomber provide clues. Until the two huge wheels of the B-36 were replaced by clusters of four smaller wheels each, airports capable of handling this giant could have been counted on the fingers (*Continued on page* 85)

● Shielding to prevent the escape of harmful rays is one of the major problems of the A-powered airplane because of the weight of the shielding material. There are three possible solutions: atom-powered missile requiring a minimum of shielding, launched by remote control methods; piloted aircraft where the crew quarters alone are shielded and the power plants are not; and (illustrated) an airplane with its power plant, mainly the reactor, encased in high-density material to prevent radiation. In the sketch, A is crew quarters; B, air intake; C, reactor; D, bombs; E, four powerful turbojet engines.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We Fly THE HILLER 360

By Don Downie

For those who have never flown a helicopter there is a thrill ahead. Just ask the man who piloted one.

AND there we sat, ten feet off the ground, going backwards!

O.K., Mr. 'Copter Pilot, whaddya do now?

That's the exact predicament that this non-rotary-winged reporter found himself in recently at the Palo Alto, California, airport of United Helicopters. It was a cold pre-spring morning just a month after the CAA had licensed young Stanley Hiller's new "egg beater."

Luckily, there was an instructor along to show us the wild and wondrous ways of flying a "Hiller-copter." Previously this same day we had "soloed" in Hiller's single-place experimental model with the inventor himself standing alongside, checking us out on the throttles and "pitch stick" as we hovered a half-dozen feet off the ground.

The brand-new Hiller 360, N69085, was a $19,995 production model, and a check-out pilot was very much in order. After an hour and a half of take-offs, level flight, hovering and landing, the helicopter was still flying us—we weren't quite flying it. However, this series of flights in the Hiller 360 was one of the most interesting experiences of this reporter's dozen years of professional flying.

To begin with, flying a helicopter, even the 360, differs just enough from piloting a conventional powered plane to keep a pilot in hot water for his first couple of hours. There are so many different ideas to assimilate all at once: pitch *vs.* rpm's, hovering, going backwards, transition speed, autorotation —it's just a bit confusing, that's all.

When a visitor enters the United Helicopter plant in Palo Alto, he is immediately impressed by two facts: the newness of the building and the youth of the people working in it. This 36,000-square-foot building is just one year old, while the average age of Hiller's employees is less than 30 years.

Our first stop was "The Boss's" office. Along one wall is a mural showing all seven helicopter designs that Hiller has worked on since 1939. Hiller, now 24, is efficient, aggressive in a quiet way, and knows what he's talking about in helicopters.

"This helicopter of ours," he said with a little of

● Flying test-stand. Author Downie started his 'copter training solo-fashion. Stanley Hiller acts as instructor from ground.

● Hovering the Hiller 360. Downie, left, found that as a fixed-wing pilot he had to disassociate himself from many flying habits.

the pride of a new father, "is the sweetest-flying 'copter in the air today. It will fly hands-off and is completely stable. If you put it in a dive, it will oscillate a couple of times like a fixed-wing airplane and return to level flight.

"Just to show you how easy it is to fly, we'll take our experimental flying test-stand out back of the building and you'll solo out in it in less than ten minutes."

Well, after all, it was his helicopter.

We walked through the neat, well-lit assembly plant and out a door to the landing ramp—an oversized square about the size of a basketball court. Here was NX67707, the original experimental model for the basic Hiller design. It looked more like an old-fashioned primary glider than a modern flying machine, but it had been flown over 250 hours in short hops.

"This rig was built merely as a flying laboratory to prove some of the new theories we had for helicopters," said the designer. "It will fly very nicely, but it isn't fixed up at all like the 360 that you'll use later."

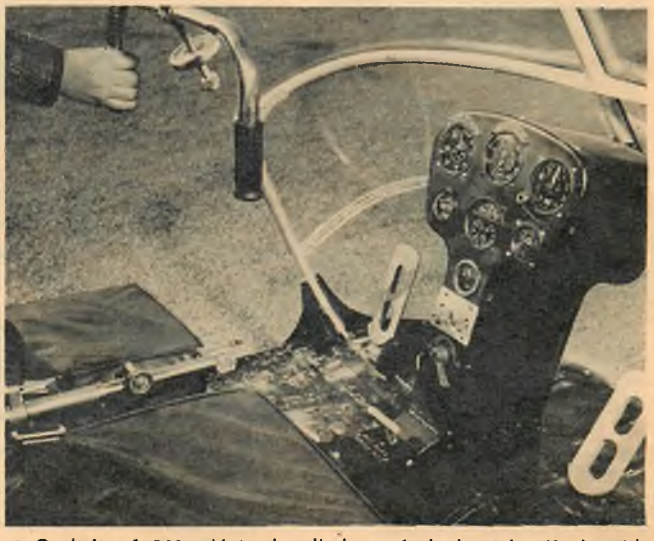
We climbed into the wide-open front seat, hooked our belt and looked around at Mr. Hiller. There was a second jump-seat just forward of the little 90-hp Franklin engine, but Hiller made no move to climb aboard.

"I'll stand alongside here and show you what to do," he said, and then grinned as he saw our dubious expression.

A battery cart was wheeled alongside and Hiller started the engine of the flying test-stand. The throttle and "pitch stick" were from an old Vultee BT-13 throttle quadrant. To make this helicopter go up, you merely pull up on the vertically-mounted throttle and "pitch stick" combined. To go down, you push down on the throttle and "pitch stick" together. Sounds simple, doesn't it?

The "pitch stick" is the control that regulates the angle that the rotor blades bite into the air, very similar to a controllable-pitch propeller. Both throttle and "pitch stick" are called the "collective" by the helicopter boys.

More-or-less conventional rudder pedals and stick control the in-flight movements of this helicopter. The stick, however, hangs down over your shoulder rather than coming up from the floor. By having the control stick connected directly to two small "servo-tabs," Hiller's design saves many pounds of weight and expensive machine parts. (*Continued on page* 73)



● Cockpit of 360. Note handle-bar of dual stick. Knob with screw is trim control; throttle and collective pitch between seats.

● Short rotor blades are servo-tabs that control rotor pitch. Note simple control linkage. Rear pipe is carburetor air intake.

BRAYTON

AN AIR TRAILS AIR CAREER REVIEW

● View of Brayton Flying Service and St. Louis Municipal Airport, showing hangars, loading dock, railroad siding and athletic field.

Fifteen years' experience in teaching aviation subjects form the background of this midwest aeronautical school

AT one of the busiest air terminals in the midwest, Brayton Flying Service is carrying on its aeronautical training program, on faith and confidence—faith in the aviation industry and confidence that one day aviation will outgrow the problems that beset it and take its place as the greatest single force of the century.

The motivating spirit behind Brayton Flying Service's Aeronautical Training Division is Clyde E. Brayton, its founder and president, who began flying back in the days when airplanes were viewed with awe and the sound of an airplane engine over St. Louis emptied the offices while employees and executives alike scanned the skies to "see what those durn fools are doing now."

The Brayton School as it is today is a far cry from the training the boys received in the days when Brayton himself learned to fly. The company was organized and incorporated in St. Louis, in October, 1933, for the sales and service of aircraft, engines, accessories and supplies and for the establishment of a flight training school. In 1940, Brayton received national recognition when the Army Air Forces awarded it a contract to train Air Force cadets. From that contract came the necessity of acquiring a separate operation at Cuero, Texas. Brayton served as president of Brayton Flying Service under Texas charter until completion of its contract in 1944. During that period, the company built five airports, comprising 1,650 acres. During 1943, Brayton Flying Service won the Safety Award of the Aeronautical Training Society for the central Training Command. In 1943, the school flew 135,082 hours with only one fatality.

In the meantime, the St. Louis company was busy on another phase of aviation. Two thousand students were trained for aircraft factory work as sheet metal technicians and as aircraft and engine mechanics, and the school operated a primary and advanced flight training program for the Civilian Pilot Training program. When the war training service program of the Civil Aeronautics Administration was initiated, a separate branch of the company was established at Moberly, Missouri, where Brayton Flying Service maintained exclusive operation of the Omar N. Bradley Airport.

When the war ended, Clyde Brayton, never one to look back on past laurels, opened one of the first schools to train civilians in post-war aviation. His school was the first one in Missouri to receive the full approval of the Missouri State Board of Education and to secure a VA contract for mechanical and flight

training. The veterans training program was launched full speed ahead and hundreds of veterans flocked to Brayton's. Brayton recognized the fact that flying was only one phase of the training needed by veterans and that the GI had a splendid opportunity for advancement in aircraft engineering, so the Aeronautical Engineering school was established. A carefully selected faculty was engaged to teach ambitious young men every phase of aviation, from building the plane to operating the airport.

While the Brayton Aeronautical Training Division is not large, students find it a thorough school and have had virtually one hundred percent success in being placed in jobs. Brayton realizes that nothing short of excellence has any place in any phase of aviation and that failure of a student to attain the minimum required standard for a term's work makes it necessary for him to make up this deficiency. Two term failures make withdrawal from the school mandatory.

Characteristic of Brayton and his staff, however, is their earnest love for flying. The officers take a special, personal interest in every student and are usually able to help direct him into the phase of aviation most suited to his personality, aptitude and needs.

Educational requirements normally are graduation from a four-year high school, but in some cases this requirement is waived, due to the fact that so many young men had their education interrupted during the war. Educational requirements for Aeronautical Engineering are graduation from a four-year high school, with two and one-half units of high school mathematics and, in addition, physics or another science. A physical examination is required for all courses in which flying is included.

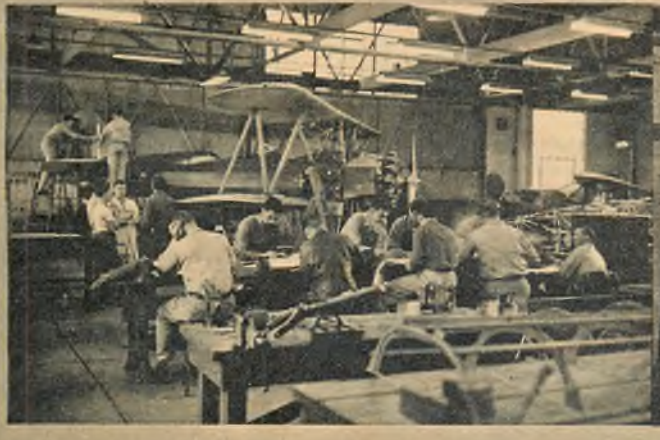
One of the most popular courses is Base Operations and Maintenance. At the very outset, Brayton points out that learning to become a base operator is more complex than learning to operate a garage. An airport is often a small city in itself and each operation, from the handling of passengers and visitors to the maintenance and service of airplanes, calls for technical skill, knowledge and training. The course requires a total of 2,285 hours plus flight instruction, and includes everything from basic mathematics to meteorology, navigation, office management, airport location and planning and such technical courses as complete power plant problems from construction to trouble-shooting. The student is graduated and awarded a diploma from Brayton's only after he has passed both written and practical tests for the Airplane Mechanics License, the Airplane Engine Mechanics License and the Private Pilot's Rating, at which time he is qualified to take the written and practical examinations given by the CAA for these ratings.

Another branch of the (*Continued on page* 83)

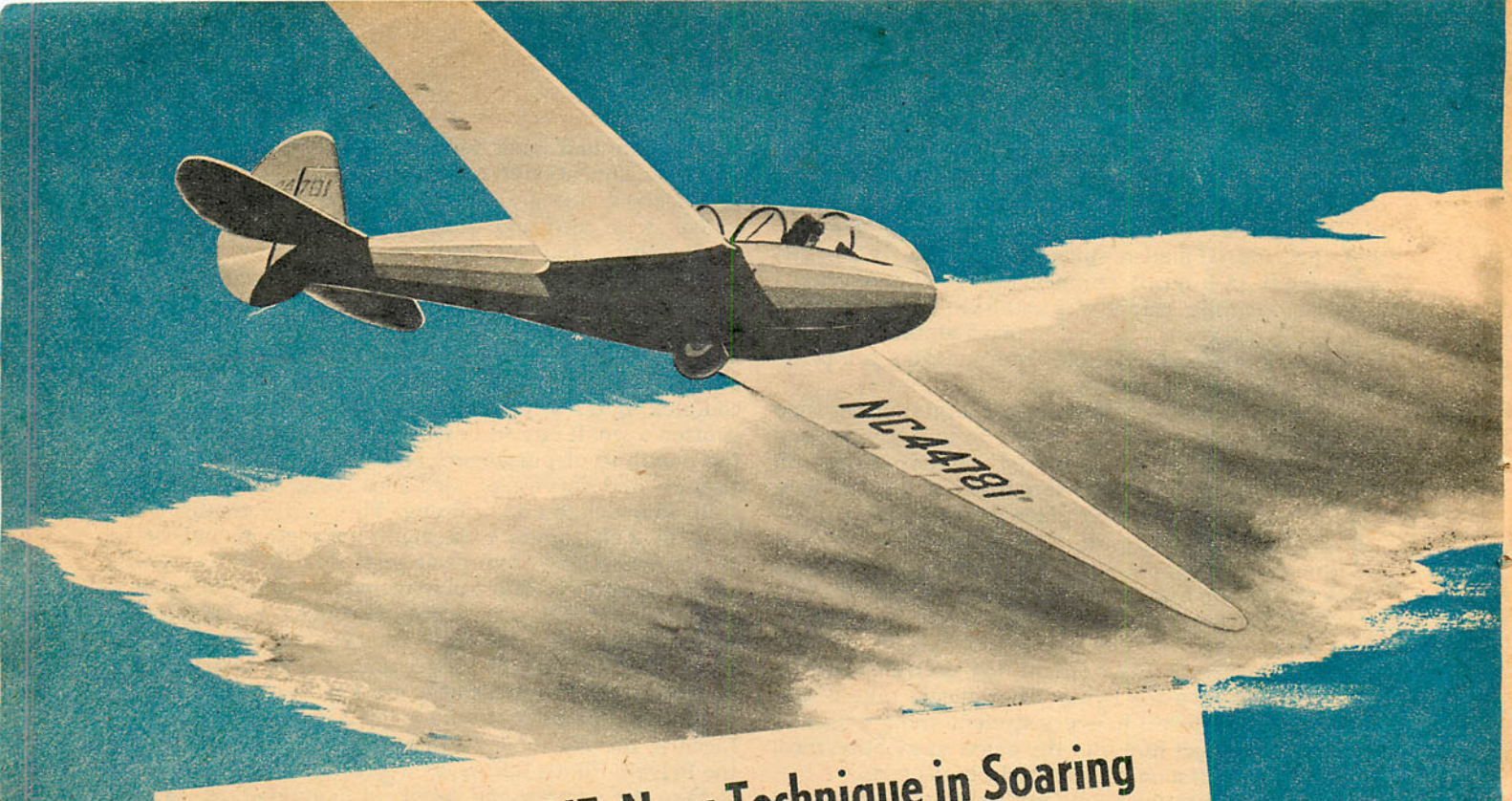
● G. S. Subraniam, left, Deputy Director, Civil Aeronautics Department of India, at Brayton to study school's operation methods.

● Students practicing propeller installation. In the engine mechanic's course they are given practical training on variety of engines.

● Future aviation mechanics get thorough training in such aspects as rigging, weight, and balance, as well as aircraft inspection.



● Hydraulic system mock-up teaches operation, trouble-shooting and maintenance of gear retracting mechanism, flaps and brakes.



STANDING WAVE: New Technique in Soaring

UNTIL recently all soaring flights were made on two types of up-currents —those formed by the wind striking the side of a mountain, and those resulting from uneven heating of the earth by the sun. These up-currents, known as thermals, produce the cumulus clouds inside of which sailplanes find lift reaching up to better than 20,000 feet.

Just prior to World War II, German soaring pilots discovered another source of lift prevalent under high wind conditions in the lee of large mountain ranges. Fast moving air spilling over the obstacle created a condition similar to water rapids; a series of waves or "bounces" extended down-wind of the range (see illustration). The zone of ascending air was marked by a lens-shaped cloud, called "Lenticular," which unlike other clouds remained stationary for hours. Several thousand feet directly below it lay strato-cumulus roll-clouds which rotated with their axes parallel to the wind. An extremely strong and smooth lift area was found in front of the clouds, but the border of the rising air was marked with a turbulent maelstrom of ascending and descending currents. The lift reached well into the tropopause, the atmospheric belt between the troposphere and the stratosphere, dying out at the base of the lenticular clouds, generally at an altitude of 30,000 to 40,000 feet.

Utilizing these up-currents, a German soaring pilot, Erich Kloeckner, reached a height of 37,800 feet in 1940. Betty Loufek's flight was made by utilizing this phenomenon which has now acquired the name of "standing wave," and recently two of America's outstanding sailplane pilots, 1948 National Champion Paul Maccready, Jr., and 3-times champion John Robinson, achieved altitudes of 29,000 and 33,300 feet above sea level, respectively, during a soaring meet at Bishop, Calif. Vertical velocities generated by the standing wave often exceed 2,000 feet per minute, and on at least one occasion were recorded at better than 6,000 feet per minute.

To a sailplane, altitude means distance. From a height of 30,000 feet a good soaring machine can cover at least 150 miles. In mountainous terrain, such as the High Sierras, the standing wave condition may extend for hundreds of miles, and as the lift is very strong, a high-performance sailplane can fly at speeds neighboring on 100 mph and still maintain altitude or even climb, because the increase in sinking speed due to (*Continued on page* 104)

S. CALHOUN SMITH

Record Flight

By BETTY McMILLEN LOUFEK

A Lady-bird and her motorless craft soar to a new altitude record

HARLAND ROSS and I pushed the green-and-white Laister-Kauffmann two-seater sailplane out to the runway. We wheeled it about into take-off position and Ross lowered to the ground the wing he was holding. The 300-foot nylon tow rope already lay stretched out in front of us.

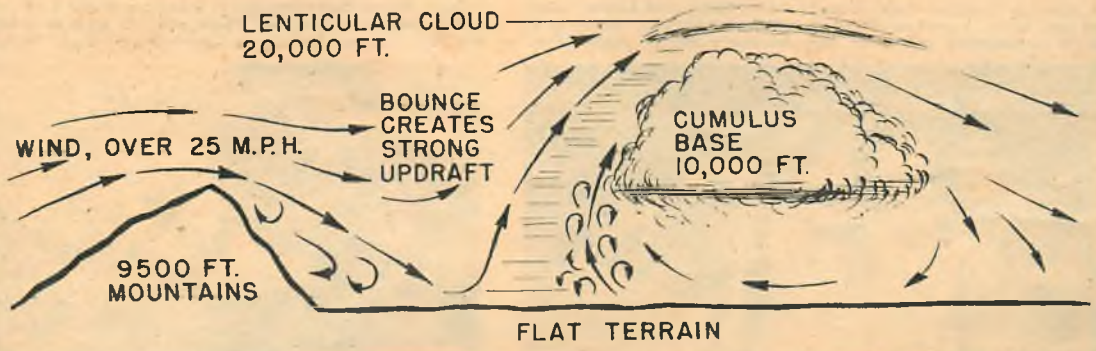
"Now, listen, gal," Ross said, "the 'standing wave' is about as good as it will ever be. This is the day you should be able to make your Silver 'C' distance and maybe get your Golden 'C' altitude. And if you get as far as Inyokern, you'll have the Women's National Distance Record. Land there if you are scraping the sagebrush. Don't stretch your luck."

(The Silver "C" is issued to soaring pilots who have made flights of at least five hours' duration, covered a distance of not less than 32 miles and reached a minimum altitude of 3,200 feet. The highest award is the Golden "C" for which the candidate must make two flights, one to an altitude of 9,840 feet, and one covering a distance of not less than 187 miles.—EDITOR.)

Inyokern lay 120 airline miles south of Bishop (Calif.) airport, the point of my take-off. That was my goal, but whether or not I made it I was determined to make my Silver "C" distance, the Silver "C" being one of the goals set up for its members by the Soaring Society of America. The distance flight would complete the requirements for it. Up to then only one American woman held this award, Virginia Bennis, of Sanford, Florida.

Bishop soaring being what it is, I had completed the five-hour duration flight requirement on my fourth solo flight in the LK sailplane by ridge-soaring the White Mountain range for six hours and eight minutes. Later I completed the altitude requirement by soaring 7,100 feet above release point on a 39-mile flight down Owens Valley from Bishop to Independence.

Previous to this, my soaring experience, outside (*Continued on page* 105)



CIVIL AIR PATROL NEWS
HIGHLIGHTS OF SENIOR
AND CADET ACTIVITIES
FROM COAST TO COAST

C.A.P.

CAP DIRECTORY PART I

• If you're interested in joining the Civil Air Patrol write to the Flight or Squadron nearest your home for information. Units are requested to advise Air Trails of changes in names and addresses *for this directory.*

ARIZONA

Ajo—Bowen Kindred Bx 125
Globe—G A Banks 1436 Broad
Phoenix—A O Riggins Bx 29
Prescott—J A Bucher Municipal Airport
Tempe—Angus Furr 115½ W 8th
Tucson—C A Baker Bx 2627
Winslow—G N Olmsted Municipal Airport

COLORADO

Almamosa—N F Kramer Airport
Antonio—J N Hurst Cirrus Air Serv
Boulder—Walter Goodell 2121 Walnut
Craig—O C Le Boutillier
Delta—E C Baker Starr Nelson Airport
Denver—W E McCray 5580 N Federal Blvd
Denver—Irene Pritis 851 Leyden
Denver—W L Weisgerber 2142 Vine
Denver—L L Petersen 772 S High
Denver—W C Bohanna 125 Hooker
Denver—Sam Maynard 2028 S Corona
Denver—C A Slott 7490 W 20th Av
Durango—P B Hawley Bx 405
Florence—W B Wood Fremont Air Serv
Ft Collins—R L Berger 227 Scott Av
Glenwood Springs—Cran Rader Rader Flying Serv
Grand Junction—H E Hammond Bx 30
Greeley—F D Bacher 815 16th
Greeley—W A Carlson 1815 13th Av
Longmont—Noland Fry Longmont Nat Bank Bldg
Montrose—R M Wenger Rt 2 Bx 130
Rifle—F K Wilson 118 W 3rd

FLORIDA

Avon Park—Bx 507
Ft Myers—Bx 1488
Jacksonville—Bx 1355
Jacksonville—Bx 4363
Jacksonville—Bx 5097
Jacksonville—563 Riverside Av
Jacksonville—3900 Richmond
Miami—2585th AFRTC Miami International Airport
Naples—Municipal Airport
Panama City—Bx 558
Pensacola—Bx 1268
Sarasota—Sarasota Bradenton Airport
Stuart—Bx 1212
St Petersburg—1026½ 13th Av S
Tampa—506 S Habana Av
Winter Haven—Gilbert Field
Winter Park—Bx 906

ILLINOIS

Alton—C E Hodge 913 Vista
Aurora—A E Congrave RD 2 Bx 132 Wheatland Field
Bartonville—Ronald McCowan 6305 Monroe Blvd
Belleville—LeRoy Schaefer 441 N 5th
Bloomington—R H Smith 110-12 W Grove
Champaign—J L Carter 511 E White
Centralia—Joe Keister Bx 103
Chicago—C W Peffer 6521 Ellis Av
Chicago—G C Nash 5847 S State
Chicago—H S Campbell 5001 W 67th
Chicago—J D Kirby 3457 W 64th
Chicago—J W Sirbek 13115 Ave C
Chicago—J V Smith 13247 Commercial Av
Chicago—L C Preckner 33 E 152nd Harvey
Chicago—Mildred Van Schoick 1435 E 60th
Chicago—M J Lucas 72 W Adams
Chicago—N H Knuth 2617 N St Louis
Chicago—Walter Barc Jr 2306 S Hoyne
Chicago—W J Gartz 15 N Keeler Av
Collinsville—B H Greer 114 N Hesperia
Crete—G O Nagle Lincoln & Exchange St
Danville—Dale Smith 1807 E Main
Decatur—Alex Van Praag Van Praag Equipment Co
E Alton—C P Taylor 3530 Western
E St Louis—W L Eisele 1906 N 21st
Evanston—H L Weaver 1817 Asbury
Highland—L A Zbinden 1818 Olive
Joliet—Harvey Steffer Wilhelmi Airport
Maroa—W D Keyes High School
Maywood—E H Volini 217 S 18th Av
Northbrook—G M Dunlap Sky Harbor Airport
Park Ridge—P O Fischer 15 N Delphia
Peoria—Lucille Lammers 726 Matthew
Quincy—W E Heberling 439 N 3rd
River Forest—W S Adelman 1514 Williams
Shelbyville—Kenneth Burk 821 W-S 3rd
Springfield—R T Dowling Lincoln Ord Depot
Springfield—G E Imhoff 519 N 8th
Vandalia—R H Williams 303 S Pine

LOUISIANA

New Orleans—R E Barker 3701 Canal
New Orleans—Ethel Kerber 833 Gallier
Alexandria—E A Baker 306 15th
Baton Rouge—E E Maser Aero Dept State University
Covington—W R Privette 1410 21st Av
Lafayette—R E Chaplin 327 Stevenson Av
Lake Charles—K B O'Connell 1113 Oklahoma
Monroe—Jack Hover 2714 Gordon Av
Shreveport—Hal Arthur Forbing
Ruston—S L Stuckey Bx 304
Sledell—P D Pravata Fremanx
Welsh—T J Fear Jr

MARYLAND

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Baltimore—Edgewater Apt 106
Baltimore—4403 Elderon Av
Baltimore—4529 Homer Av
Cumberland—Bx 923
Ft Meade—Bldg T-644
Hagerstown—2 North Av

MICHIGAN

Battle Creek—Charles Titler 95 Jericho Rd
Detroit—Wesley Hopp 19150 Teppeet
Detroit—Bernard Duoweke 2983 Berwick Av
Detroit—Blucher 14375 Stansbury Av
Detroit—P R Maguire 18219 St Marys Av
Detroit—Wm Frasure 14268 Appoline Av
Detroit—Earsley Taylor 241 E Forest Av
Detroit—J W Higgins 16129 Mack Av
Detroit—Margaret Mac Murtie 544 Emerson Av
Elsie—S J Keys 241 W Main
Flat Rock—A H Stults Bx 362
Flat Rock—E V Bennett 29163 Walnut
Flint—B F Miller 407 E Kearsley Apt 5
Flint—Jack Bush 622 E Court
Gladwin—A R Harold Rt 2
Grand Rapids—G Van Otheran 936 Lake Mich Dr
Grayling—John Selesky 414 Cedar
Holland—Charles Sligh Jr Rt Beechlawn
Kalamazoo—Carroll White 713 Jackson
Lansing—N K Jepson 309 Seymour Av
Melvindale—Wm Beard 17398 Hanna Av
Mt Pleasant—Art Savage
Metamora—L B Laur 4180 S Oak
Muskegon Hts—P B Hubbell 641 Baker
Perry—Norman Cain 129 N Main
Pontiac—Don Bussard 382 N Saginaw
Port Huron—D B Cole 1412 22nd
Romeo—R B Holmes 229 Lafayette
Saginaw—Becky Thatcher 502 N Webster
Saginaw—D B Milsted 5120 S Washington Rd
St Ignace—Richard Welch Bx 313
Traverse City—Carl Anderson 602 S Union
Utica—Judge Charles Merritt City Courtroom
West Branch—Azel Mead State Police Post
Ypsilanti—Beth Rust Bx 56

MINNESOTA

Albert Lea—Russell Sorenson c/o Olson Mfg Co
Hibbring—Grover Hines 3409 4th Av W
Minneapolis—Arthur Tourangeau 5 E Lake
Mora—J T Barnes
Rochester—Stanley Whiting 912 8th Av N W
Robbinsdale—Russell Holt 3860 W Bdwy
S St Paul—H F Howe 216 5th Av S
St Paul—T Doherty Ramsey School 1703 Grand Av
Virginia—Vernon Thomas Bx 263
Waseca—Clifford Bartelt Bx 175
Winona—Sanford Tyler Sr High School

MISSISSIPPI

Columbus—c/o Royal Crown Bottling Co
Greenville—404 Orlando
Gulfport—2001 25th Av
Jackson—Bx 2007
Leland—105 California Av
Ocean Springs—Bx 195
Pascagoula—c/o Little Steak House
Vicksburg—3119 Washington

MONTANA

Circle—Louis Schnebley
Conrad—J M Mamuzich
Cut Bank—Robert Fagan
Ft Peck—R P Erpelding Bx 1755
Great Falls—Philip Teakles Bx 344
Kalispell—Silas Westfall
Miles City—James Carmichael Bx 479
Scobey—Arnold Fredriksen

NEBRASKA

Ainsworth—Henry Miles
Alliance—C L Bill Bx 323
Bayard—J L Lewis Bx 301
Beatrice—C A Gibson 501 S 8th
Chadron—P E J Brooks Bx 1314
Crete—Arthur Aksamit
Gering—C P Demott 1545 11th
Grand Island—H L Coleman 523 N Jefferson
Hastings—H E Dwyer 212 N Cedar Av
Kearney—A B Jeikert 1310 Ave G
Lexington—Herschel Amrine Bx 326
Lincoln—O T Powell 3428 P St
Norfolk—Howard Murphy Bx 427
N Platte—J O Jenkins Bx 653
O'Neill—Freeman Knight
Omaha—Lucy Daniels 1615 N 22nd
Omaha—L A Cutler 6227 Florence Blvd
Omaha—P J Stavneak 6701 Florence Blvd
Ord—William Steen
Plattsmouth—B E Evans c/o High School

NEVADA

Battle Mt—Rene Le Maire
Carlin—N A Drennan
Gardnerville—Fred Minchin
Reno—Les Connolley Bx 1290
Smith—Frank Mann

NEW HAMPSHIRE

Claremont—J F Howe 97 Pleasant
Dover—Louis Stocklan 67 Stark Av
Goffstown—R D Bailey High School
Gossville—H L Stevens Bx 2
Groveton—D D Pike Bx 115
Hinsdale—Raymond Hildreth
Keene—Rita Carter Jordan Rd Rt 1
Laconia—F D Morin 614 Main
Portsmouth—Raymond Whitcher 112 Circuit Rd
Tamworth—F G Cleveland

OREGON

Central Point—Bx 267
Eugene—Bx 828
Hood River—RFD 1
La Grandi—Civil Air Patrol
Lakeview—367 "G" St S
Pendleton—Municipal Airport
Portland—4003 S E 29th Av
Redmond—Roberts Field
Salem—1638 S Commercial
St Helens—Bx 1015 Sta A
The Dalles—222 W 10th

TEXAS

Austin—L J Marks Rt 2 Bx 108a
Balmorkea—J K Smith Bx 205
Beaumont—Pat Burrell LaSalle Hotel
Big Springs—W D Berry 106 Cayton Dr
Bryan—G H Deaton 116 S Main
Dallas—R C Hartman 206 Mt Shasta
Edinburg—M H Ciarlariello 816 S Closner
El Paso—W M Follett 3128 Pershing Dr
Ft Stockton—O B Carthen Bx 922
Ft Worth—M W Cox Rt 10 Bx 221
Galveston—R J Swanson 2610 Av Q½
Georgetown—W H Shipp Jr 1807 Austin Av
Graham—V O Rosser 614 3rd
Harlingen—V W Walsh 109 Van Buren
Houston—F D Newton 4036 Villanova
Houston—Henry Sauer 4202 Roseneath
Lubbock—H A Moore 2504 N 4th
Lufkin—P R Wilson Texas Forestry Ser
McKinney—H L Dyer 112 E Louisiana
Mineral Wells—T E Hubby Municipal Airport
Monahans—V N Beckman Saunders Motel

(Continued on page 91)

• M/Sgt. Carroll Sorenson shows Cadets Rollin Conly and Lowell Baker of Albert Lea, Minn., Squadron the front office of a trainer. Major S. R. Sorenson is commanding officer of this extremely active organization.

• Capt. Arlene Davis introduces members of the Cleveland, Ohio, all-girl C.A.P. Squadron to AT-6. There are 140 girls in outfit. Girls over 18 who have "graduated" from Cadets assist Capt. Davis in the program.

NEWS

JOIN THE CAP CADETS! MEMBERSHIP OPEN TO ALL BOYS AND GIRLS BETWEEN THE AGES OF 15 AND 17

Patrol Entertains Students

Through the cooperation of the Civil Air Patrol, 34 students from 17 nations participating in the Marshall Plan recently visited the United States to study the American educational system, form of government, and way of life.

The students were housed by American families and attended schools designated by the Metropolitan Study Council of Columbia University.

Starting January 23, they toured the United States, visiting Nashville, Dallas, Ft. Worth, Phoenix, Los Angeles, Albuquerque, Denver, Detroit and Washington.

Reserve Component Set Up

National Headquarters CAP has established a reserve component for the CAP, patterned after those of the military services.

Officers or other personnel who find it necessary to withdraw from active participation in CAP yet desire to maintain their contact with the organization, may transfer to the reserve, provided their separation is under honorable conditions and the applicant maintains a permanent residence within the U. S. or its possessions.

Forms for transfer to the reserve are obtainable from Wing Headquarters and transfers will date from the time of receipt of application at National Hq.

All commissions in the Officers Reserve CAP and the reserve status of enlisted personnel will continue in force for a period of five years unless sooner revoked by National Headquarters or upon request of the reservist concerned. Rank or rate assigned the reservist will be that held at the time of transfer, provided such rank or rate has been in effect for a period of at least six months.

Quick Action Saves Plane

Two unidentified lightplane flyers in Minnesota are paying tribute to the quick thinking and quick acting of two members of the Mora, Minnesota Squadron.

The two CAPers, Lts. Shepard and Hack, had just left Mora Airport late one afternoon when they heard the hum of a lightplane motor. Soon the plane, a Piper Cub, was spotted against the lighter part of the western sky as the curtain of darkness fell. It was flying over the opposite side of the town from the airport.

A car was driven up on a rise by CAP Lt. Barnes so the headlights would point in the direction of the plane. The car lights were blinked on and off. The Cub circled and headed for the airport where it made a safe landing.

The Cub's two occupants admitted they were lost and their gas about gone. They were headed for an emergency landing on the fairgrounds race track; when they observed the signals and were guided to the airport.

The race track they had picked was covered with a new fill of soft dirt and on top of this a number of steel towers were being assembled, all invisible in the dusk!

NEW SCHOOL-CAP PROGRAM

CAP NOTES

What CAP Wing in the United States has the largest number of certificated teen-age flying members?

The South Dakota Wing appears, from information received, to be on top. Here's a few: Lawrence Youngren, 17; Walter Clark and Dick Clark, 17; Cleo Plaugher, 18, and Betty Engel and Jean Abbott, 19.

* * *

Col. Bertrand Rhine, California CAP Wing Commander for more than seven years, has resigned.

While Col. Rhine will not be connected officially with California CAP, he has promised to devote considerable personal time to its activities.

* * *

New York Wing CAP members are sporting special Civil Air Patrol license plates. The plates, made of aluminum and reflectorized in red and blue have in bold letters Civil Air Patrol and in smaller print "Aux. U. S. Air Force" and CAP insignia at each side of the plate, are obtained by members through Wing Headquarters for a nominal cost.

* * *

Every local CAP Squadron is delighted when a former member distinguishes him or herself. The Independence, Mo., Squadron is especially proud of former member Robert Andes, now a Navy seaman on a destroyer.

From the USN Destroyer Fox recently, Seaman Andes noticed weak flashlight signals which turned out to be the last desperate attempt of three downed flyers to attract a passing ship. The flyers had been in the water for 16 hours.

Andes' alertness saved the three men. It also earned him a 30-day furlough.

* * *

Oleta Claybaugh of the Idaho Wing CAP has designed one of the most popular features of all Wing publications, a "what-do-you-want-to-know?" column that really helps the Cadets.

Cadets fire their questions in each month, and they're promptly answered in the Wing publication by various officers of the Idaho Squadrons, or by Wing Headquarters.

CAP-AF Rank Equalized

Army, Navy or Air Force personnel presently on active duty with the Armed Forces but also participating in CAP work will not be able to hold a higher CAP rank than that which they hold in the military services, National Headquarters announced.

Effective January 1st, 1949, all such military personnel holding a higher CAP rank than their rank in the services revert to the rank they hold on active duty in the Armed Forces.

Proposed Plan Calls For Integrated Air Training

A far-reaching training plan embracing the cooperation of leading American educators will be presented nationwide by the Civil Air Patrol.

Cadets who successfully complete these CAP courses are to be issued certificates of proficiency which entitle them to a priority rating when applying for aviation cadet training, Air ROTC courses, or enlistment in the Armed Forces. Examinations will be semi-annual or annual, with grading to be done by National CAP Headquarters.

The program was outlined at a recent 3-day meeting in Washington of CAP's National Educational Advisory Committee. Prominent educators from government, schools, and industry, examined the proposed course, which is expected to get underway in the 1949-50 school year.

The plan is designed primarily around the CAP Cadet program (boys and girls 15 through 17). The educators concerned themselves with selection of appropriate material for the course of instruction, evaluation of existing text and reference material, and the determination of which subjects are appropriate for high school use, and which are straight CAP functions.

Material to be used will be designed to meet the curricular requirements of the various State Depts. of Education.

The proposed course is in three parts. The first is a basic unit including history and purpose of the CAP Cadet program, a study of the national defense establishment, classes in teamwork, pre-flight studies, activities such as model aircraft building, air marking, communications and photography, and a summer encampment.

The second unit deals with aviation science, including history of aviation, aeronautical mathematics and physics, theory of flight, navigation, communications, meteorology, and aviation aids.

The third unit deals with social science, with studies in how the plane has changed the world, and the implications of the air age.

The course is devised for instructors with limited experience in aviation education. Homework will not be assigned. Organizational activities are to be so arranged that Cadets will not have to sacrifice school studies for Cadet training. The natural interest Cadets have displayed in CAP courses will be an added incentive in increasing their interest in school subjects.

The three units are to be interchangeable between CAP and the high school. The high school will teach those studies in the program which are part of the high school curriculum; the CAP instruction will supplement the high school instructor's work in those phases of aviation education where facilities are more readily available to CAP.

(*Continued on page* 90)

"Having soloed is important, Ralph, but let's not overdo it!"

AIR TRAILS Solo Club

WHAT are your chances of surviving a washout? According to Crash Injury Research more than half of the washout crashes in private flying are survivable. Our concept of safety usually includes only the causes of accidents and stops short of the idea that accident fatalities can be greatly reduced by a better understanding of structures and their relationship to the human body.

Safety does not refer necessarily to the perennial charge that a philosophy of stall-and-spin-proof craft would automatically reduce by half the annual fatalities. It does refer to the fact that it is now possible through research to reduce mortalities due to unenlightened design. While lack of knowledge does not permit sweeping improvements, enough knowledge already exists to prove that chances of walking away from an accident are influenced by the type of airplane you fly. Whether auto or plane pilots, we are vitally interested in designs that minimize dangers in an accident.

During the past five years, Crash Injury Research has studied the causes of injuries and fatalities in more than 600 survivable accidents, principally in the kind of ships flown by us Solo Clubbers. Through a limited but useful understanding of the causes of such injuries, design changes have somewhat increased the chances of survival. But since basic crash facts remain unknown, judgment of the amount and duration of force survived is largely guesswork. So only the obvious causes of injury have been attacked, mostly by changes in cockpit and cabin installations. Lack of multi-G research facilities for studying the mechanics of structures and of the human body under heavy dynamic loads has left an important part of aviation's safety problem completely unexplored, according to CIR.

When someone walks away from a bad crash we are too apt to write it off as a freak. Actually, the human body will withstand a fantastic force if given a break. A workman who fell from a high smokestack landed on his side in loose rubble after a drop of 150 feet, making a depression some seven or eight inches deep. Because of even this slight cushioning only minor injuries were sustained despite a deceleration of nearly 200 G's. Investigations of fourteen similar falls indicated that decelerations of 100-200 G's can be survived when the force is brief and well distributed over large areas of the body.

"When airplanes first came into use, most crashes resulted from deficiencies of the aircraft," says CIR, "structural failures, fires in the air, instability in turbulence, and so on. Consequently, manufacturers concentrated their efforts on increasing the reliability of the airplane in flight. Today, the chief cause of airplane crashes is no longer the aircraft but directly or indirectly the pilot. Until some means is found to improve the judgment of inexperienced pilots, the surest way to cut not only deaths and injuries in private flying, but also the public's widespread fear of flying is to design a popular priced safety plane that is hard to get killed in."

Cushioning the cabin and protecting the occupants from crash dangers by intentionally designing surrounding structures to absorb energy during collapse is a completely undeveloped approach to the problem of offsetting the results of (*Continued on page* 101)

HOW TO BECOME A SOLO CLUB MEMBER

This club is open only to those who have actually soloed a heavier-than-air craft, either powered or motorless. It does not matter where or when the flight was made. Applicants must furnish the membership committee with a satisfactory proof of their qualification for acceptance. There are no dues. Once a member, always a member.

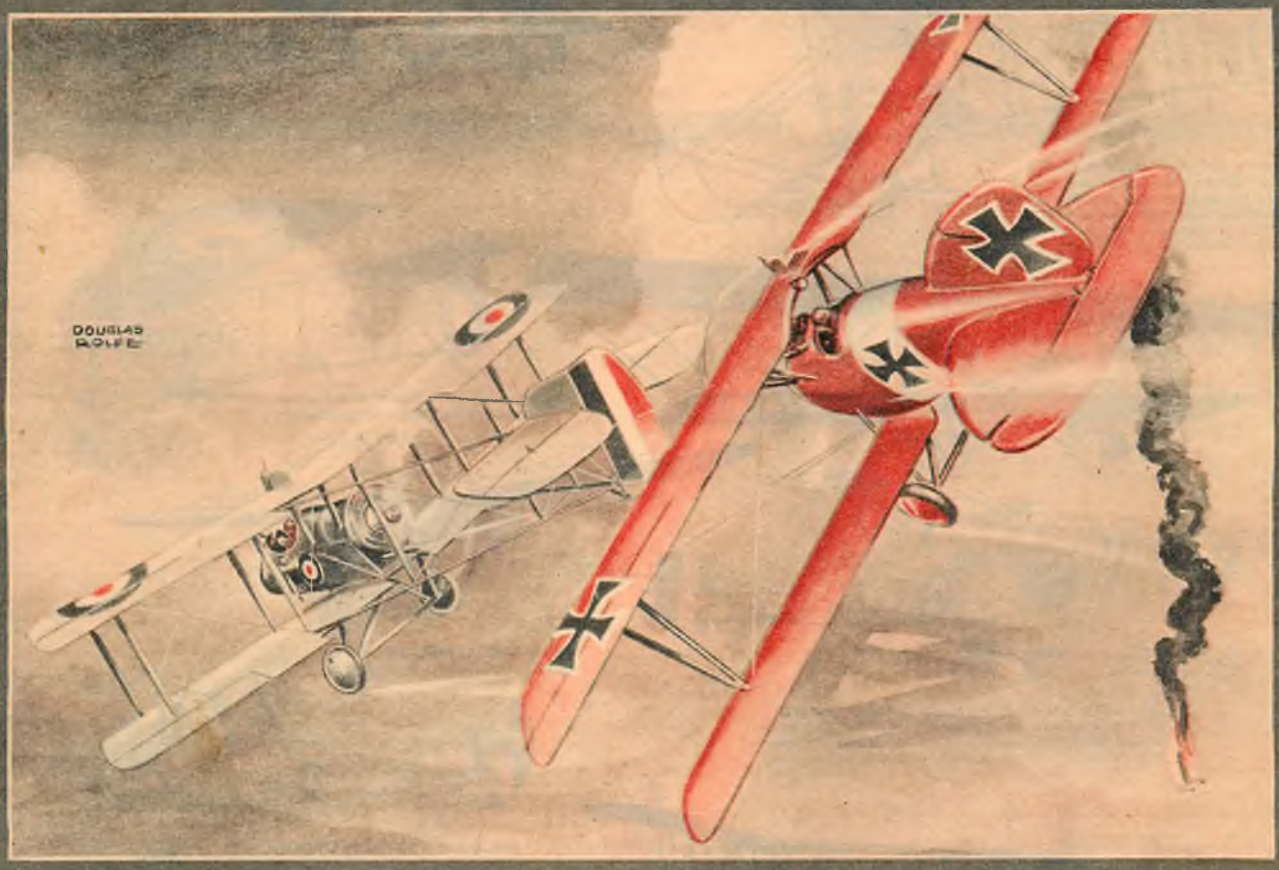
To obtain sterling silver Solo Club wings and life membership card, send coupon, with 75¢, to Solo Club Membership Committee, Air Trails Pictorial, Box 489, Elizabeth, N. J.

Proof of qualifications as a Solo Club Member:

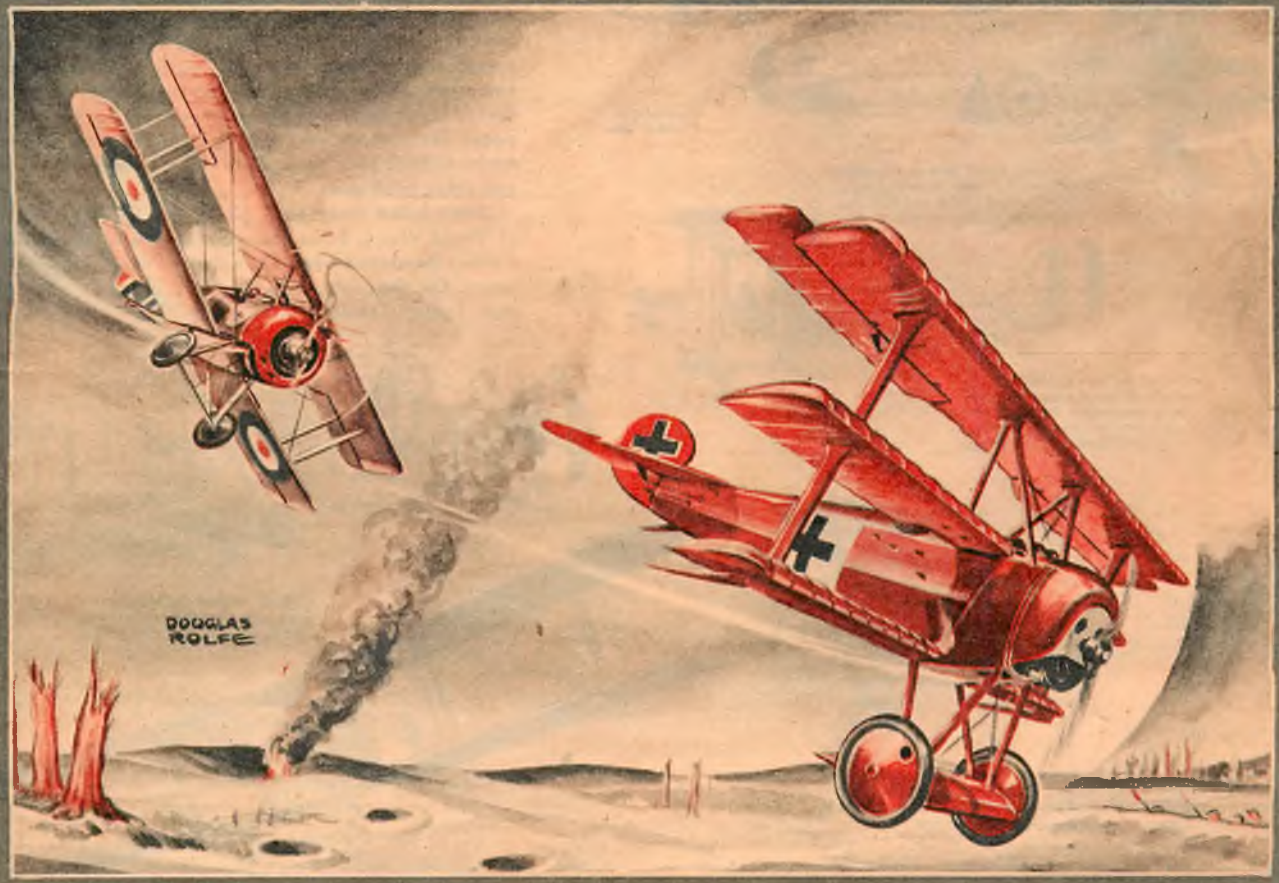
1. CAA Airman Certificate, number and rating.....
2. F.A.I. license and number.....
3. Evidence of: Service in Army, Navy air forces, either as a rated pilot or having received flight training including solo time (attach).

Applicant ..... Age.....

Street..... City or Town.....State.....

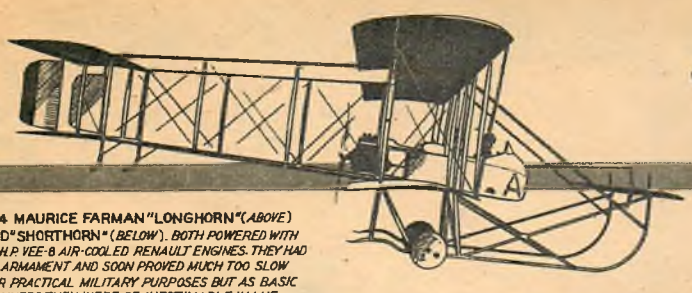


● Major Lanoe Hawker, V.C., commander of the Royal Flying Corps' crack No. 24 squadron, is shot down in a de Havilland DH-2 by the rising young German ace Rittmeister Manfred, Freiherr von Richthofen, whose victory was due to the fact that his heavier, more powerful (160-hp) Albatross D-111 could outclimb his opponent's single-seat fighter (100-hp Monosoupape Gnome rotary radial).

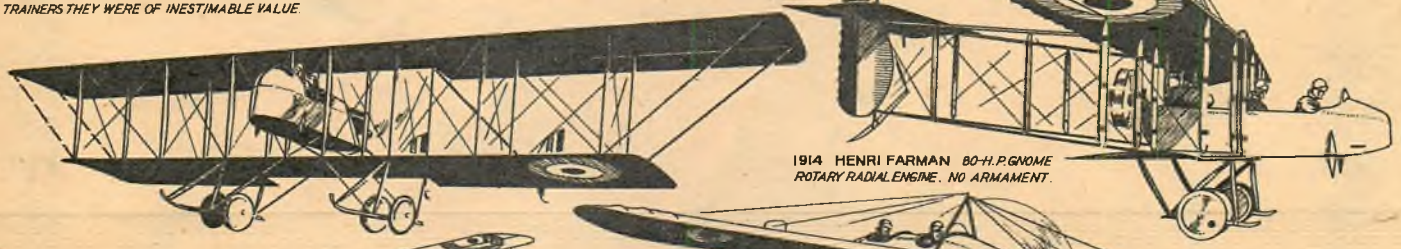


● End of von Richthofen: A young Canadian flying a Sopwith Camel catches the Red Baron near the ground in his Fokker Triplane DR-1 immediately after the German had shot down his last victim. The Camel mounted two .30-cal. synchronized Vickers guns; the Fokker had two .30-cal. synchronized Spandau guns. Sopwith had 130-hp Clerget rotary radial; Fokker, 110-hp Oberursel rotary.

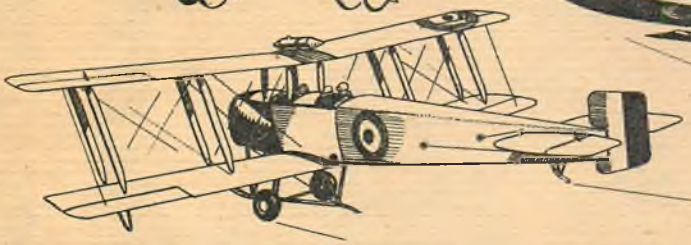
Air Progress



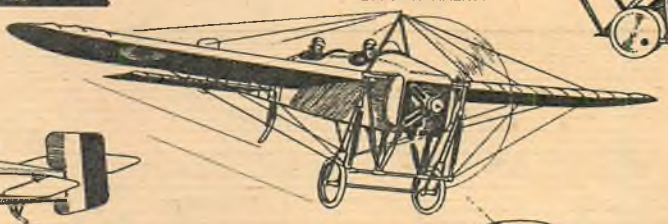
1914 MAURICE FARMAN "LONGHORN" (ABOVE) AND "SHORTHORN" (BELOW). BOTH POWERED WITH 70-H.P. VEE-8 AIR-COOLED RENAULT ENGINES. THEY HAD NO ARMAMENT AND SOON PROVED MUCH TOO SLOW FOR PRACTICAL MILITARY PURPOSES BUT AS BASIC TRAINERS THEY WERE OF INESTIMABLE VALUE.



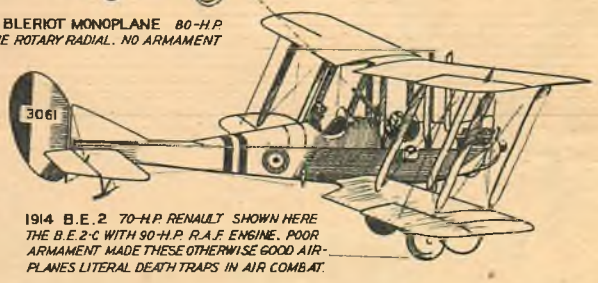
1914 HENRI FARMAN 80-H.P. GNOME ROTARY RADIAL ENGINE. NO ARMAMENT.



1914 AVRO 504-K 80-H.P. GNOME ROTARY. EMPLOYED AT FIRST AS AN ALL-PURPOSE WARPLANE IT WAS SOON WITHDRAWN FROM ACTIVE SERVICE TO BECOME, IN MODIFIED FORM, THE TOP BASIC TRAINER PRODUCED DURING WORLD WAR ONE.

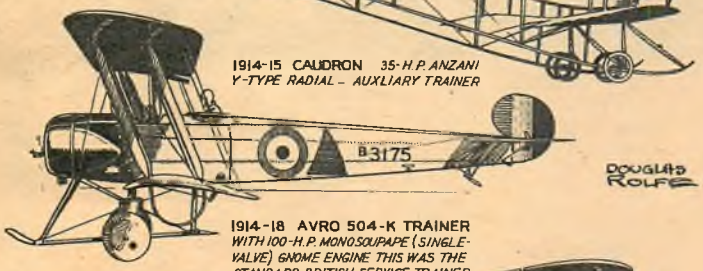


1914 BLERIOT MONOPLANE 80-H.P. GNOME ROTARY RADIAL. NO ARMAMENT.

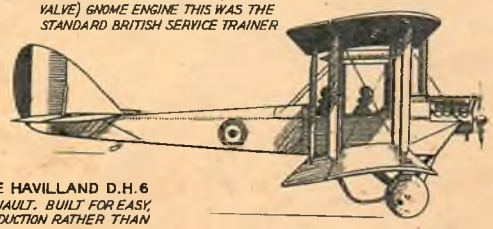


1914 B.E.2 70-H.P. RENAULT SHOWN HERE THE B.E.2-C WITH 90-H.P. R.A.F. ENGINE. POOR ARMAMENT MADE THESE OTHERWISE GOOD AIRPLANES LITERAL DEATH TRAPS IN AIR COMBAT.

1914-15 CAUDRON 35-H.P. ANZANI Y-TYPE RADIAL — AUXLIARY TRAINER



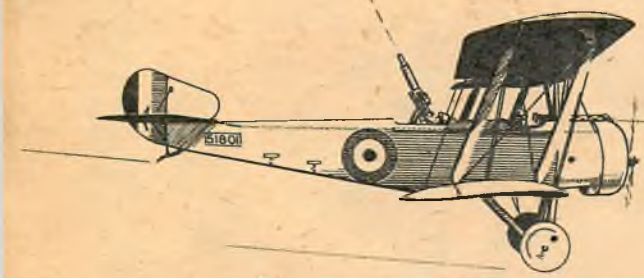
1914-18 AVRO 504-K TRAINER WITH 100-H.P. MONOSOUPAPE (SINGLE-VALVE) GNOME ENGINE. THIS WAS THE STANDARD BRITISH SERVICE TRAINER.



1916-18 DE HAVILLAND D.H.6 80-H.P. RENAULT. BUILT FOR EASY, RAPID PRODUCTION RATHER THAN FOR LOOKS THIS HANDY TRAINER WAS ANOTHER BRITISH SERVICE TYPE.

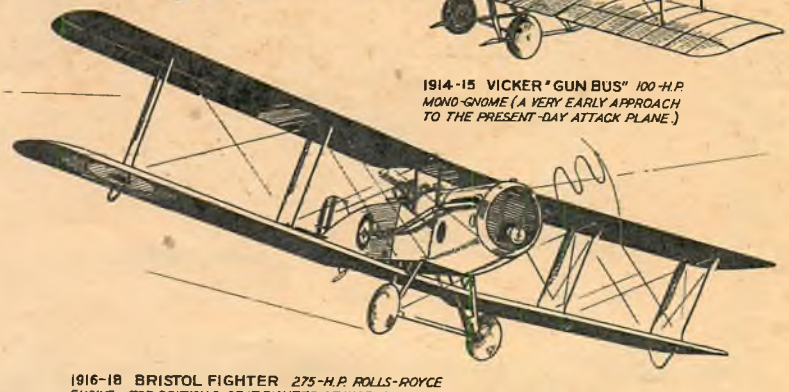
These illustrations depict the growth of Britain's Royal Air Force. Originally a detachment of the army balloon service, it became in 1912 the Royal Flying Corps with personnel drawn from the regular army. In 1914 the R.F.C. embarked on its first active service, taking to France the odd assortment of planes shown on the top of this page. These craft were totally unarmed and whatever aerial combat they engaged in was conducted with rifles and other small arms.

Shown below these early planes are the basic trainers of World War I. Below these come some of the two-seat fighters developed when serious aerial warfare came into being. On the right page we have a galaxy of single-seat fighters; three typical reconnaissance planes, and



1916 SOPWITH 1½-STRUTTER 110-H.P. AND (OR) 130-H.P. CLERGET ROTARY RADIAL. FIRST BRITISH TWO-SEAT FIGHTER WITH ROTATING REAR GUN MOUNT AND FIXED SYNCHRONIZED FORWARD-FIRING PILOT'S GUN.

1914-15 VICKER "GUN BUS" 100-H.P. MONO-GNOME (A VERY EARLY APPROACH TO THE PRESENT-DAY ATTACK PLANE.)

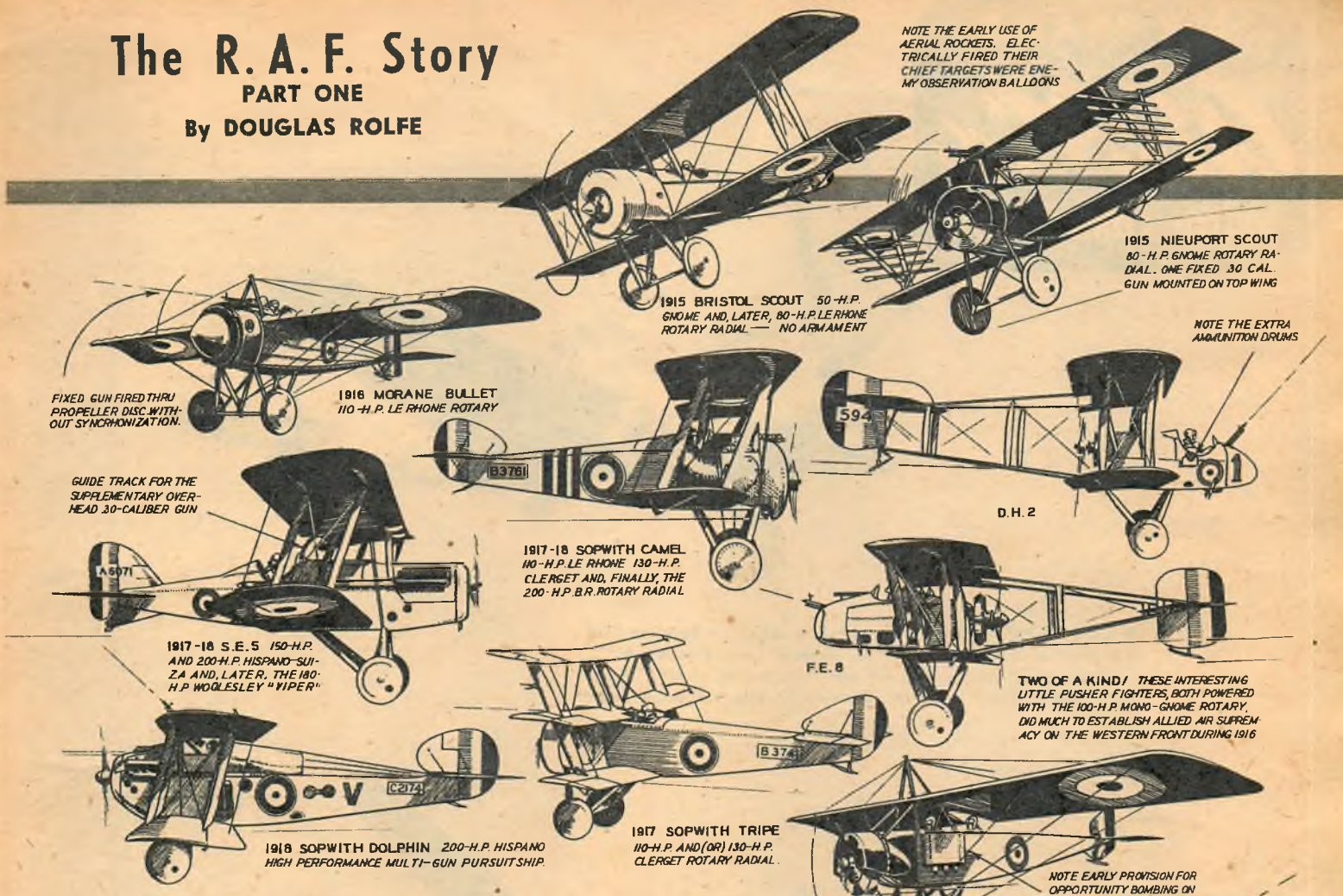


1916-18 BRISTOL FIGHTER 275-H.P. ROLLS-ROYCE ENGINE. TOP BRITISH 2-SEAT FIGHTER OF WORLD WAR I, THE FABULOUS "BRISFITE" COULD ACTUALLY OUT-FLY AND OUT-FIGHT THE VERY BEST PURSUITS OF THE PERIOD.

The R. A. F. Story

PART ONE

By DOUGLAS ROLFE

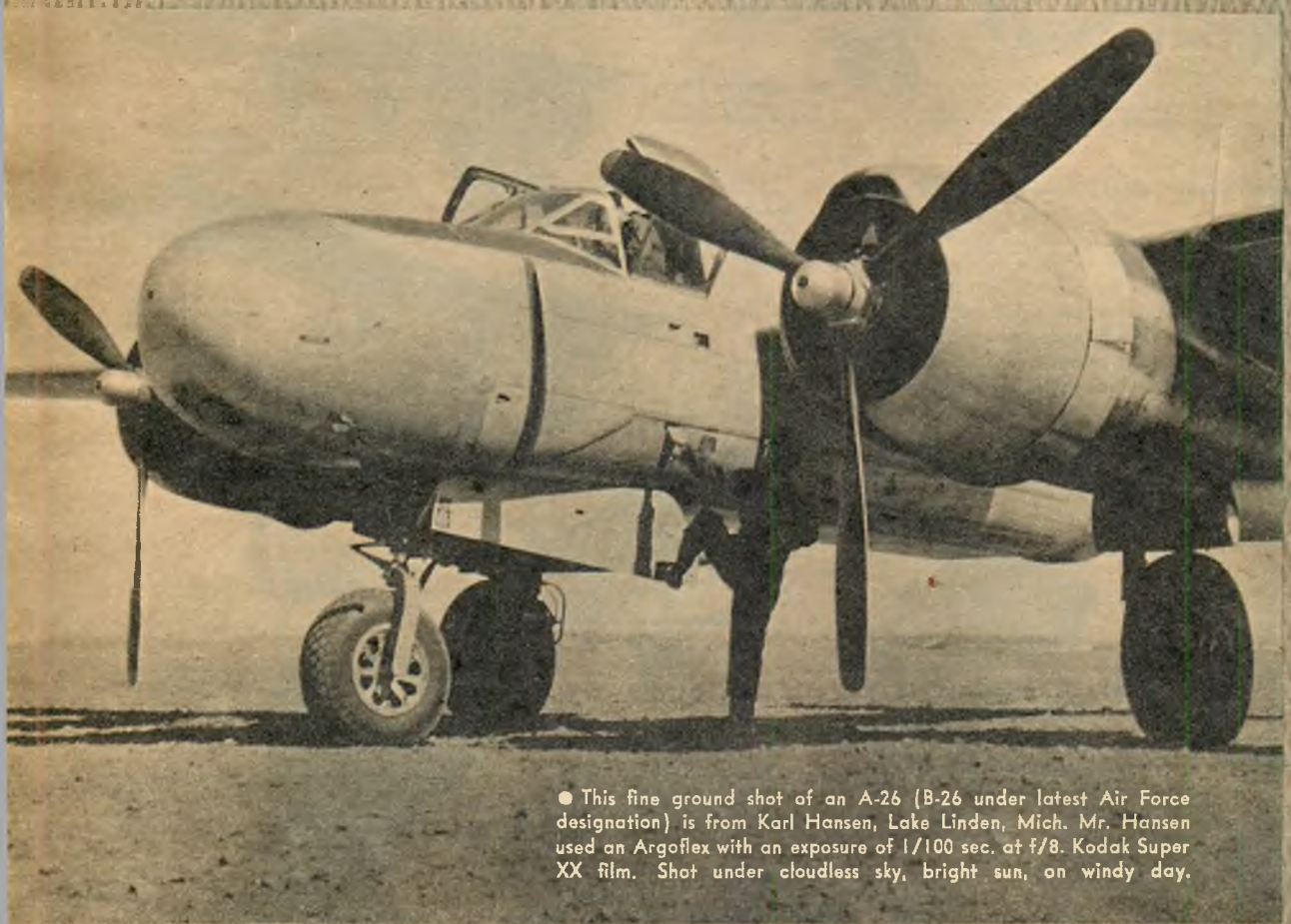


finally the standard day-and-night bombers used during World War I.

In early 1918 the R.F.C. and the Royal Naval Air Service were merged to become the first independent air force in the world. From an original war footing of less than fifty planes and a personnel of about 3,000 officers and men, the R.A.F. ended the war with a total strength of nearly 23,000 planes and a personnel of 30,122 officers and 263,410 other ranks. Service planes which did a doubtful 60 to 65 miles per hour in 1914 were now hitting between 135 and 150 mph, and aerial warfare had reached the point where the R.A.F. lost more than 900 pilots, gunners and observers in the single month of March, 1918.

AIR TRAILS Air Pix PHOTO COMPETITION

● Curtiss P-40F making practice strafing attack on Egyptian field is subject of this wartime shot by Howard Levy, Brooklyn, N. Y. Camera was Speed Graphic 4x5 with lens opening of f/4.5. Focal plane shutter speed 1/800 sec. Eastman XX film. K-2 yellow filter.



● This fine ground shot of an A-26 (B-26 under latest Air Force designation) is from Karl Hansen, Lake Linden, Mich. Mr. Hansen used an Argoflex with an exposure of 1/100 sec. at f/8. Kodak Super XX film. Shot under cloudless sky, bright sun, on windy day.

CONTEST RULES

This competition is open to all photographers—amateur or professional. Payment of $10 will be made on or before publication to those whose photographs appear.

Entries may be concerned with any phase of aviation, and should be glossy prints *not less than* 5 x 7 inches in size. Prints should be well wrapped and protected in the mails by stiff cardboard. Entries must be accompanied by name and address of photographer. Mail to Air Pix, c/o Air Trails, Box 489, Elizabeth, N. J. Because of the large number of participants, entries will not be returned.

Include full data on subject, camera and film used, exposure, lens setting, and conditions under which picture was made. List equipment for enlargement, printing paper, and all other pertinent information. Air Trails does not assume responsibility for entries. The editors regret they cannot enter into correspondence concerning contributions.

DE HAVILLAND 4

By WALTER A. MUSCIANO

One of the most famous "crates" in history makes an exceptional control-line model for C and D motors

A BRITISH design, the De Havilland 4 was one of the few designs built in the U. S. during World War I. Primarily intended for reconnaissance duty, it wasn't long before the D.H. 4 was bombing by day and night and engaging enemy fighters in combat. To say it was a rugged ship would be an understatement. Powered by either Rolls-Royce, Hispano-Suiza or the famous Liberty engines, the craft was turned out in great quantity during 1918 and came in a variety of modifications.

The first U. S. Air Squadron to fly in sorties over enemy lines used Liberty-powered De Havillands. This was in France on April 8, 1918.

On April 19, 1919, Capt. E. F. White flew from New York to Chicago (738.6 miles) non-stop in six hours and fifty minutes. Average speed was 106 mph and this flight established a distance record.

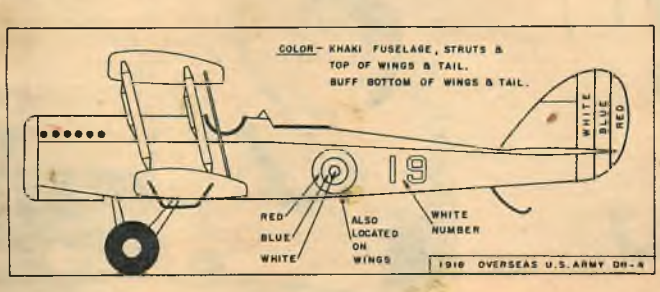
Four D.H. 4's covered 9,329 miles from New York to Nome, Alaska, and return with an average speed of 80 mph. Numerous stops were made. This flight took place during July 17 to 20, 1920.

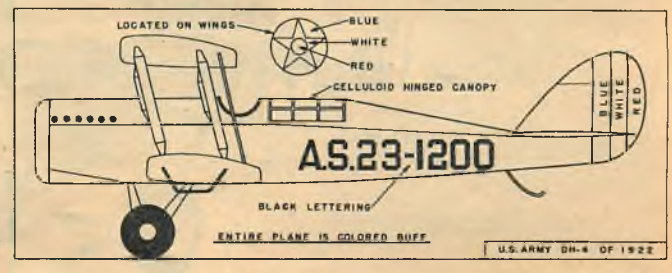
Many De Havillands were used on the early mail routes and were standard army equipment as late as 1925. A famous plane? You bet!

The Liberty-powered D.H. was selected for our control-line model because it was used not only by the English and Americans during the war but retained by the U. S. Army and Navy after the war and used for flying the mail. This fact allows a variety of insignia and color to be used.

The fuselage sides are cut from 1/4" medium sheet balsa. Be sure to cut away for the lower wing. Cement the mounts in their proper location. While this is drying, cut the bulkheads, bellcrank mount and horizontal tail surfaces. Bevel the rear of the fuselage as the plan view indicates and cement the sides together with the aftermost bulkhead in place. Attach the stabilizer atop the fuselage and let dry. Now bend the landing gear which is made in three pieces. These pieces are assembled before the landing gear is installed.

The joints should be bound (*Continued on page* 80)



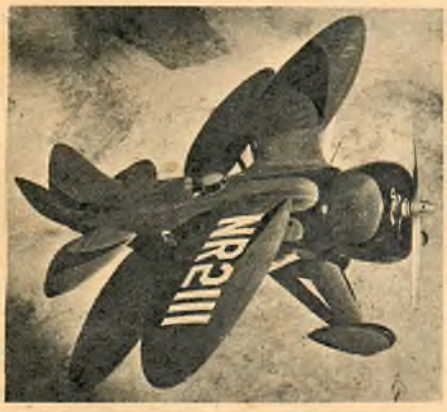


Model Matters

NEWS, VIEWS, COMMENTS, PHOTOS FROM MODEL CLUBS AND BUILDERS IN NORTH AMERICA AND OVERSEAS

● Payment of $2 to $5 is made on or before publication for photos of unusual interest sent exclusively to AT. No photos can be returned.

● Elliot Berelson, Brooklyn Mercury Mites club (right), gets some free advice from a youthful spectator concerning his Navion. Norman Rosenstock, noted speed man, makes some adjustments.



● Hall Racer built from A. T. plans by Thomas J. Jones, Little Rock, Ark. Powered by Ohlsson 23. Plane won first prize in Exchange contest.

DOPE CAN

CONDUCTED BY VAL A. LUCE

HERE'S some more news of the National meet which was announced in this column last issue for Olathe, Kansas, July 26 through 31.

Line-up of top officials will be as follows: Jess Hall, Olathe, contest director; Jim McClelland, Independence, Kan., contest supervisor, who will also handle rubber and glider flying, both indoors and outdoors; Richard Gelvin, St. Louis, U-control speed events; Roy A. Mayes, Berkeley, Calif., and Johnny Clemens, Dallas, Texas, U-control stunt competition; Leo Rutledge, Wichita, free-flight categories; June Pierce, St. Joseph, Mo., radio-control; L. L. Cooke, Kansas City, field manager; and Mr. and Mrs. H. S. Robbers, Oakland, Calif., recording and timing.

Timing will be done by Navy personnel under AMA-certified field judges. The Legion Memorial Building will be the center of all activity until July 25, then the scene will shift to N.A.S.

All planes and personal gear should be shipped by Railway Express direct to Olathe—addressed to the contestant, in care of Mr. Hall.

The Academy of Model Aeronautics will hold executive and leader meetings, in addition to contestants' meetings, during the competition.

On the afternoon of July 30, and again on July 31, the Navy will present an air show for the entertainment of contestants and spectators. A victory banquet will be held Sunday evening, July 31, after which the prizes will be awarded.

Maximum free-flight recovery will be assured by down-wind ramps, radio communication, recovery jeeps, flight cover provided by the Sheriff's Air Patrol of Jackson County and by the organized cooperation of surrounding farmers, state and local police patrol.

Eleven new records were established at the Nationals at Olathe in 1948 and free-flight recovery was 93.3%.

A complete line of model airplane parts and accessories will be available at the meet workshop.

Glow, Little Glow Plug: James Schenck of Pittsburgh, whose letter about a flying field was mentioned in a previous issue, sends along his method of guaranteeing that his glow plugged engine won't conk while testing a free-flight ship. Looks good, too, so here it is: He uses a manufactured fuel cut-off, actuated by an airdraulic timer. During the test period a pair of penlight cells, tied in with the timer, are used to keep the element glowing during low speed operation. (*Continued on page* 94)

● Control-line flying scale S.E. 5A model by Corbett K. Bates, San Leandro, Calif. Detail includes flexible Lewis gun, Hispano Suiza engine. Four-bladed prop is in order since some used 4 blades, some 2 blades.

● Contestant readies speed entry in contest at Hickam Air Force Base, Oahu, Hawaii, which marked opening of official U-control flying site at base. Officers of Pacific Air Command acted as judges; 200 entered.

• Another California contender! H. A. Sturtevant, Glendale, is proud owner of the 52" Waco U.M.F. from A.T. plans. Powered by Super Cyke, weighs 4 lbs., hits 47 mph. Has twin exhaust muffler, metal cowl, aircraft fabric covering, with red fuselage, white strips, silver wings.

• Super-detailed non-flying scale B-25, work of Paul Nock, Albany, N. Y. Took over 1,500 hours. He used 1/16" sheet balsa with 15 coats of filler and dope. Motors are built up and incorporate all external parts of prototype. 75-mm cannon in nose, Plexiglas turret, shock-absorbing gear.

• Kansas City, Mo., Municipal Auditorium, will be scene of '49 Nationals indoor flying. Height is 96 feet; narrowest wall-to-wall distance is 225 feet; lower ceiling is 75 feet.

• Dr. Walt Good (left), AMA contest board chairman, receives copy of Navy's 7-point model plane program from Rear Admiral E. C. Ewen, representing Secretary of Navy.

• Knight Twister of 41¼" span won 1st place in All Western meet at Las Vegas for Arthur C. Giddens, Boulder City, Nev. Weighs 3½ lbs. Plane is powered by Anderson Spitfire.

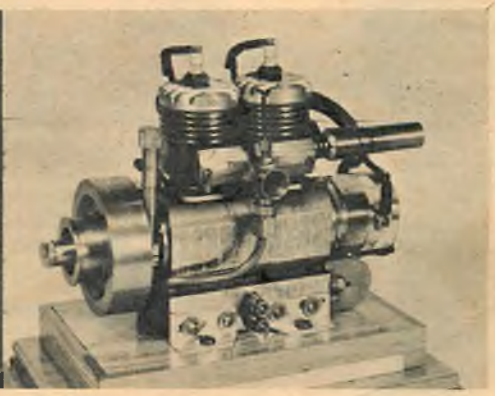
• Missouri Slope Airplane Modelers Assoc. members (Bismark, N. D.) travel around aiding small clubs. Here's team man expounding.

• Lawrence H. Conover, Iowa City, Ia., with his Ed Lidgard-designed "Hi Ho" Wakefield model. Power is 22 strands of T-56 3/16.

• McCoy-powered stunt job by a member of Texas City, Tex., club. Being symmetrical all around, you tell us when it flies inverted.

• William J. Orphan, Norwood, Mass., built this Boeing L-15A from Air Trails plans. Powered with glow plug Bantam. Boasts seats, safety belts, built-up instrument panel. Orphan re-elected president, Norwood SME.

• Alton A. Dorfmeier (1538 W. Clinton Ave., Fresno, Calif.) designed this alternate-firing, 2-cycle gas engine, about 8" long. Features 1-piece counter-balanced crankshaft, split connecting rods, 1-piece crankcase.



● Herb Kothe of Omaha, Neb., who took 1st place and $500 at the '48 Nationals in PAA-Load event, weighs in.

PAA THE SPONSOR SPEAKS

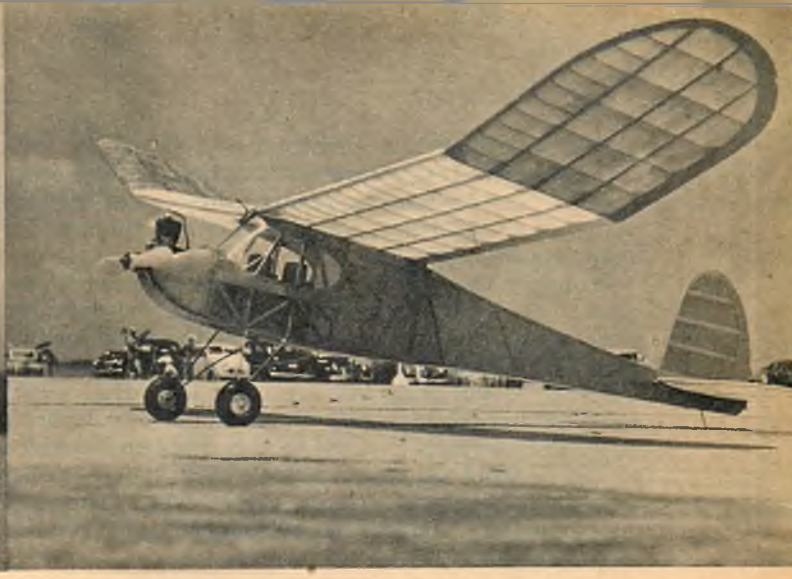
Pan American World Airways tells why and how a new free-flight contest was born. Will be held again at Nats and 17 meets

By DALLAS SHERMAN

ROARING in under full power where angels fear to glide, we are about to break through the supersonic barrier of contest officialdom and reveal the secrets of a sponsor. In the growing complexity of model airplane contests (and in big plane contests too, for that matter) the contestant and the sponsor stand at opposite ends of the poles, so to speak, with many and varied factors and personalities interposed between them.

The feelings and opinions of contestants have been stated forcefully and repeatedly, and although they are far from unanimous they serve good purpose in reminding us of the numerous elements—in addition to fickle Lady Luck herself—that the harried contestant must meet and conquer before he can carry off the prize hardware. Even with the best plane on the field, he must still take account of atmospheric conditions, field rules, surrounding terrain, the skills and temperaments of other contestants, processors, timers, judges, and even the spectators! Small wonder the contestant has little or no time left for the trials and tribulations of anyone else; in the heat of the contest (*Continued on page* 68)

● Clean lines of Kothe's 1st-place winner evident here. Door must be wide enough to admit "passengers," weighing 8 ounces each.



● Realism and weight-carrying possibilities are features of payload competition. Winning model has 68" span, Torpedo 29 engine.

PAA PAYLOAD WINNER

By HERBERT KOTHE

Winning flyer gives valuable data on design best suited for winning in 1949 contests

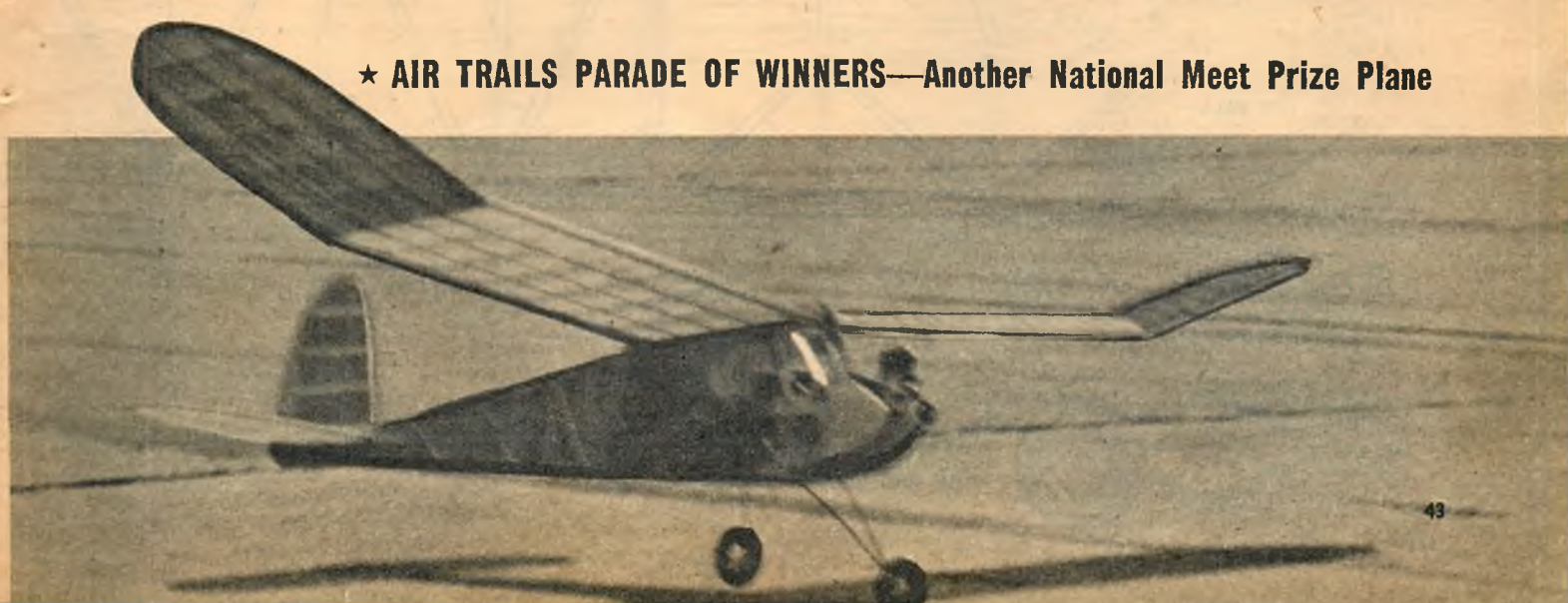
COMPETITION for the payload type model has been talked about for many years, but nothing was done about it until 1948, when Pan American Airways inaugurated their sponsorship of this event. PAA has opened the field of competition for an airplane which has had to take a back seat in recent years to the contest ship.

Heretofore realistic models have never had a chance in a contest which is predominated by the super-powered high-performance contest jobs of today. Now one can build realistic models with heavier wing loadings and be able to compete. Pan American Airways, by sponsoring the PAA-Load event, is endeavoring to stimulate the development of models that employ some of the same characteristics of commercial aircraft—that is, models that not only fly successfully but also carry a cargo or payload.

Rules adopted for the PAA-Load event are such that the design of the model is restricted to a certain degree. The rules state that the model must meet AMA specifications for class "B." In other words, the weight must be at least 100 ounces per cubic inch engine displacement and the engine must be no smaller than .20 cubic inches displacement and no larger than .299 cubic inches displacement. In addition to meeting the AMA rules the model must also conform to the requirements that apply only to the PAA-Load model. These rules state that the model shall carry in flight two dummy occupants, composed of a body 3″ x 3″ x 1″, each occupant weighing 8 ounces.

Except for balance purposes, neither of the occupants shall in any manner be essential to the operation of the model. The model must provide an enclosed compartment for carrying the occupants in upright positions relative to normal flight. Inserting and removing of each occupant must be convenient with the model completely assembled, except for the operation of the door(s) or hatch(es). Occupants may touch each other if seated side by side but there must be at least 2″ between them if seated tandem, one behind the other. Visibility must be provided each occupant to the front and to both sides through a windshield and windows (*Continued on next page*)

★ AIR TRAILS PARADE OF WINNERS—Another National Meet Prize Plane

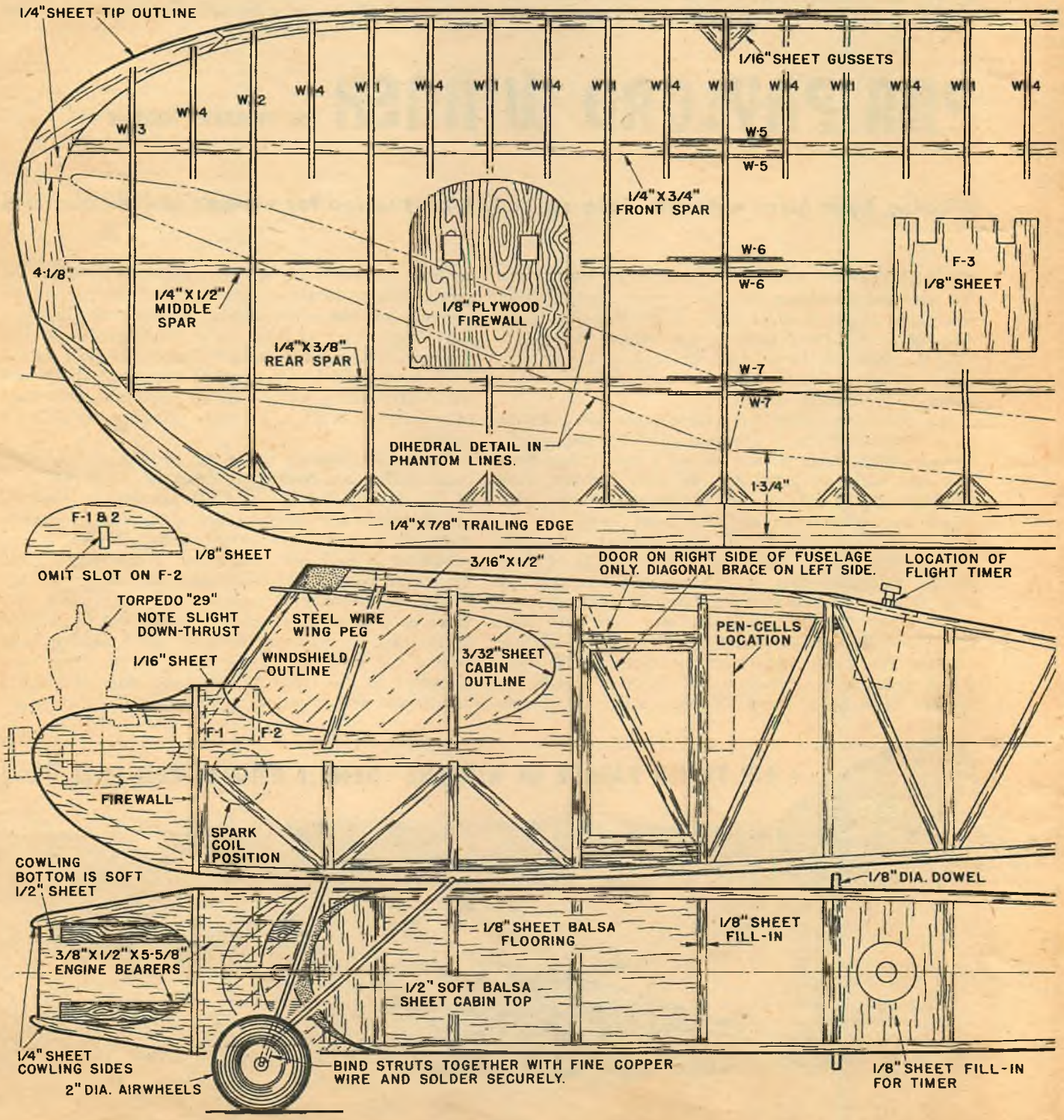


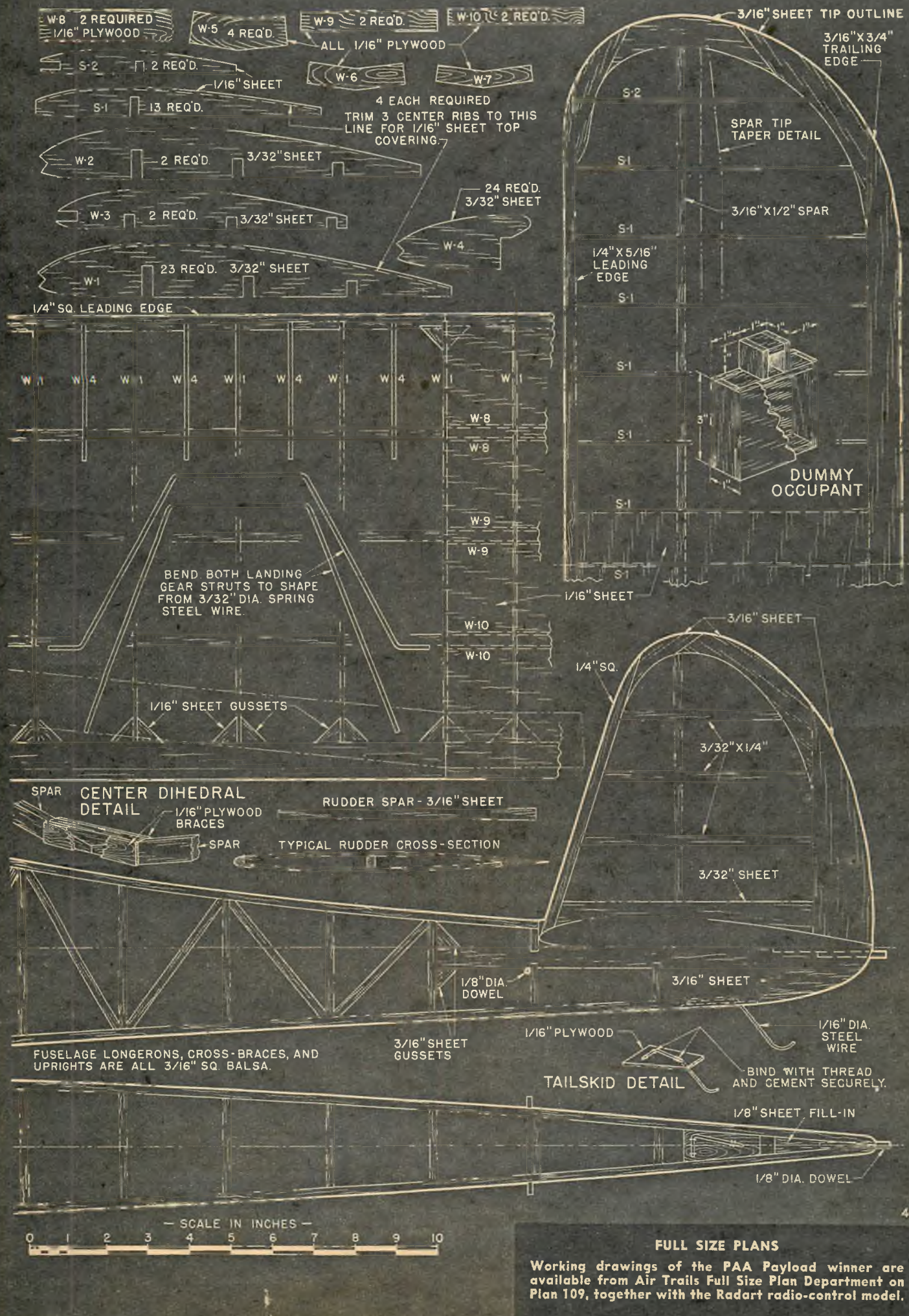
at least one inch high, unobstructed except for normal structural framework and the heads of the occupants. It can be seen by reading these rules that the design of a model that would conform to them would definitely be restricted.

Probably the design problem that resulted in the most deliberation was: what would be the optimum wing loading to use? Obviously if the wing loading were very high the glide ratio would be reduced, although if the wing loading were low, drag would increase and consequently climb would be sacrificed. After giving much thought to this problem I decided to use a wing of approximately 700 square inches projected area which would give a wing loading of approximately 7 ounces per 100 square inches of area.

After the problem of wing loading had been solved, the type of model to be designed had to be determined. I chose to keep the model within the limits of conventionality so that it could be constructed easily and with a minimum of time. I had only one month before the Nationals to build and test the plane, so I wanted as simple a model as possible, yet efficient and not overly time-consuming to construct.

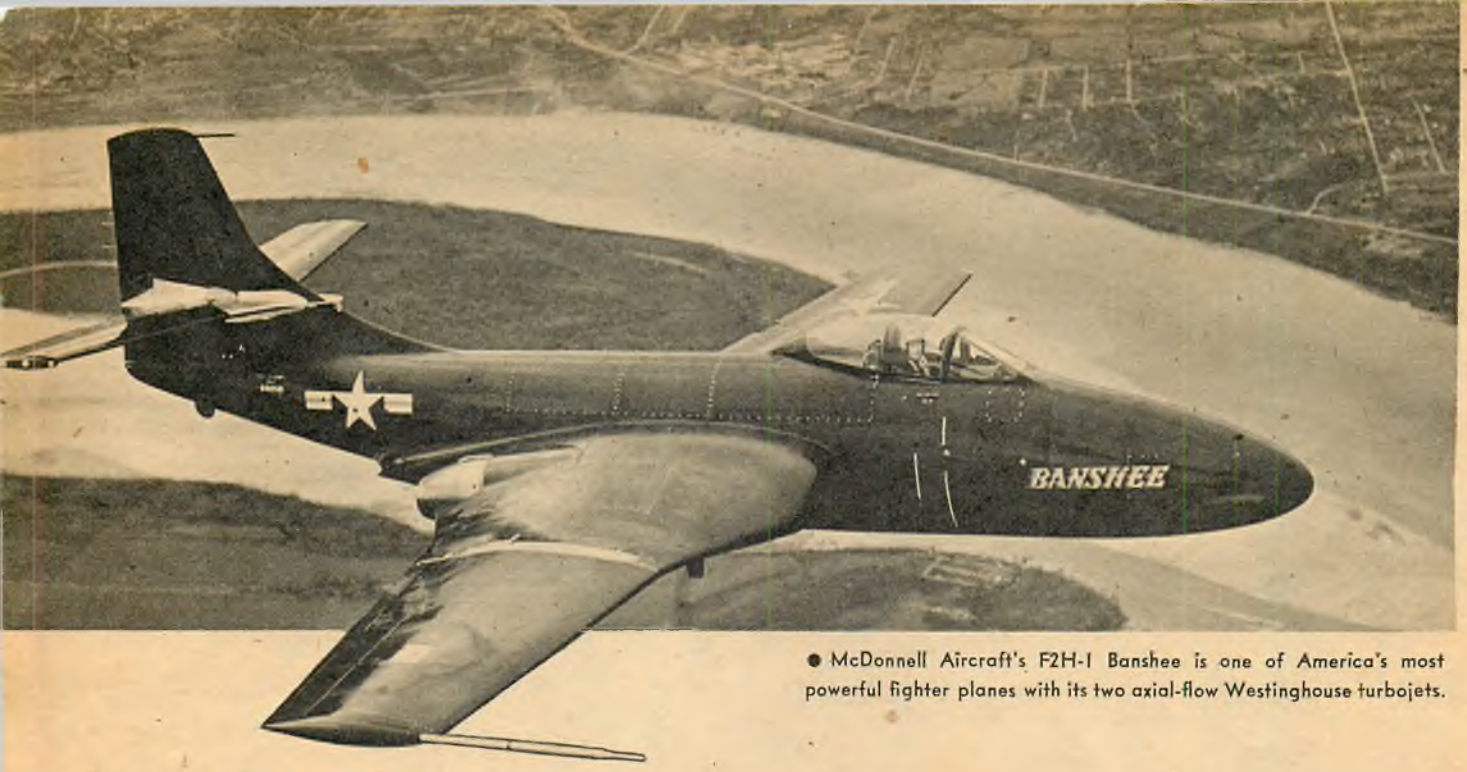
Preliminary flight tests with the PAA-Loader proved that it was going to be a good competitor. With only a slight shifting of the dummy occupants the model attained an amazingly flat and long glide. About 3 degrees of downthrust and a good Torpedo 29 was all that was required for the model to have a climb that would rival some (*Continued on page* 81)





FULL SIZE PLANS

Working drawings of the PAA Payload winner are available from Air Trails Full Size Plan Department on Plan 109, together with the Radart radio-control model.



● McDonnell Aircraft's F2H-1 Banshee is one of America's most powerful fighter planes with its two axial-flow Westinghouse turbojets.

Solid Stuff:

BANSHEE

By H. A. THOMAS

Build this fast, far-flying Navy fighter that operates off carriers, land, or catapult

COMPARED with many radical new jet aircraft, the McDonnell Banshee appears conservative at first appraisal. But more careful analysis of its design features and its remarkable performance is assurance enough that this ship is strictly up to date.

The new fighter is similar to the earlier Phantom in arrangement but it is heavier, faster, ranges farther and carries more armament than its predecessor. Twin Westinghouse turbojet engines are housed efficiently in thickened wing roots close inboard where one-engine operation produces no objectionable yaw. In fact the Banshee is designed for one-engine cruising. At high speeds the jet engines really produce power—more power, in the case of a fast-flying Banshee, than a B-29's total output!

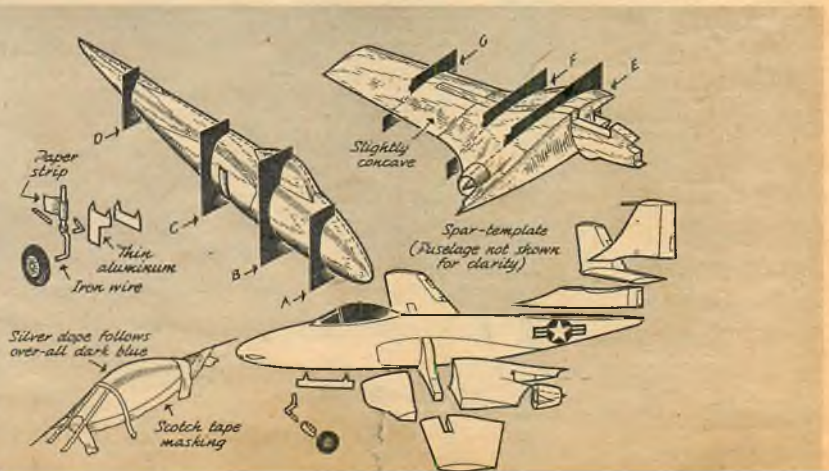
Climb is 9,000 feet per minute from take-off, the rate being much greater than this when the craft has attained good speed. Coupled with this speed and climb is take-off and landing performance suitable for shipboard operation and a range exceeding 2,000 miles.

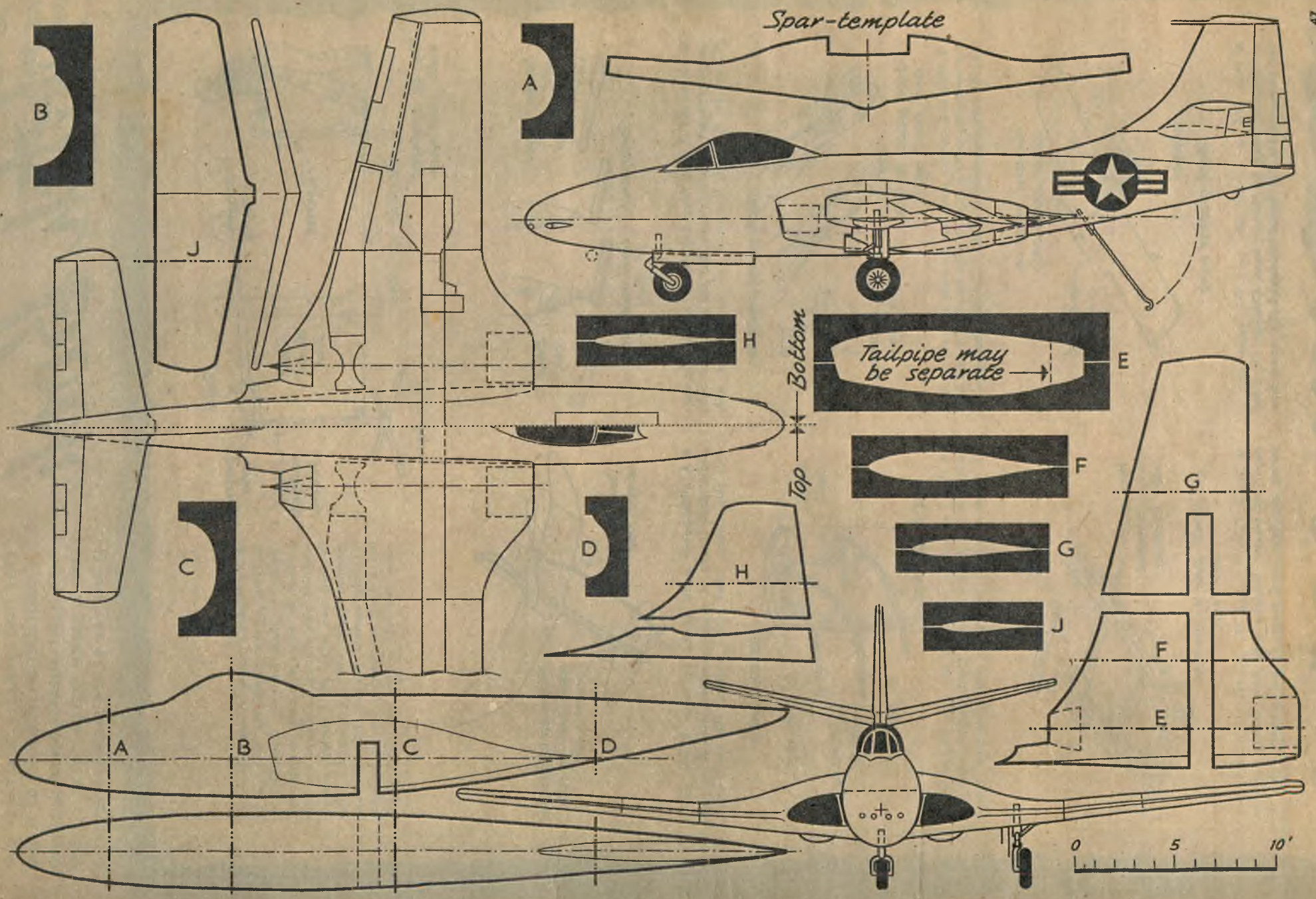
We have drawn the Banshee solid model plans as large as possible to go in the space allotted. By means of the scale, you may enlarge the drawings to any standard scale you prefer.

After selecting balsa of firm, uniform grain for all parts, the fuselage may be bandsawed to side, then to top view outline. Carve it to approximate shape with a sharp, long-bladed pen knife referring frequently to the drawings. Check the templates during final sanding. Cut out and permanently fix the spar-template in the slot provided for it. The four wing-root sections are shaped roughly and fitted to the spar-template and to the curved fuselage sides. You can fill any small imperfections later with dope-talc putty.

Next come the outer wing panels, which are tapered, then cemented in place. Final shaping is done after the wing joints (*Continued on page* 79)

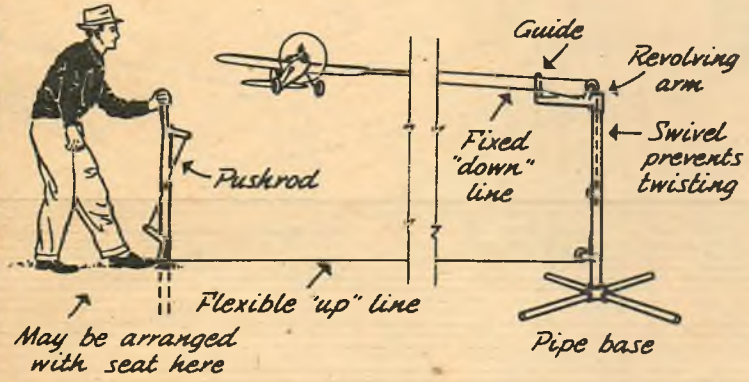
● Close up of wing root and jet engine shows how nicely power plants have been arranged. Wings fold for storage aboard carrier.



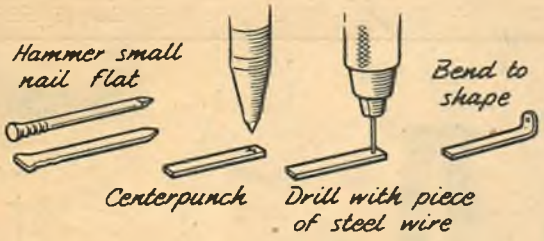

Spar-template
A
B
C
D
E
F
G
H
J
Bottom
Top
Tailpipe may be separate
0
5
10'

Sketch Book

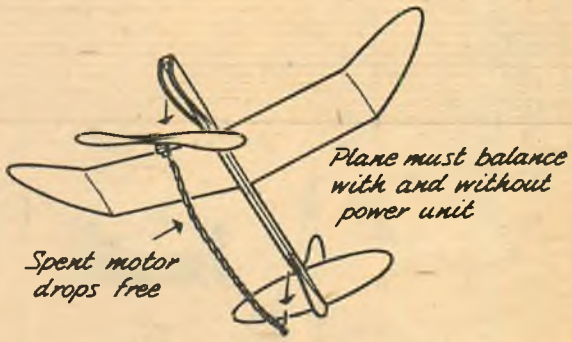
HAVE YOU DEVELOPED SOMETHING NEW IN CONSTRUCTION, CONTROL, OR FLYING THAT MIGHT INTEREST OTHER MODELERS? SEND A ROUGH SKETCH—WE'LL REDRAW IT AND PAY $2 FOR EACH ONE ACCEPTED



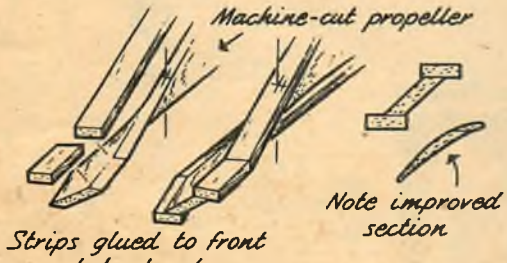
● Jim Walker's remote or outside-the-circle U-control system brings the pleasure of "flying" to those who are susceptible to dizziness. By means of a chair arrangement, modelers with physical handicaps can also fly their own ships. We'd caution against planning flights with low-powered models in windy weather, however. Note that one line is fixed to revolving arm so operator moves the "up" control only. Cost is low.



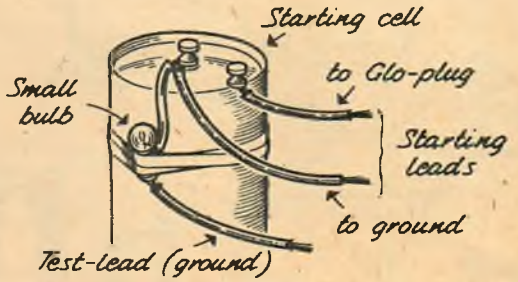
● Always out of small thrust bearings for rubber jobs when you need them? Here's an oldie, but still good, from John Walker, Bel Air, Md. Use small nail, hammer flat, drill.



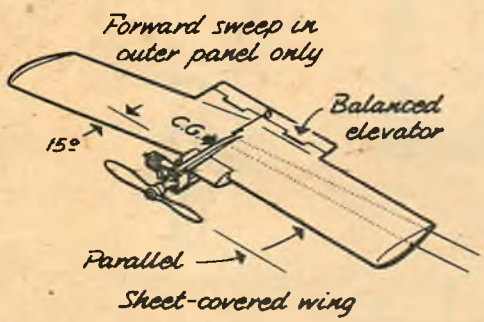
● A glider-power model combo by Victor Weber, Concordia, Kan. Tension of wound-up motor holds power unit while ship climbs. When motor slackens, the works drop.



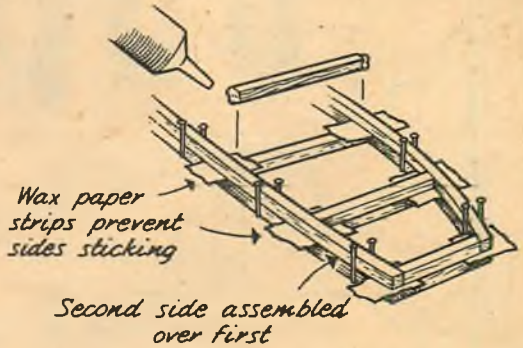
● High-performance props can be made from the machine-cut variety by adding wooden strips to edges before sanding, for more undercamber. Robert Cooper, Charleston, S.C.



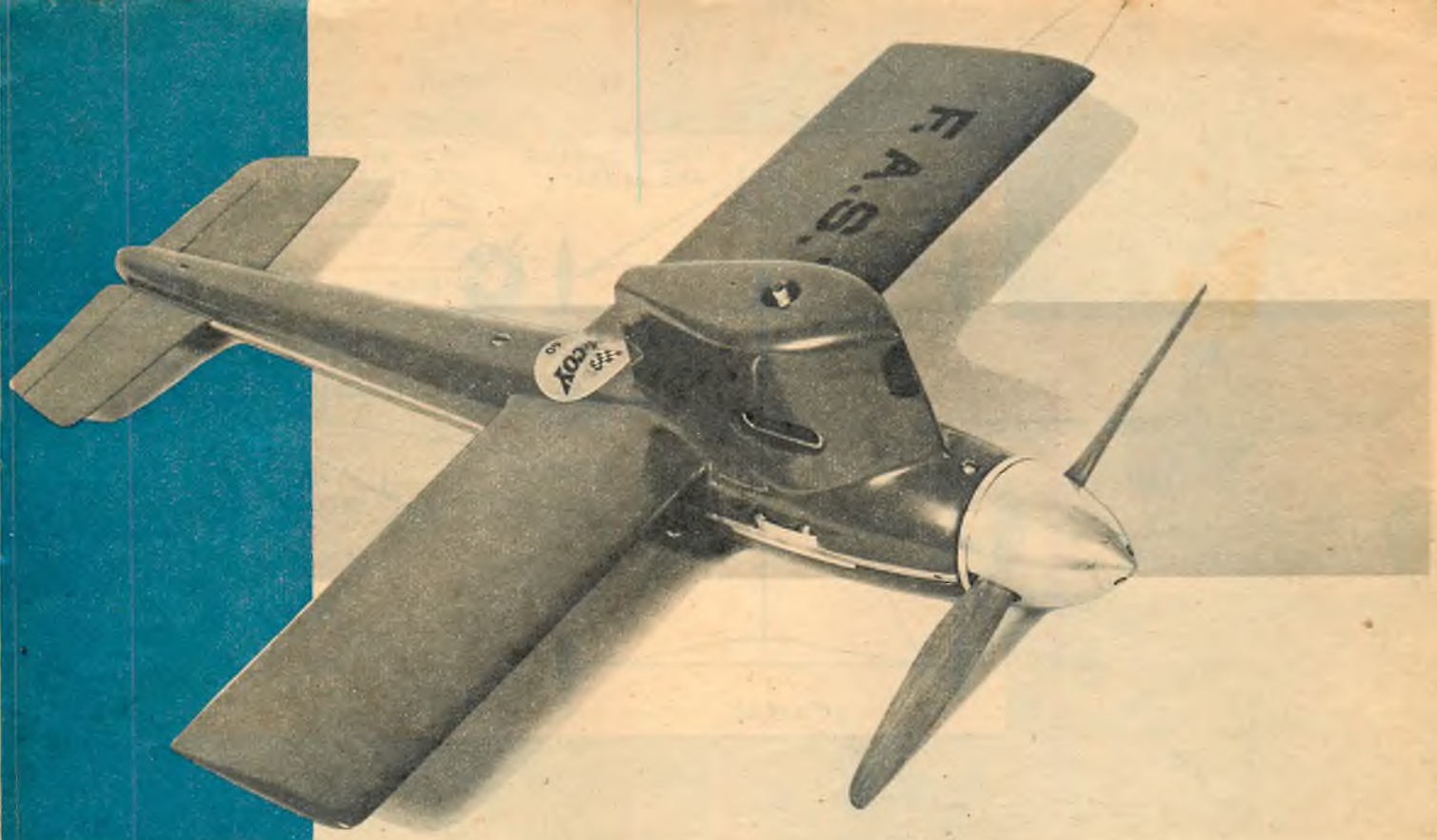
● There's no need of unscrewing your glow plug to test it, points out John Gibson, Barstow, Calif. He wires small bulb on a test circuit. If bulb glows, your glow plug is o. k.



● How odd can control jobs get? This flying wing of asymmetrical layout by Herbert Izuno, Chicago, Ill., is fast and maneuverable. Tex Russell pioneered this model type.



● Charles Cohn, Chicago, Ill., uses the old stand-by wax paper, to prevent fuselage sides from sticking together during assembly. Small pieces do not interfere with pins.



By PARKER F. HUBERT, Jr.

Gay Lady V

Winner of the Air Trails trophy at the 1948 National meet

HERE is a clean, advanced, rugged job for the discriminating model builder. Stemming from a long line of contest-winners (each of the previous Gay Ladies held an official record at one time or another), this design can be relied upon for consistent performance. A magnesium crutch and a bellcrank bracket called a "wishbone" are features of this design, which take it out of the beginner's class. However, it is a good basic design, and a more simplified version could be made without too much trouble.

To start construction, select two pieces of medium-hard, close-grained sugar pine, each measuring 1½" x 3" x 20". Straight grain, free from knots, will make work easier. Each block should be faced on one side so that both fit together without gaps in between. Coat each flat surface with Weldwood glue and insert a sheet of bond paper between the blocks before clamping together with ordinary "C" clamps. Allow 24 hours for the glue to set before starting in on the "hacking and hoping."

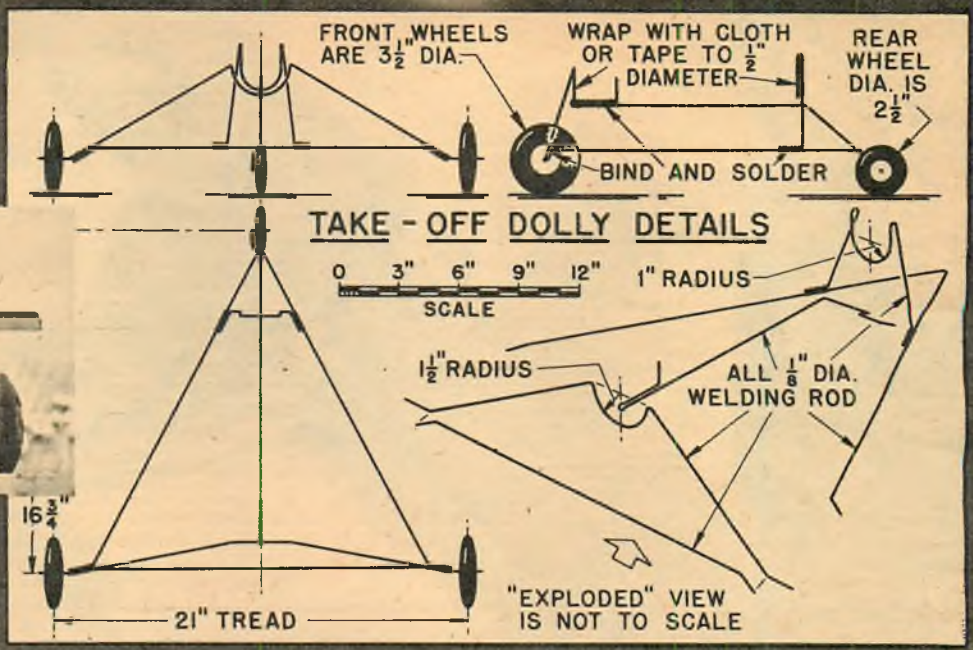
After marking "centers" on each end (to coincide with the bond-paper) mount in a wood-turning lathe and "rough" it down to slightly larger than finished dimensions. By using (*Continued on page 77*)

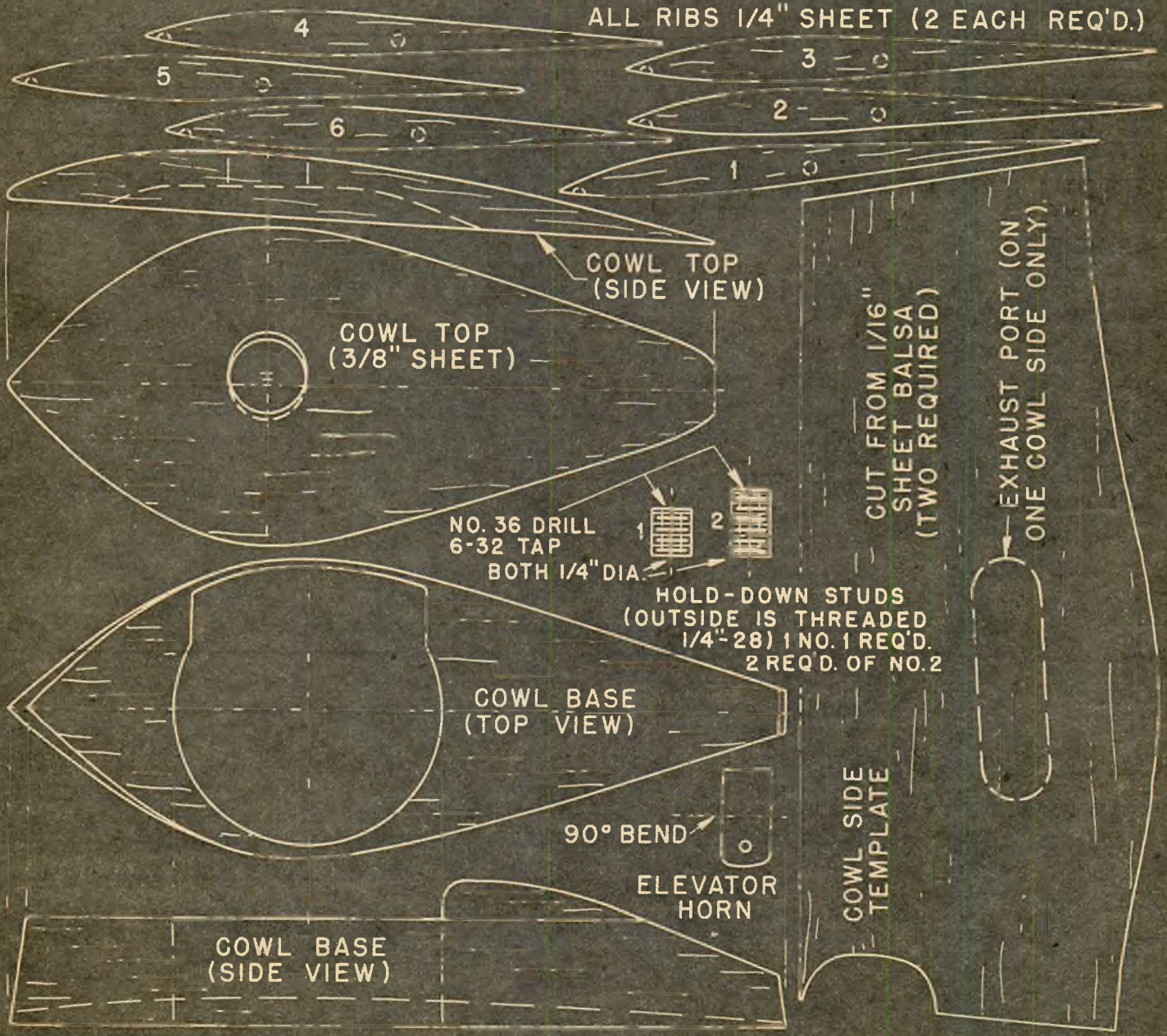
● Top photo shows Gay Lady V and Air Trails first-place trophy which was awarded to Mr. Hubert at the 1948 National meet at Olathe, Kan. Bottom shot shows magnesium crutch. Many design and construction tips from designer will interest all speed fans.

★ **AIR TRAILS PARADE OF WINNERS** { **Another National Meet Prize Plane**
Another National Record Holder

GAY LADY V

● Dolly is lined up so wheels track in a circle, preventing dolly from skipping or bouncing excessively on take-off. Ship is airborne within quarter of circle if flown off flat field.

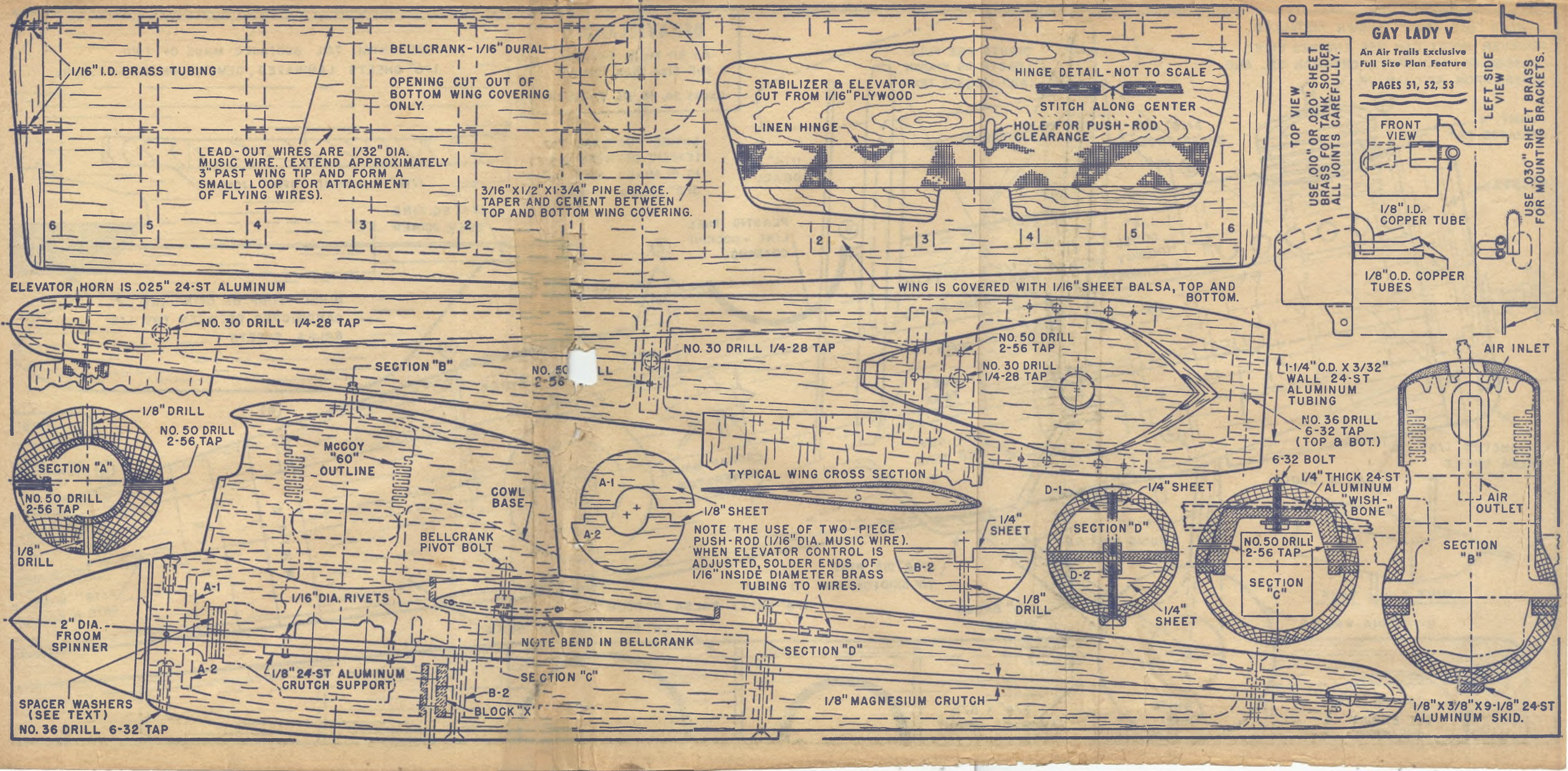


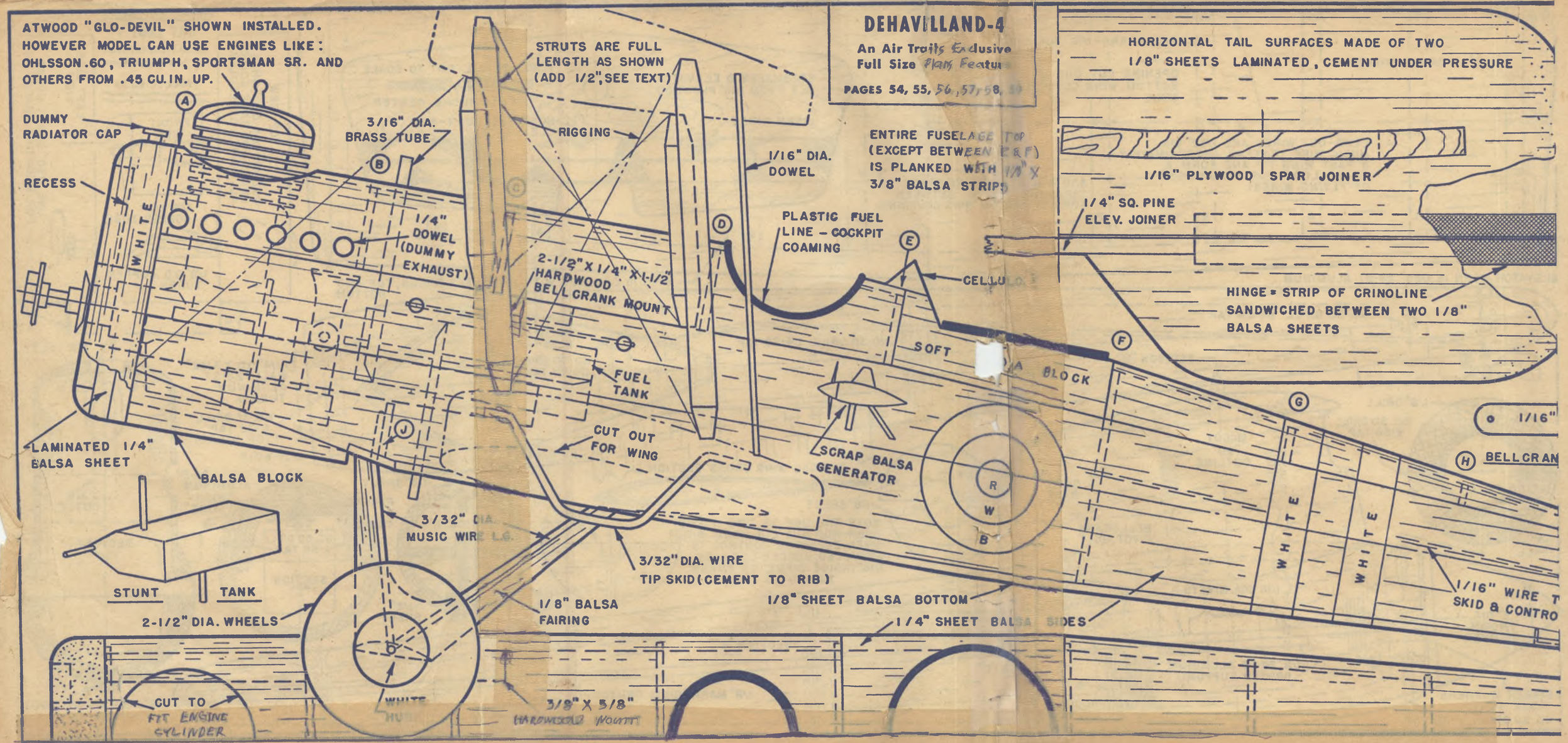


GAY LADY V

An Air Trails Exclusive Full Size Plan Feature

PAGES 51, 52, 53



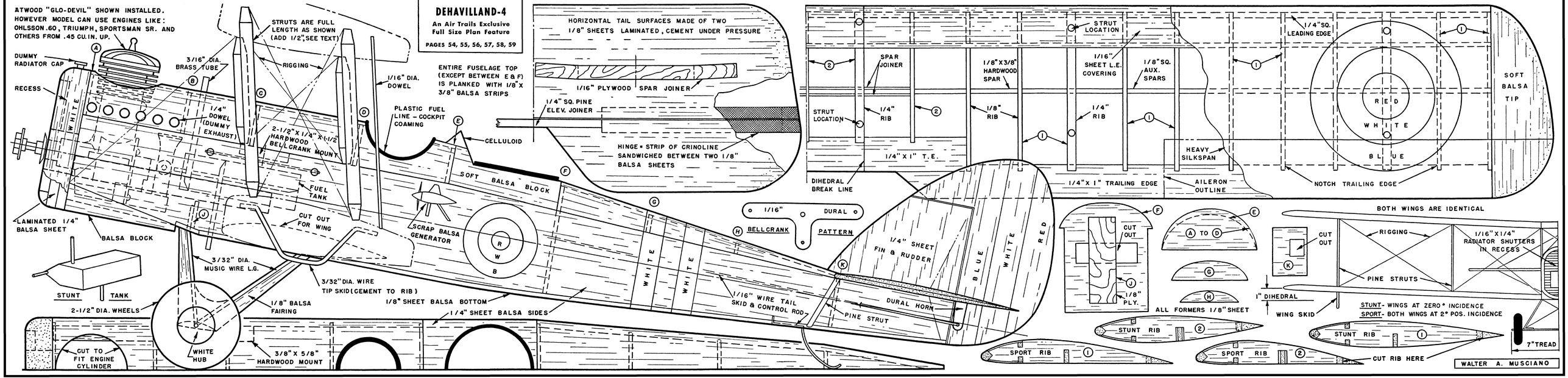

ATWOOD "GLO-DEVIL" SHOWN INSTALLED. HOWEVER MODEL CAN USE ENGINES LIKE: OHLSSON .60, TRIUMPH, SPORTSMAN SR. AND OTHERS FROM .45 CU.IN. UP.
DEHAVILLAND-4
An Air Trails Exclusive Full Size Plan Featu
PAGES 54, 55, 56, 57, 58,
STRUTS ARE FULL LENGTH AS SHOWN (ADD 1/2", SEE TEXT)
RIGGING
1/16" DIA. DOWEL
ENTIRE FUSELAGE TOP (EXCEPT BETWEEN E & F) IS PLANKED WITH 1/8" X 3/8" BALSA STRIPS
HORIZONTAL TAIL SURFACES MADE OF TWO 1/8" SHEETS LAMINATED, CEMENT UNDER PRESSURE
1/16" PLYWOOD SPAR JOINER
1/4" SQ. PINE ELEV. JOINER
HINGE = STRIP OF CRINOLINE SANDWICHED BETWEEN TWO 1/8" BALSA SHEETS
DUMMY RADIATOR CAP
3/16" DIA. BRASS TUBE
RECESS
WHITE
1/4" DOWEL (DUMMY EXHAUST)
2-1/2" X 1/4" X 1-1/2" HARDWOOD BELL CRANK MOUNT
PLASTIC FUEL LINE - COCKPIT COAMING
CELLU
SOFT
BLOCK
FUEL TANK
CUT OUT FOR WING
SCRAP BALSA GENERATOR
LAMINATED 1/4" BALSA SHEET
BALSA BLOCK
3/32" DIA MUSIC WIRE LG.
3/32" DIA. WIRE TIP SKID (CEMENT TO RIB)
1/8" SHEET BALSA BOTTOM
1/16" WIRE T SKID & CONTRO
BELLCRAN
STUNT TANK
2-1/2" DIA. WHEELS
1/8" BALSA FAIRING
1/4" SHEET BALSA SIDES
CUT TO FIT ENGINE CYLINDER
3/8" X 3/8" HARDWOOD MOUNT

DEHAVILLAND-4

An Air Trails Exclusive Full Size Plan Feature

PAGES 54, 55, 56, 57, 58, 59

ATWOOD "GLO-DEVIL" SHOWN INSTALLED. HOWEVER MODEL CAN USE ENGINES LIKE: OHLSSON .60, TRIUMPH, SPORTSMAN SR. AND OTHERS FROM .45 CU.IN. UP.



ALL FORMERS 1/8" SHEET

WALTER A. MUSCIANO

SOFT BALSA TIP

RED WHITE BLUE

AILERON OUTLINE

HEAVY SILKSPAN

1/16" SHEET L.E. COVERING

1/4" SQ. LEADING EDGE

1/8" SQ. AUX. SPARS

SPAR JOINERS

STRUT LOCATIONS

1/8"x 3/8" HARDWOOD SPARS

1/4" RIB

1/8" RIBS

1/4" RIB

1/4"x 1" TRAILING EDGE

1/4"x 1" TRAILING EDGE

UPPER & LOWER WINGS ARE IDENTICAL

FRONT L.G. LEG FULL SIZE. 3/32" MUSIC WIRE

BIND WITH FINE WIRE AND SOLDER.

5/16"x 1"x 5-1/8" WOOD AXLE COVER

WASHER SOLDERED ON.

LENGTH TO SUIT WHEEL USED

CROSS SECTION (Scale)

1/16" PLYWOOD SPAR JOINERS 4 REQUIRED

1/16"x 1/4" RADIATOR SHUTTERS IN RECESS

RIGGING

PINE STRUTS

1" DIHEDRAL

WING SKID

3"

ATWOOD "GLO-DEVIL" SHOWN INSTALLED. HOWEVER MODEL CAN USE ENGINES LIKE: OHLSSON .60, TRIUMPH, SPORTSMAN SR. AND OTHERS FROM .45 CU.IN. UP.

STRUTS ARE FULL LENGTH AS SHOWN ADD 1/4" EACH END FOR MOUNTING

RIGGING

1/16" DIA. DOWEL

3/16" DIA. BRASS TUBE

PLASTIC FUEL LINE - COCKPIT COAMING

CELLULOID

ENTIRE FUSELAGE TOP (EXCEPT BETWEEN E & F) IS PLANKED WITH 1/8"x 3/8" BALSA STRIP

DUMMY RADIATOR CAP

1/4" DOWEL (DUMMY EXHAUST)

2-1/2" x 1/4" x 1-1/2" HARDWOOD BELLCRANK MOUNT

SOFT BALSA BLOCK

WHITE

FUEL TANK

SCRAP BALSA GENERATOR

CUT OUT FOR WING

LAMINATED 1/4" BALSA SHEET

BALSA BLOCK

3/32" DIA. MUSIC WIRE L.G.

3/32" DIA. WIRE TIP SKID (CEMENT TO RIB)

1/8" BALSA FAIRING

STUNT TANK

2-1/2" DIA. WHEELS

WHITE HUB

1/4" SQ. PINE JOINER

HORIZONTAL TAIL SURFACES MADE OF TWO 1/8" SHEETS LAMINATED, CEMENT UNDER PRESSURE.

1/16" DURAL

BELLCRANK PATTERN

HINGE - STRIP OF CRINOLINE SANDWICHED BETWEEN TWO 1/8" BALSA SHEETS

BLUE WHITE RED

1/4" SHEET FIN & RUDDER

WHITE WHITE

DURAL HORN

1/16" WIRE TAIL SKID & CONTROL ROD

PINE STRUT

1/8" SHEET BALSA BOTTOM

1/4" SHEET BALSA SIDES

POSITION OF FORMER (A)

(C2) FULL OUT-LINE

1/16"x 1/4" RADIATOR SHUTTERS

STUNT RIB (2) — 6 OF 1/8" BALSA, 4 OF 1/4" BALSA

STUNT RIB (1) — 8 OF 1/4" BALSA, 36 OF 1/8" BALSA

SPORT RIB (1) — 8 OF 1/4" BALSA, 36 OF 1/8" BALSA

SPORT RIB (2) — 4 OF 1/4" BALSA, 6 OF 1/8" BALSA

CUT OUT

1/8" PLY.

(A) TO (D)

ALL FORMERS 1/8" SHEET

STUNT - SET WINGS AT 0° INCIDENCE

SPORT - SET BOTH WINGS AT +2° INCIDENCE

1/4" SHEET BALSA SIDES

CUT TO FIT ENGINE CYLINDER

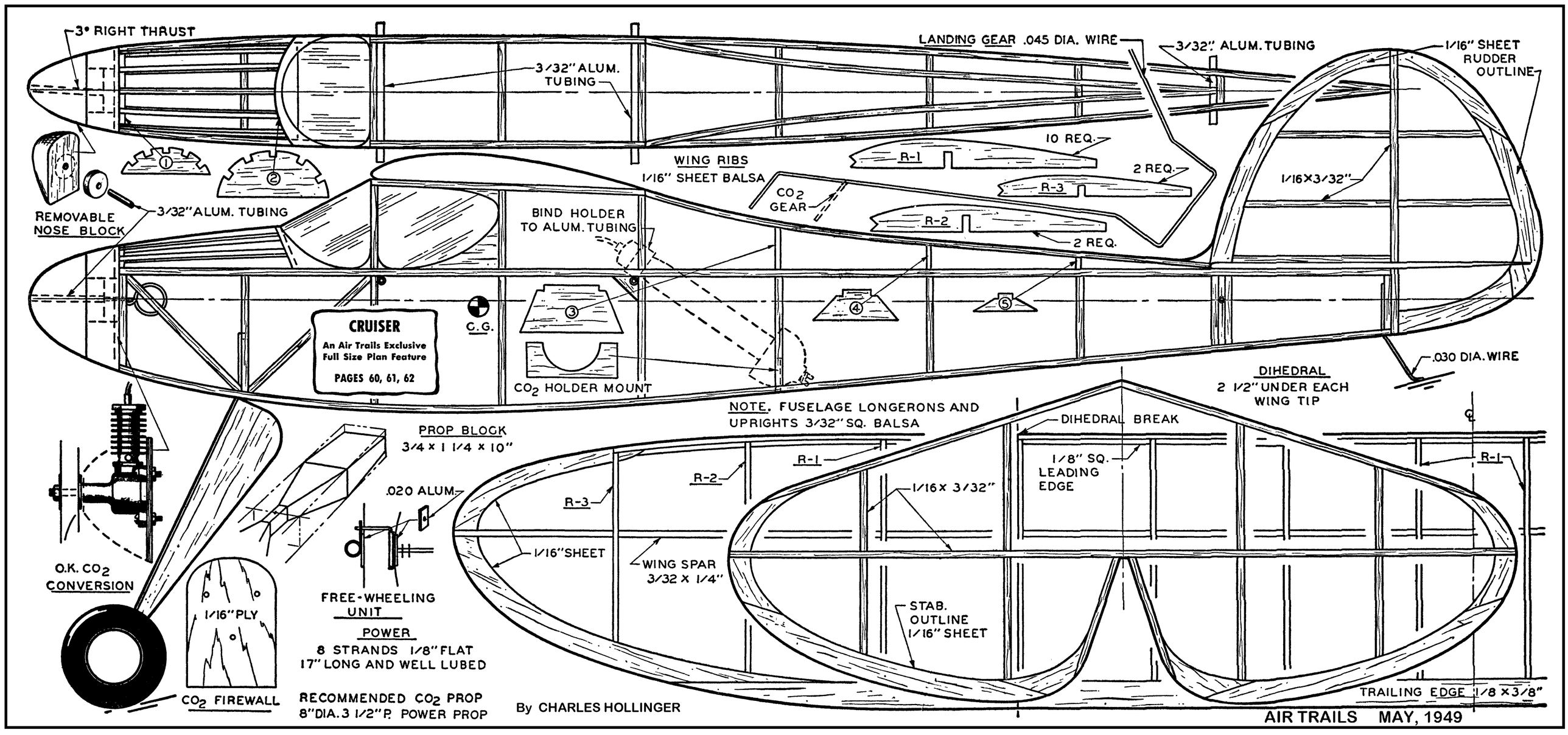
3/8"x 5/8" HARDWOOD MOUNT

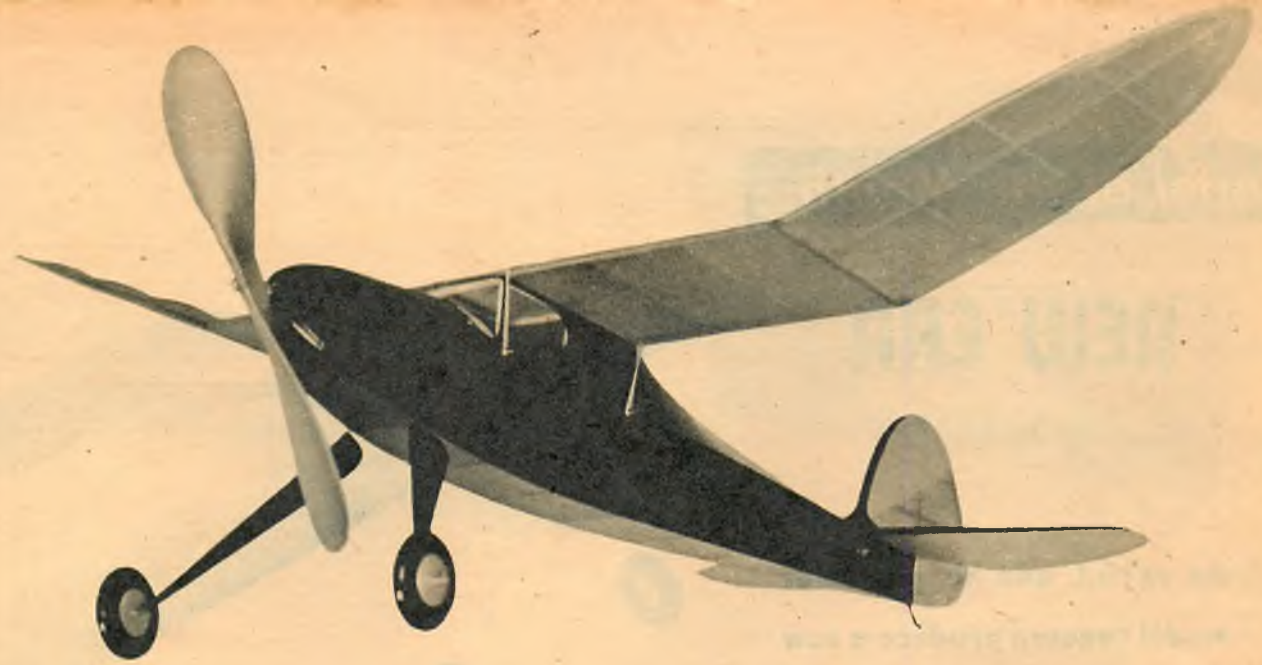
BLUE WHITE RED

SOFT BALSA TIP

DeHAVILLAND DH-4
Scale - 1"=1'-0" Span 42-1/2"
Designed by - WALTER MUSCIANO
Published - AIRTRAILS MAY 1949
Traced by - Dick Gleason 1-27-81

24x36


3° RIGHT THRUST
3/32" ALUM. TUBING
LANDING GEAR .045 DIA. WIRE
3/32" ALUM. TUBING
1/16" SHEET RUDDER OUTLINE
WING RIBS
1/16" SHEET BALSA
10 REQ.
R-1
2 REQ.
R-3
R-2
2 REQ.
1/16X3/32"
CO2 GEAR
REMOVABLE NOSE BLOCK
3/32" ALUM. TUBING
BIND HOLDER TO ALUM. TUBING
C.G.
CRUISER
An Air Trails Exclusive Full Size Plan Feature
PAGES 60, 61, 62
CO2 HOLDER MOUNT
.030 DIA. WIRE
DIHEDRAL
2 1/2" UNDER EACH WING TIP
NOTE. FUSELAGE LONGERONS AND UPRIGHTS 3/32" SQ. BALSA
DIHEDRAL BREAK
1/8" SQ. LEADING EDGE
1/16 x 3/32"
R-1
R-2
R-3
1/16" SHEET
WING SPAR 3/32 x 1/4"
STAB. OUTLINE 1/16" SHEET
TRAILING EDGE 1/8 x 3/8"
PROP BLOCK 3/4 x 1 1/4 x 10"
.020 ALUM.
FREE-WHEELING UNIT
POWER
8 STRANDS 1/8" FLAT
17" LONG AND WELL LUBED
O.K. CO2 CONVERSION
1/16" PLY
CO2 FIREWALL
RECOMMENDED CO2 PROP
8" DIA. 3 1/2" P. POWER PROP
By CHARLES HOLLINGER



CRUISER

This slick free-flighter takes either rubber or carbon dioxide engine. Has flown 21 minutes

By CHARLES HOLLINGER

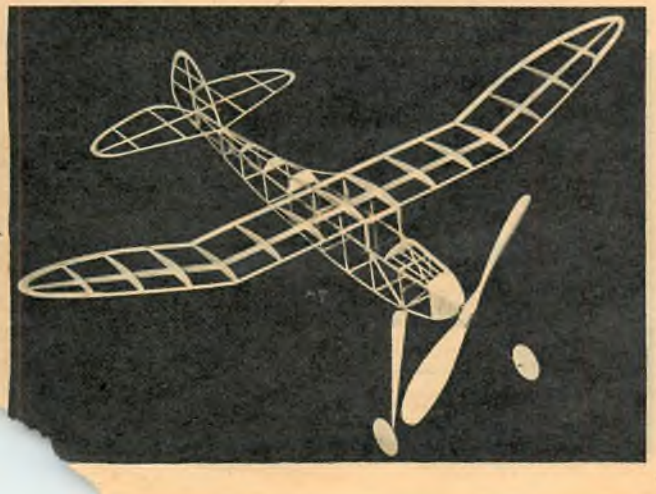
HERE'S a little sport ship fully flight-tested that will give you real performance as a rubber-powered model or with a CO_2 motor in the nose. Most modelers agree that the "ideal" model has between 100 and 150 sq. in. of wing area. Ships this size seem to be extremely consistent and very easy to handle. After all, a pound of rubber isn't required to get them into the air.

Our first Cruiser wasn't designed with contests in mind. Nevertheless, it proved its capabilities by putting in flights as high as twenty-one minutes out of sight. The one in the photos has more than two hundred flights to its credit with only a few rips in the covering as the result.

The construction is so simple that with the full size plans the little ship can easily be completed in two evenings' work. If you intend powering your Cruiser with a Herkimer O.K. CO_2 engine, use hard balsa throughout, while if it is to be rubber-powered with T-56 use medium stock for the longerons and spars and soft sheet for the bulkheads and wing ribs. When joining the two fuselage sides together first turn them upside down and cement the cross-pieces in place at the widest part of the fuselage. Check for squareness with a right angle then pull the rear together cementing in the remaining braces.

The landing gear is bent right over the layout and fitted to the fuselage with the extra brace strip and plenty of glue. Carve the nose block from hard balsa, sand to final shape and cut (*Continued on page* 84)

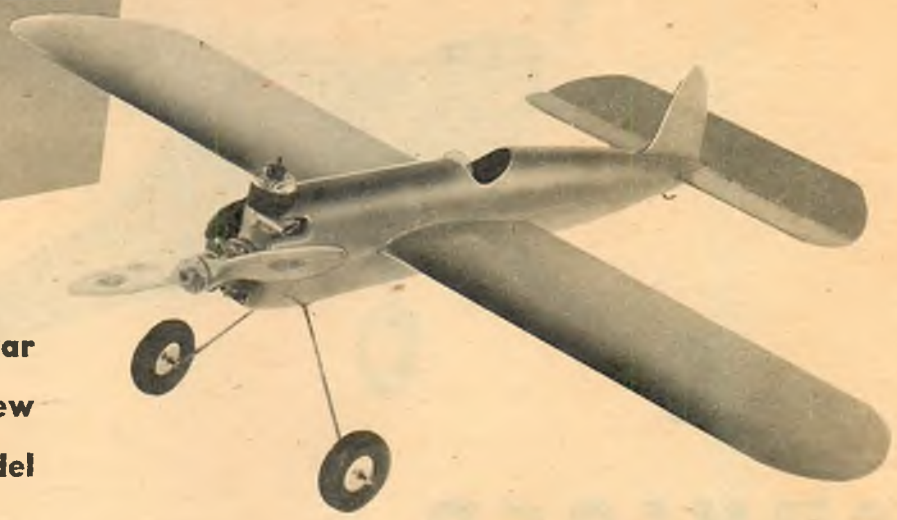
● Construction is easy. Read instructions, follow plans carefully.



● The Cruiser model shown here has made more than 200 flights.

Model of the Month

NEW ERA



An ex-G.I. and his post-war model concern produce a new type of control-line model

EVER since the model airplane manufacturers tumbled to the fact that many of the customers go for prefabricated kits in a big way, builders have been living in a dream world of pre-carved fuselages, shaped wings, formed parts, and ships that almost fly out of the box. It's a buyer's market that has the kit producers burning the midnight oil figuring out new stunts to outfox the competition. The latest of these is Enterprise's New Era, an appropriately named sport and stunt ship for engines of from .099 to .299 cubic inch displacement. Price is $3.95.

The New Era is one kit that is so simple to assemble that a plan is not required. Instead of the usual plan, there is just a large, neatly air-brushed "exploded view" which shows how and where the parts fit together. A look at the drawing and a quick reading of the brief directions, and you can have your New Era into the air just as fast as the glue dries and you can wield the sandpaper. Designer Jerry Brofman outdid himself in engineering this kit. Let's have a look.

If you want to count the plywood motor mount (two mounts are included, one for radial mounting and the other for side-lug mounting) there are only eleven pieces of wood in this airplane. The two-piece fuselage consists of an upper shell and a lower shell. Both are completely carved, inside and out, requiring just a final sanding. Slots for the stabilizer and fin, spaces for the wing and motor mount, the cockpit, and even a slot for the formed landing gear wire, are all cleanly and precisely cut. Tail surfaces are cut to outline shape, needing only the usual quick rounding of the edges. And the wings—gentlemen, there is something to see!

Disregarding the spar, and the tip blocks, this remarkable wing consists of two span-length pieces which butt along a line slightly forward of the 50% chord point. Both pieces are completely carved, both inside and outside, after the fashion of a two-piece fuselage. When these two pieces—the leading-edge and trailing-edge sections—are joined together at the spar position, an all-balsa hollow wing results.

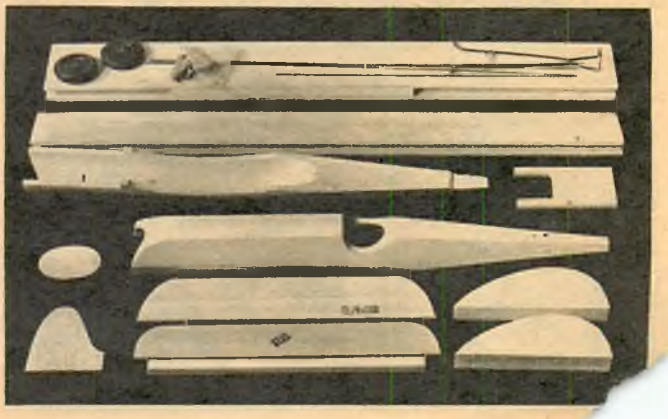
To assemble, a ¼" wide spar strip is cemented into the opening along the front face of the trailing edge section, with about half the width of the material, or ⅛", projecting to fit snugly into the opening along the rear face of the leading-edge section. Words only complicate what is truly a delightfully simple operation. The tip blocks, which come sawed to the proper planform shape, are glued to each wing tip, carved to final shape and sanded. There is nothing more that need be said about the contents of this kit, or how it goes together, for outside of the shaping of the wing tip blocks, there is no hacking and carving.

In addition to the fuselage and wing shells, and the tail surfaces, there is a formed landing gear—ready to attach—hard-rubber wheels with brass bushings, and a glassene envelope of parts, such as finished, brass elevator hinges, control horn, motor-mounting bolts and nuts, and so on.

Although the quick success of the New Era, like that of so many of the high-grade control-line numbers, suggests that manufacturing is a simple mechanized business, the actual story of the New Era, and of Enterprise, is an absorbing example of how to beat the bad breaks in ten not-so-easy lessons.

"In March, 1946, I started out with a friend, as Vet-Aero," Brofman relates. "Our first and only kit was my Super Sunduster, a Class C free-flight that has won, and is still winning, (*Continued on page* 92)

● All shaping work is done; only a few parts comprise New Era kit.



PLYMOUTH ANNOUNCES

THE THIRD INTERNATIONAL

MODEL PLANE CONTEST

AUGUST 22nd THROUGH 29th

DETROIT, MICHIGAN

50 events!

167 trophies!

$8750 in U. S. Savings Bonds!

With more prizes, more events, more trophies, the Third International Model Plane Contest will be held next August in Detroit under the sponsorship of the Plymouth Motor Corporation in conjunction with the Aero Club of Michigan.

This year the big meet—sanctioned by the Academy of Model Aeronautics—will feature 50 indoor and outdoor events, including rubber-powered planes, gas-powered free flight, control line gas-powered, jet, stunt, flying scale and the new event, towline glider. Cash prizes will total $8750 and 167 trophies will be awarded.

All winners receive a trophy. In addition, the three winners of each event, including the new Novice Class, will get U. S. Savings Bonds . . . $100 for first place, $50 for second place, and $25 for third place. Each of the contestants will be chosen from winners of AMA-sanctioned Plymouth Dealer Contests—or on the basis of records made in AMA-sanctioned Plymouth Dealer Qualifying Trials—or on the basis of records made in any other AMA-sanctioned contests.

Four classifications for contestants:

NOVICE—*13 years of age, and under, but not yet 14.*

JUNIOR—*14 to 15, but not yet 16.*

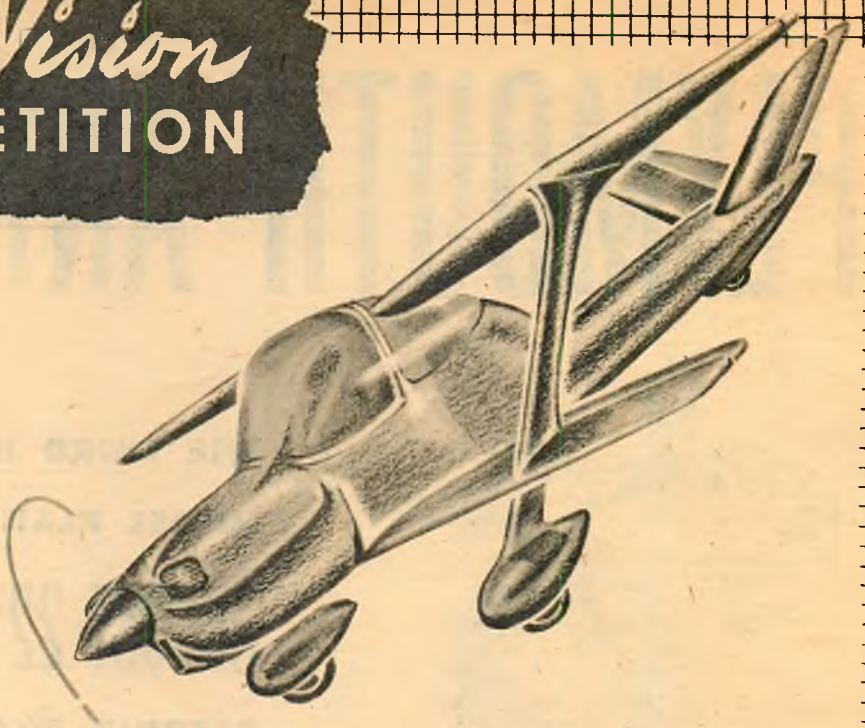
SENIOR—*16 to 20, but not yet 21.*

OPEN—*21 to 25, but not yet 26.*

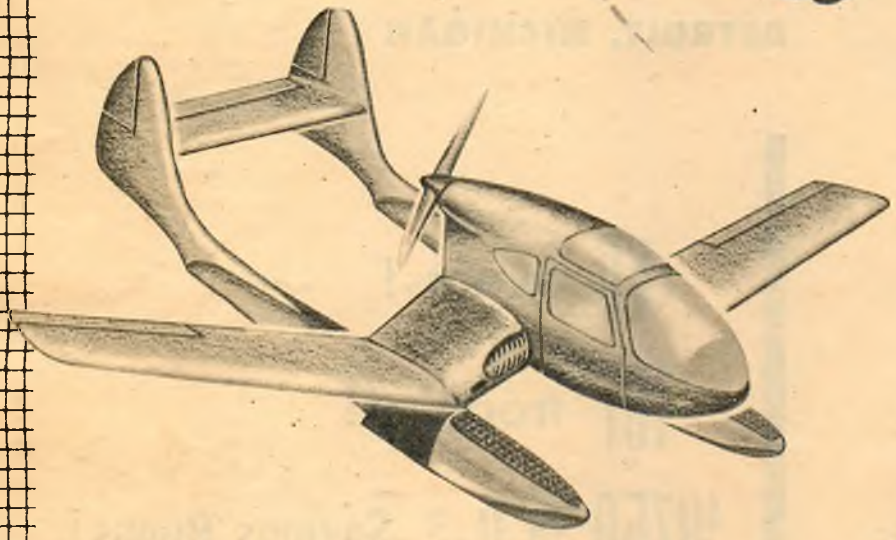
Don't miss the thrills and excitement in Detroit next August 22nd through the 29th. This year's meet will be bigger and better than ever. *On and after April 15th, secure entry blanks and rule books from your Plymouth dealer.*

• PLYMOUTH MOTOR CORPORATION • *Subsidiary of Chrysler Corporation*

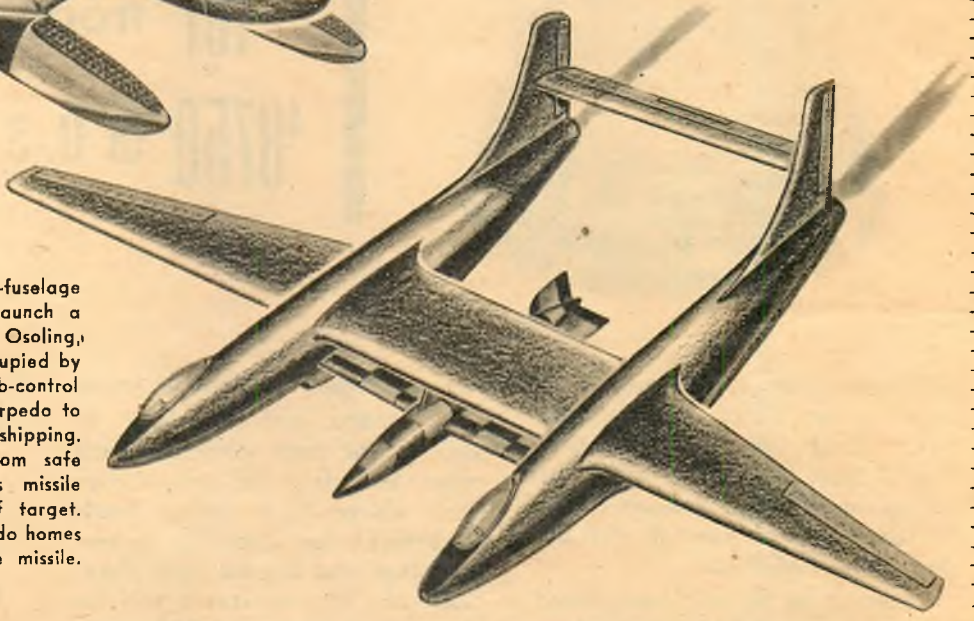
Airmen of Vision
DESIGN COMPETITION



● First prize, a negative stagger biplane by Calvin B. Smith of Seattle, Wash. The two-place personal plane resembles the pre-war Beechcraft, which was one of the most efficient aircraft in its class. Negative stagger has considerable advantage, as it greatly reduces interplane interference, thus cutting down drag, increasing lift coefficient and decreasing stalling speed. Smith's plane has a span of 25 ft., butterfly tail, flat-four 100-hp engine. Top speed is 130 mph, and landing speed is 45 mph.



● Second prize winner, Walter E. Mooney, Cambridge, Mass., submitted this interesting four-place seaplane. Twin floats mounted directly on the inverted gull-wing carry the ship's tail surfaces. The 125-hp engine swings a 10-ft. propeller through a series of "V" belts, acting as reduction gear. This greatly minimizes propeller noise. The engine is located in the lower rear section of the fuselage. Wing roots have air scoops in the leading edge. Wing span is 36 ft.; speed, 125 mph; range, 600 miles.



● Third prize, a jet-propelled twin-fuselage bomber equipped to carry and launch a guided missile. Designed by Edwin Osoling, Largo, Fla., the left fuselage is occupied by pilot, the right by radar-bomb-control operator. The missile is a flying torpedo to be used against heavily protected shipping. Mother plane shadows target from safe distance by radar and releases missile which it controls to proximity of target. From there, seeking device in torpedo homes it on target. Rockets can replace missile.

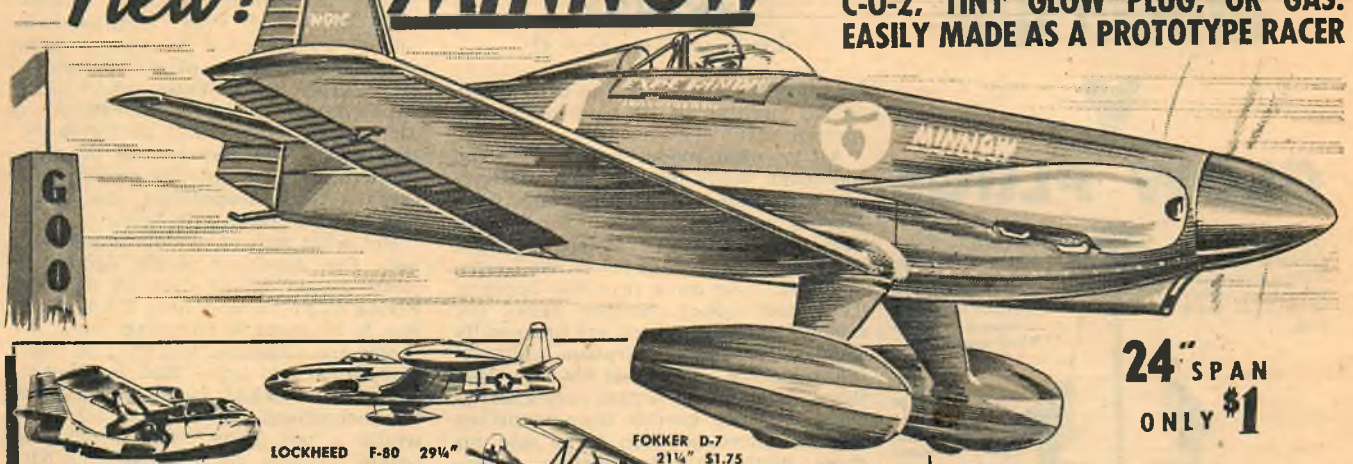
Air Trails has opened its columns to those who are interested in presenting plans for aircraft of the future.

Rules governing the competition are:

1. Three-view sketches of the proposed aircraft will be required. These should be not less than 8½ x 11 inches for the entire three views.
2. Sketches of the complete airplane in three-quarter front and rear position should be included.
3. Photos of a model of proposed design may be included.
4. Information on power plant(s), estimated performance, dimensions, and explanations of any unusual features are required. Data as to age, occupation or schooling is welcome.
5. Entries will not be returned and for that reason those participating should retain copies of all material submitted.
6. The editors regret they cannot enter into correspondence concerning designs submitted.
7. Designs may be of any type: commercial aircraft, military planes (fighters, bombers, troop transports), planes for the private flyer and single-place sporting craft.
8. Mail entries to Airmen of Vision, c/o Air Trails, P. O. Box 489, Elizabeth, N. J.
9. The entry each month judged by the editors as the most practical or of the greatest significance will receive an award of $25. Awards of $5 will go to runners-up.

New! "MINNOW"

A BUILT-UP "IT" MODEL THAT'S EASY TO MAKE — FOR RUBBER, C-O-2, TINY GLOW PLUG, OR GAS. EASILY MADE AS A PROTOTYPE RACER



24" SPAN ONLY $1

REPUBLIC SEABEE
Span 28" . . . $2.25

LOCKHEED F-80 SHOOTING STAR 29¼" $2.75

FOKKER D-7 21¼" $1.75

RYAN NAVION Span 25¼" $1.75

BAYLES' GEE-BEE Span 17¾" $1.75

"M" KITS—AIR-ISTOCRATS OF THE MODEL WORLD

They replace world-famous "SF" kits, but are exactly the same, except for the ommission of liquids, and consequently lower price. Full sized plans with amazing detail, high grade selected material, and dependable, thorough, model engineering are featured in these beautiful kits. Though simple to build, they are the most realistic in the world, and when powered by rubber, C-O-2, or gas (when "beefed up", they make marvelous control liners)—they are hard to tell from the real thing in flight. Avoid imitations of these superb products of our 30 years of model designing and kit manufacture. Get the REAL THING.

A REALLY STREAMLINED MIDGET RACER!

This unbelievably sleek race plane won the 1948 Goodyear race with a 169.6 miles per hour average speed — using a standard lightplane motor. Piloted by Herman "Fish" Salmon, the bronze colored speedster won not only the race, but the admiration of all who like aviation racing. The CLEVELAND "IT" model of this sleek beauty is a faithful replica of the real "Minnow", and its handy, 24" span is just right for either free-flight or control line enthusiasts. It is very simply built, offering no trouble to the beginning modeler, yet can be "tricked-up" into a superbly beautiful model by the more experienced modeler. Kit IT-116 only $1.00

BEECHCRAFT BONANZA

LUSCOMBE SILVAIRE

PIPER CUB

STINSON VOYAGER

LUSCOMBE SEDAN

ONE-DOLLAR "IT" KITS — ARE FINE SCALE FLYERS

These one-dollar kits have won deserved popularity everywhere, as they build true scale, flight engineered models. They are made especially for the modeler who will not compromise on quality and realism, but who wants simple construction, low price, and contest performance. Almost all "IT" models are of 30" wingspan, a convenient and efficient size. They may be powered with a variety of rubber, CO2, glow plug, and jet motors (depending on the design chosen). More airplane for less money just cannot be found.

POPULAR 30" SPANS

GLOBE SWIFT

AERONCA CHIEF

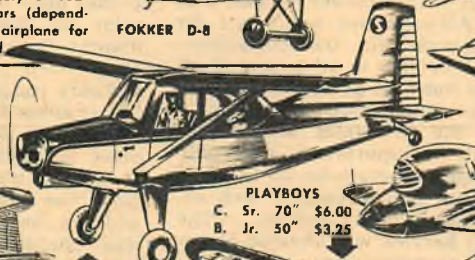
ERCO ERCOUPE

FOKKER D-8

F-80 SHOOTING STAR

RYAN NAVION

LUSCOMBE SILVAIRE 43" Span $3.00



PLAYBOYS
C. Sr. 70" $6.00
B. Jr. 50" $3.25

TETHER TOPPERS
TOPPER I (C-O-2) 16" $1.00
TOPPER II (A & B) 16" $2.25
TOPPER III (B & C) 20" $3.00

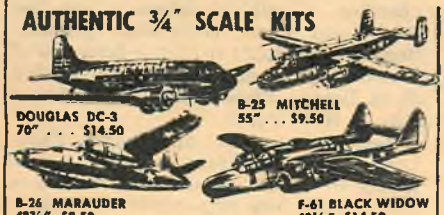
STINSON Flying Station Wagon 43" $5.50

LUSCOMBE SEDAN Free-Flight-Control-Radio Giant 76" Span $7.50

SUPERB C-D GAS MODELS

Quick pictures of famous C-D gas models:
Playboys—Efficient proven pylon design, plus easy building and ruggedness.
Toppers—Speed and sport control kits with classy lines, fine streamlining.
Stinson Flying Station Wagon—A 43" span scale free flight or control model of a famous four place personal and executive airplane.
Luscombe Sedan—Huge 76" span, is a very simply built model. A triple threat—for control line, free flight, and radio control.
Luscombe Silvaire — Scale, 43" span gassie F-F or C-L, with sleek lines, dependable performance.

AUTHENTIC ¾" SCALE KITS

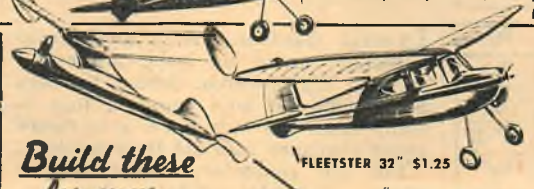


DOUGLAS DC-3 70" . . . $14.50

B-25 MITCHELL 55" . . . $9.50

B-26 MARAUDER 48¾" $9.50

F-61 BLACK WIDOW 49½" $14.50



Build these for your miniature glow plug motor now!

FLEETSTER 32" $1.25

LANCER 32" $1.00

CO2 & RUBBER CONTEST & SPORT ENDURANCE KITS

Three perfectly designed, contest performing, well built endurance models. Fly them with CO2, tiny glow plug, or rubber motors. Readily fly out of sight when permitted. Beautiful "Baby Fleetster" resembles real cabin planes, but is contest-designed. "Lancer" is high efficiency climber and soarer with ultra modern lines.

HOW TO ORDER: SEE YOUR LOCAL HOBBY DEALER FIRST. HE HAS THESE MODELS AND OTHER CLEVELAND DESIGNS AS WELL. If you are then unable to get C-D's, do not accept substitutes or imitations, but order direct, including 25c for packing-postage. Minimum order $1.00. No C.O.D.'s. Special Delivery in U.S.A. is 25c extra. (Ohio residents: add 3% sales tax). Military men stationed outside continental U.S., Possessions, Canadian and all foreign customers, add 20% for special handling, etc. in addition to 25c packing-postage charge.

SEND 5c or (2) 3c STAMPS FOR VERY LATEST ILLUSTRATED CATALOG

CLEVELAND MODEL & SUPPLY CO., 4515E2 Lorain Ave., Cleveland 2, Ohio. World's Finest Models, Since 1919

The Sponsor Speaks

(*Continued from page 42*)

he often loses sight of the prize itself, to say nothing of its contributor, the sponsor.

All too often model flying fields (and big plane fields too, for *that* matter!) are surrounded by all too many trees none of which bear fruit in the form of cash, merchandise or "hardware"; which is to say in short that prizes don't grow on trees. They come from the Sponsor. They cost money. Neither prizes nor money, believe it or not, are universally popular at model airplane contests! Many sincere enthusiasts advocate that this activity should remain pure amateur sport with no tarnish from monetary fumes. There is much to be said for these sentiments; nonetheless, agreement is more general that successful contests must provide incentives. The cents in incentives add up to dollars, any way you figure it. Dollars are what it takes to provide incentives, whether the incentives take the form of cash, cups, certificates, medals, mementos, merchandise, or what not. In the end, we call the incentives "prizes."

The polite way to say it is that "the Sponsor *provides* the prizes." In a very few cases we can be even more polite and say that the Sponsor *donates* the prizes from his own private funds with no accounting required by his superiors or the law. Not so in the vast majority of cases where the sponsor is a corporation or organization operating under normal business practices of budgets and accounting. What happens here?

In 1948, Pan American World Airways decided the time had come for the airline to offer practical encouragement to aeromodelers. Contests were an established practice of the model plane enthusiasts; so PAA would become a Sponsor!

What is the business basis for such sponsorship? The answer is that Pan American Airways has a product for sale—world-wide air transportation—which is marketable to all people of all ages. Sound business principles indicate that airlines should assist education in presenting the principles and advantages of air transportation, especially to the younger generations. To this end Pan American had already a well established Educational Service. The Educational Service was anxious to encourage the aeromodelers. What was holding 'em? One acid test requirement: The money they spent must be for *education in air transportation.*

George Gardner, PAA's Educational Director, turned up some interesting facts in his research. School teachers throughout the land admitted that in many cases the kids knew a lot more about airplanes than did their teachers.

But the youngster, or adult, who whips out model airplanes that perform like screaming demons, and knows all the answers as to how an airplane flies, does not always consider what flight means to man. Was there a way to help model builders realize the significance of the airplane to every-day life in the air age and to demonstrate that air transport will prove as effective in promoting peace as has the bomber in winning war? Actually air transport is a most vital factor in both war and peace. The AMA gave further food for thought. Counting junior, senior, and open, there were 138 official established events for model airplanes, and nobody knew how many additional unofficial events such as beauty, exact scale, specific power plants, and on and on. Surely one of these would justify expenditures as being educational in air transportation. But *air transportation means the transporting of something through the air.* The model should carry a load. Accordingly, the "PAA-Load Event" came into being.

But what sort of models should they be? Pan American World Airways is justly proud of its fleet of gleaming Flying Clippers, and since PAA money was to be spent to encourage modelers, it was first suggested that they be model Clippers—PAA type, that is. Nothing could have looked more logical. But the technicians raised questions: What would a non-flying scale model contribute towards air transportation education? Wasn't a flying model of a PAA-Clipper, whether free-flight, control-line, or radio-control, a little too much to ask for at this stage of the art? To begin with, all PAA Clippers are multi-engined and elaborately equipped so that models would be extremely complicated and expensive. No, scale models of PAA Clippers wouldn't do. Mr. Gardner decided to try the simple approach and asked PAA technicians to state the minimum requirements for a model airplane which would perform the simplest basic act of air transportation. They defined it this way:

"A heavier-than-air machine which will transport a given payload from one place to another through the air while providing safety and protection throughout the flight."

Breaking down this definition, things began to look clearer. First and foremost, there must be *payload*—the "PAA-Load Event"! What kind of payload? In civil air transport the payload may be passengers, mail, cargo, or any combination of these three. Since most airplanes must also have at least a human pilot for the flight crew, PAA chose dummy "occupants" for the payload. How much payload? AMA technical advisers suggested one pound for Class "B" engines, and this figure was adopted. What about this business " . . . from one place to another through the air . . .?" In model lingo, that meant free-flight. Now "the safety and protection factors," and we have it. So the requirement was established that the "occupants" must be carried upright in a closed compartment and afforded minimum safe "visibility." As for flight rules, it was decided to follow the established AMA contest procedures as closely as possible. (Complete details of the 1948 PAA-Load Event rules and specifications are available from the Educational Director, Pan American World Airways, 28-19 Bridge Plaza North, Long Island City 1, New York).

Response to the announced PAA-Load Event specifications was mixed, to say the least. While most modelers cheered this new opportunity for realistic free-flight and recognized it as an educational advance, others cried out in anguish against what they termed overly complex technical requirements. Some experienced modelers accepted the principle of payload but kicked like mis-timed engines under the requirements of dummy occupants in closed compartments. The PAA-Load Event

Get details now on the "PAA-LOAD" event coming to your locality!

OLATHE • BOSTON • CHICAGO • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES • MIAMI • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHILADELPHIA • PORTLAND • SAN FRANCISCO • ST. LOUIS • SAN DIEGO • SEATTLE • WASHINGTON

$4,670 CASH PRIZES awarded at 17 special AMA meets— plus the 1949 "Nationals"

● This year, Pan American World Airways brings to your part of the country the thrilling new "PAA-LOAD" event which made big history at the 1948 Olathe Nationals. "Most educational advance in model airplane history," said experts!

For 1949: More contests, more prizes, classes A and B, open and combined Junior-Senior, standard AMA flight rules and simplified specifications; 18 Big Contests, 216 Prizes, $4,670.00 All Cash.

Get ready now! Build or convert your free-flight gassie for PAA-LOAD. For contest dates and all other details, see your nearest AMA Leader, or write to:

Educational Director

PAN AMERICAN WORLD AIRWAYS

28-19 Bridge Plaza North, Long Island City 1, N. Y.

PAA

COMET'S LINE-UP of STARS!

—everyone BLAZING a PATH of VALUE and PERFORMANCE through the MODEL AIRPLANE FIELD!

TWO BRILLIANT VERSIONS OF A POPULAR PLANE!

The PIPER CUB Control Model

So completely prefabricated, it reduces building time to the absolute minimum! Completely finished 1-piece balsa wing; ready-cut balsa fuselage sides and formers; 1-piece formed shockproof landing gear, shaped balsa tail pieces and plywood firewall. Biggest value in the field at only $2.95! Kit No. T-15; Wingspan 35½"; suitable for Class "A", "B" and small "C" engines, including the new Ohlsson "29."

The PIPER CUB *Flying Model*

Here's another Comet model of this famous plane—a sensational rubber-powered flyer—and an equally sensational value at only $1.00! We've tested it and perfected it—and the result is a model that puts on a great show in the air, and is remarkably easy to build. Kit No. P-10; Wingspan 40".

THREE OTHER COMET GAS MODEL TRIUMPHS!

ROOKIE TRAINER

Introduced several months ago—still the talk of the trade, and favorite of the model builder! A marvel of simplicity and accuracy, a great performer, and an unusually complete U-control kit. For Class "B" and "C" engines. Kit No. T-6; Wingspan 35½"..... **$2.95**

The ZIPPER

Comet's famous free flight gas model, with many features never duplicated by others! Wingspan 54"; for "B" and "C" engines. Kit No. T-10..... **$5.95**

The ZIPPER "A"

Another great free flight gas model, modeled after the Zipper—and a consistent contest winner! Many "Zipper" features. Wingspan 32"; Kit No. T-12..... **$2.50**

FLYING MODELS - A THRILL TO BUILD AND FLY!

The 54" TAYLORCRAFT

What a value for only $1.00—this big 54" model, *authentic down to the last detail.* Built-in flyability and stability. Kit No. P-8 ..... **$1.00**

SKYROCKET 32"

A big model—and a big value! This great flyer may be flown CO-2 or rubber-powered. Kit No. L-10; a typical Comet value at only ..... **50¢**

SPAD

Here's the most famous of World War I planes, in a great little flyer at a popular price! Kit No. E-17 ..... **25¢**

COMET MODEL HOBBYCRAFT, INC.

129 WEST 29th STREET, DEPT. T5, CHICAGO 16, ILLINOIS

We Fly The Hiller 360

(*Continued from page 25*)

Actually, when you move the control stick on a "Hiller-copter," you're merely changing the angle of these servo-rotors. They, in turn, change the angle of the big blades. The self-damping action of these control rotors corrects any oscillation and gives the ship inherent stability. This simplified control system is the exclusive patented feature that makes the 360 different from other helicopters.

As the flying test-stand warmed up, we became colder and colder. The morning was damp and foggy and the exposed seat of NX67707 was far from comfortable.

The temperature gages came slowly up off the pegs as Hiller gunned the engine a little and explained about torque on take-off.

"Just before you leave the ground, you'll need full left rudder on this little job. The big ship has the torque all taken care of automatically but this one may give you a little trouble. Just as the wheels come up off the ground, you'll need a lot of right rudder. It is just opposite from a fixed-wing airplane. Try it and see," he said as he pulled up a little farther on the "collective."

Suddenly we were in the air—and the nose was swinging far off to the right.

"Use left rudder," shouted the designer above the noise of the little engine.

The next ten minutes were almost like our first dancing lesson. We tried to follow instructions as fast as they were given while Hiller walked along beside the test-stand, telling us what to do.

When we started to drift off to the right, Hiller asked for a little left stick. When we started to back up, he advised forward stick and a little "up" on the "collective." Sure, we were in the air, but the test-stand was still the master of the situation.

At the end of about ten minutes, Hiller let go of the little ship completely and walked away, not far, but he left us sitting up there more or less on our own. We pushed a little here, pulled a little there, perspired freely in spite of the cold, and finally nursed the 'copter back down to the ground without driving the landing gear up through the rotors.

Again inside the plant, Hiller explained a little more about his new 360 over a cup of steaming coffee in the plant's spotless little commissary.

"It takes quite a while to really get accustomed to a helicopter," said the designer. "Usually people with no previous flight experience get along better for the first few hours than an old hand at flying does. The greenhorns have nothing to un-learn, but after three or four hours in the helicopter, the experienced pilots catch on quickly.

"I'll take you out in the 360, show you what it will do and then let one of the other pilots go along while you get familiar with the airplane."

When we returned to the graveled "heliport," a gleaming new three-place Hiller 360, NC9085, was warmed-up and waiting. John Till, our passenger on the trip north from Los Angeles, came along to hold down the third seat, and

the young designer gave us a never-to-be-forgotten demonstration flight.

After a careful warm-up, Stanley Hiller checked the mags on his 178-hp Franklin engine—the only small power plant licensed at this time to operate vertically, checked the carburetor heat and tested the engine at full power. The 360 takes 3,000 rpm from the engine on take-off while the rotors are geared down to 327 rpm. Two tachometers on the instrument panel overlap. While it wasn't needed on this particular morning, a gear-driven fan cools the sheltered engine.

Hiller gunned the engine, eased up on the "pitch stick" and we were in the air. At about 15 feet, he pushed the nose down with forward stick pressure and we started to pick up speed. As we gained 20 mph, the acceleration was astounding. The pick-up of this helicopter from 25 to 65 mph was out of this world. For a few seconds it seemed as though someone had pulled the fuse on a Jato unit under the cockpit.

We climbed up to the cloud base, about 500 feet, and headed north along the power lines adjoining San Francisco bay. Then we stopped, turned, backed up and flew hands-off. Hiller turned back to the factory and "parked" beside a tall tree where we could almost touch the branches from the open cockpit. After a couple of fast passes over the "heliport," the designer came in and landed on much less than the proverbial dime.

After another time-out for scalding coffee, we went back to the 'copter. This time our instructor was Frank W. Peterson, a former Wright Field 'copter chauffeur with over 750 hours in these "egg beaters." His job was to let us fly the Hiller-copter—and still not crack it up.

We went through a quick review of the theory of flight for a helicopter as the engine warmed up. Then we took off to try it out. We were seated in the middle of the 360, straddling the keel. Sandbags were added on the far right floorboards to equal the weight of a third passenger.

"I'll make the first take-off," said Mr. Peterson. "You follow through on the controls. After we get up in the air a hundred feet, you take over and get the feel of the ship for yourself."

Up we went. At a couple of hundred feet and 76 mph, cruising speed for the 360, Mr. Peterson trimmed out the ship with the round knob on the control column, and took his hands and feet off the controls.

"It's all yours," he grinned.

We took over the controls and tried flying the ship in the air. It was a cinch so long as we flew it like a conventional airplane. The control touch was very light and the ship responded beautifully to coordinated turns, shallow climbs and dives.

"OK," said our instructor. "Now let's stop here and hover."

To slow up a conventional airplane, you pull back on the stick. To slow up a helicopter, you pull back on the stick and push down on the "collective" throttle and "pitch control." Then, as speed falls off, you must push forward on the control column and come in with partial power, or you'll wind up going backwards as we promptly found out.

One consistent trouble this reporter had with the "collective" on the Hiller 360 undoubtedly dated back to too many hours behind the controls of twin-engined transports where the pilot pushes forward and down on the throttles for more power. In the Hiller-copter, you push down for less power and we had to stop and think which way the throttle should go before making a move. It was impossible to break this habit in the short time we flew the 360, but at the end of our lesson, it was noticeably easier to react more automatically to the throttle settings. In fact, this control system is so simple that the CAA has allowed Hiller to build a dual controlled ship with only one throttle and pitch lever mounted between the center and the left seats. The "dual" control stick hanging down from overhead looks exactly like the handlebars on a bicycle.

After about 20 minutes of pogo-sticking around the tide-flats near the factory, we really began to get cold. Our gloves lay in the cockpit of the Swift 125 we had borrowed to fly up from Los Angeles, and it was tied down at the nearby Palo Alto Airport. When our hands were getting quite blue, we suggested a stop at the Airport, both for a brief respite from the cold air and to pick up the gloves.

So we flew a conventional traffic pattern and then tried to remember how to slow the ship up for a landing.

"Here's the right way to come in for a landing," said Peterson. "Follow through, and you make the next one," he said as he took over the controls.

"At about 400 feet, drop the 'collective' and set your forward speed at 50 mph. Come in on a regular glide, just like a Cub, but make your approach high. At 100 feet, ease back on the stick and lose air speed. Then, as the ship begins to settle, catch it with the 'collective' and when forward speed is completely lost, drop the nose a little so that you won't go backwards. Then add a little more 'collective' to stop the descent just off the ground. See, it's easy," he added as we lightly kissed the runway.

We taxied off the runway; forward stick and almost enough "collective" for take-off. We parked near the Swift and cut the switches. As the rotor blades coasted to a stop, we climbed out and crouched a little as we walked out beyond the tops of the blades. At slow speeds, the 17½-foot blades droop a little and while they would not give a permanent haircut to a tall passenger so long as the ground was level, it was just a precautionary measure.

"For general safety reasons," said Peterson, "we have everybody duck as he comes in and out of the ship, but there is plenty of clearance unless we park on rolling ground. With the rotor off, the tip is 7½ ft. above ground."

"Yes, this one has a self-starter!"

First of the COMET "SUPER PRE-FABS!"

COMET

The PIPER CUB

Featuring the

SENSATIONAL NEW

STRUCT-O-SPEED CONSTRUCTION

(Rubber-Powered)

Only 25¢

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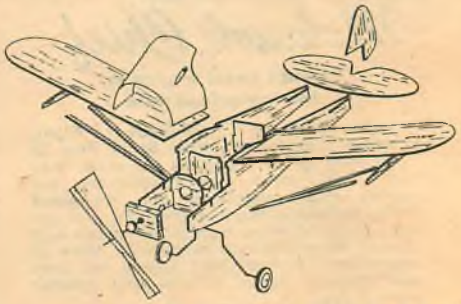

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would have many more entrants, said they, if there was only a set payload weight and the contestants could take it from there. They then could grab any handy free-flighter and simply hang, tie or stuff the weight anywhere without bother about size, shape, or position on the model. The PAA requirements, they complained, called for special models or modifications that would be useless in any other event. Other equally experienced contestants disagreed; any model which could perform well with "occupants" aboard could certainly hold its own when the money is off its back, and what could be a sweeter step toward radio-control than a good free-flighter with the proved ability to carry payload in a safe enclosed compartment?

Just to keep the record straight, the PAA-Load Event rules must not have been too restrictive, since most of the Nationals' entries were modified standard kits (including the popular pylons) and there was nothing restraining originality had anyone decided to enter a Canard or a Flying Wing. Worries over poor performance under these rules were completely dispelled when Herb Kothes' winner of original conventional design flew more than six minutes, and everyone breathed easier because there was the pound of "occupants" aboard to help dethermalize the winner safely back to earth!

Speaking of the winner brings us to the high point of the sponsor's participation in a contest. Even so, the sponsor does not enjoy the pleasure of awarding the prizes and then bowing out with a smile. Cash for awards is but a small part of the sponsor's expense. One of the largest sponsors of model airplane events spends approximately ten times as much in distributing prizes as the prizes themselves are worth. All this distribution money goes for display advertising, direct mail, program space, photography, art work, telephone and telegraph, travel and miscellaneous.

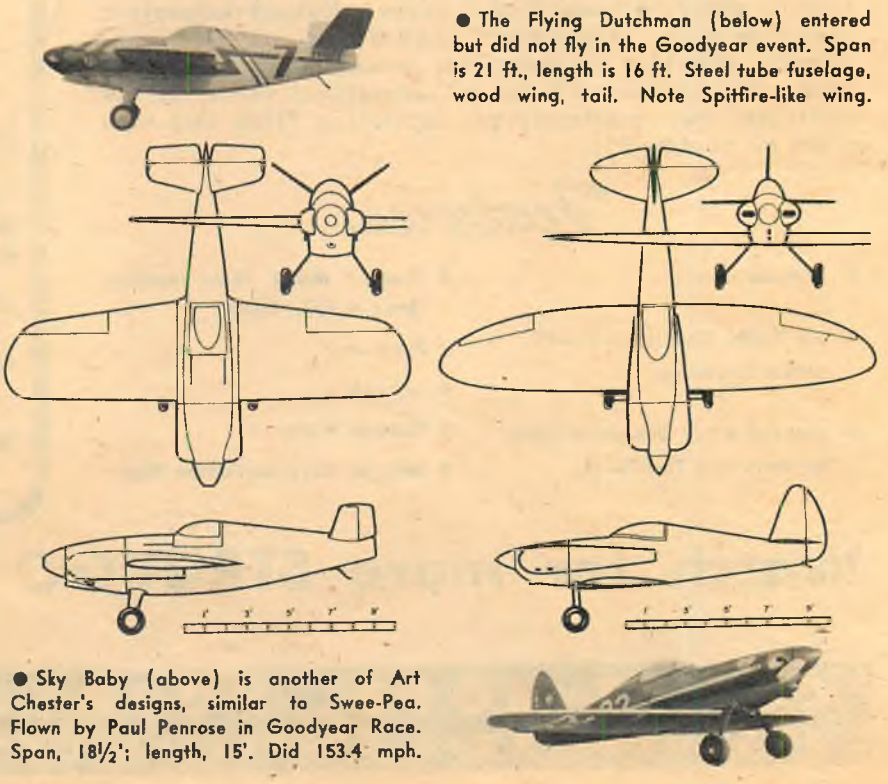
How does the sponsor figure that encouraging model aviation is worth all this fuss and feathers—and expense? Any practical demonstration of air transportation is a direct benefit to the airlines. The PAA-Load event is such a demonstration reduced to its simplest terms. Payload is the life blood of an airline, and in the PAA-Load Event we see a pound of payload being flown safely with a tiny engine of approximately ⅛ horsepower. Pan American Airways engineers estimate that a single pound of additional payload on every Clipper plane would have been worth $24,000 to PAA in 1947 alone! Air Force and Navy engineers don't calculate the dollar evaluation, but they admittedly sweat blood for each additional pound of payload. If model engineers can show how this single pound of payload may be flown more efficiently in models they will make a direct contribution to the problem.

As we go to press, Pan American World Airways is planning to announce a greatly expanded sponsorship of the PAA-Load Event for 1949. Plans are not only to repeat this outstanding event at the Nationals, but also to introduce it at 18 key AMA contests throughout the country, and to enlarge it to include both class A and class B engines and all classes of contestants.

(Technical adviser for the PAA-Load Event is Dallas B. Sherman, PAA operations representative, Washington, D. C. Sherman has been a free-flight fan for 30 years, having built his first flying model in 1918 and progressed to a gassie by 1936. To him, payload carrying airplanes—big or small—are old stuff. In 1941 he designed for Edgar Bergen a free-flight gas model to be custom-built for Charlie McCarthy.

During the war, Sherman piloted big multi-engined transports all over the world carrying vital payloads for ATC. He won the Distinguished Flying Cross for piloting unarmed transports in areas of enemy air activity. Now a Colonel in Air Force Reserve, Sherman owns and flies his personal "Swift 125" in which he plans to cover the AMA 1949 contests featuring the PAA-Load Event.—EDITOR)

GOODYEAR RACERS



● The Flying Dutchman (below) entered but did not fly in the Goodyear event. Span is 21 ft., length is 16 ft. Steel tube fuselage, wood wing, tail. Note Spitfire-like wing.

● Sky Baby (above) is another of Art Chester's designs, similar to Swee-Pea. Flown by Paul Penrose in Goodyear Race. Span, 18½'; length, 15'. Did 153.4 mph.

After this chilly hop, we readily understood why United Helicopters was building a bubble-type canopy for the 360. CAA inspectors were due at the factory on the day of this flight to approve the new hatch.

We picked up our gloves and sat talking with Mr. Peterson, trying to find out why the 'copter was still flying us rather than doing just what we wanted it to do.

"You'll have less trouble with that 'collective' control," explained our instructor, "if you just figure it as an 'upper' and a 'downer.' Pull up to go up and push down to go down. Let's go up and try it again."

We made the take-off without too much trouble and encountered the same terrific acceleration between 25 and 65 mph that had been so noticeable on the first flight.

"Transition speed on these ships," said our instructor, "is between 20 and 30 mph. Below that speed, it is extremely difficult to maneuver the ship should you have a sudden power failure. If your altitude is above 200 feet, you're in the clear because you can pick up over 30 mph in a normal glide and have enough speed to spare for an 'autorotation' (power-off) landing. Actually, vertical autorotation is possible, but the sinking speed vertically is slightly over that which the landing gear can absorb safely—about 18 feet-per second.

"Autorotation," he explained, "is about the same thing as a glide in a fixed-wing aircraft. At speed above 25 mph, the rotor blades will keep turning on their free-wheeling shaft so that a pilot will have sufficient momentum to flare out and land with a dead engine."

On our return flight to the Hiller factory, Peterson said, "Try changing the power setting and notice how much rudder it takes to hold a straight course. When you make a right turn, you lose up to 50 rpm from the main rotor because of the increased pitch in the tail rotor. Then when you make a left turn, you'll gain rpm's and start to climb. In level flight, however, it will fly both hands and feet 'off.'"

We tried different power settings in cruising flight and had to use considerable rudder to keep the ship from yawing. As the factory approached, the instructor made no move to take over the controls so we circled the plant and headed into the wind at about 300 feet.

This idea of stopping in mid-air at nearly a hundred feet is very difficult to get used to, since that's just about the height of a final approach in a fixed-wing airplane where your air speed reads anywhere between 45 and 110 mph, depending on the type of plane. Anyhow, we let the ship glide down to under a hundred feet and pulled back on the stick, easing in a little "collective" as the air speed dropped.

Of course, we left the back stick applied too long, and started to drift backwards. A little forward pressure on the handle-bar controls and more up on the "upper" stopped our reverse travel. As in most new planes, we used too much control, used it too late and were taking up far too much sky while trying to settle down on the "heliport."

"Don't overcontrol it," admonished the instructor.

We eased off a bit on the pushing and pulling and stabilized the ship at about 15 feet. Then we pushed down gently on the "collective" and headed for the ground. As usual, we used a little too much control and had to come back in with some more "upper" to keep from driving the tricycle gear right up around our ears.

We finally nursed the "egg beater" down to about a foot off the ground, figured that we had the landing made, and pushed all the way down on the "collective." The ship bounced once and stayed down the second time, but it wasn't neat.

"Fly it all the way down until the wheels touch," said Peterson as we cut the switches. "Don't drop it in the last foot."

We absorbed more coffee and instruction and asked what happens if you hit a bird in flight?

"The birds seem to evade a helicopter," said Peterson. "We've tried throwing dead birds into the rotors on the ground and it decapitates them without damage to the ship. In flight, however, I've never been able to run one down."

Hiller's blades are laminated spruce with metal leading edges that are covered with fabric. He buys them from the same company that makes blades for some of the competing 'copters, though Hiller's are of different design.

Ninety-two percent of the parts for the Hiller 360 come from a hundred different sub-contractors scattered all along the West Coast. In that way Hiller is able to figure his cost per unit and still be assured of high quality material through a performance bond arrangement with his manufacturers. The Palo Alto factory is in reality a large assembly plant combined with a tool and die shop for original patterns. The plant is geared for a mid-year production of one ship per day with an eventual potential of two per day. Sufficient parts for the first 100 planes are now being built by sub-contractors and completed 360's began rolling out of the Palo Alto plant in January. At this writing, retail cost of this three-placer is just half that of the next cheapest ship licensed by the CAA.

After thawing out, we went up again; this time with Harry Watson, another ex-Wright Field pilot. We were still having our hands full with hovering and landing. It was very difficult to overcome both the habit of pulling back and up on the throttle for more power instead of less, and it went against all our previous aeronautical training to break off a glide a hundred feet in the air. In a conventional plane, you'd splatter it all over the runway that way.

We shot landings, if you can call them that in a helicopter, for another half hour at the factory. On our last few hops, the instructor was more or less able to leave us alone, but this single half-day transition into helicopter flight is inadequate.

For agricultural flying, dusting, spraying, and pest control, the new 360 should be ideal as it is now licensed. For industrial and commercial work, power line patrol, air mail, passenger hopping and cross-country flight of any type, a canopy is badly needed. In cold weather the pilot is just as exposed to the wind and rain as he was in the days of the Curtiss pushers. It would be unfair to do a "We Fly" story on this ship without flying it with the new bubble canopy. We couldn't do that on the day we were in Palo Alto because the CAA was flight-testing the new accessory. Arrangements were made, however, for a hop later that month when the new canopy model was to be presented for the first time to Los Angeles aviation writers. After all, it gave us an excuse to go up again in this fascinating piece of flying machinery.

N68962, complete with bubble canopy, was shown to the Los Angeles newspapermen at the Oakmont Country Club in Glendale. Flights were made from a sheltered spot in the fairway and a dozen writers took their first rides in the new Hiller-copter.

We had the opportunity to fly this sedan version of the 360 from the country club to the Grand Central Airport in Glendale. In spite of bitter cold weather (for Southern California), the cockpit was quite comfortable. No cabin heater was installed, but the helicopter is still a "working" airplane and not a "plush-job," and the mere addition of a full cowling is quite adequate for any jobs that the 360 may do in the near future.

As this article goes to press, Hiller's United Helicopters is the only factory in the country making licensed helicopters exclusively. His competitors make their rotary-winged craft in conjunction with some sort of conventional plane program. It is interesting to note, in passing, that this 'copter has been developed completely without government subsidy and the two-million dollar experiment has been financed through private stock sales.

Gay Lady V

(Continued from page 49)

progressively finer grades of sandpaper, the exact desired shape is attained. Place the tail end on a scrap balsa block and use a chisel to separate the halves. Exercise care in doing this, to avoid marring the smooth contours of the fuselage. Whichever half you select as the bottom should be mounted on a jointer so that a ⅛" layer can be removed from the flat center portion. This makes room for the crutch. Since the crutch ends under the stabilizer, a small sheet of pine, ⅛" thick, should be glued to the tail end so that the top and bottom of the fuselage will fit together snugly with the crutch in place. Both halves are now hollowed out to correspond with the plans and are carefully sanded down.

Bulkheads A-1, A-2, B-2, D-1 and D-2 are cemented in place now, with a small block ("X") cemented to the front of B-2. A hole thru this block (vertical) accommodates the "position" wire on the dolly. The slots for the wing and stabilizer are cut into the top half. Cut a hole through which the cylinder will pass when assembled. Mix a batch of Weldwood glue and thin it down in a 5:1 ratio with water (5 parts of water to 1 part of Weldwood). This is used to brush on a hard "skin" which will strengthen the fuselage considerably. Three coats will do, allowing a half hour or more between coats. Locate and drill holes as specified on the plan.

Select a piece of ⅛" x 3" x 18" magnesium for the crutch. After marking a centerline, lay out the outside shape or outline and work down to shape with a file (or whatever metal-working machinery you have access to). Now lay out the inner lightening holes (dotted lines in top view) and work the metal away to the desired point. The two aluminum crutch supports are added now (⅛" x ⅜" x 9⅜" rectangles) and the various holes drilled and tapped. The one hard job in making this ship is drilling and tapping the side holes in the crutch that anchors the nose ring. Just be very careful in "centering" the drill for one thing, and take it easy when threading the hole—a 2-56 tap isn't very strong. Center-punching the holes is a good idea, and if you can use someone's drill press and drill vise, the job will be made very simple.

The ⅛" x ⅜" x 9⅛" aluminum skid can be fitted on now, after rounding off the exposed edges slightly. In securing metal for this ship, specify 24ST grade where noted, as this is a hard and tough grade of aluminum. Note that the front hole in the landing skid is tapped to take a 6-32 bolt which holds both the nose ring and skid in place. The other two holes are countersunk to take flat-head screws, the finished skid being smooth from stem to stern. The nose ring is merely a short piece of 1¼" outside diameter aluminum tubing with a 3/32" wall. Two side holes secure it to the crutch, and a hole on the top is threaded for a 6-32 bolt which holds the front end of the fuselage top in place.

In making the wishbone, copy the outline from Section "C" onto ¼" thick aluminum or magnesium and work to shape. Before drilling, center-punch the side holes—the top one should be easy. Before attaching the wishbone,

we have to build the wing.

Lay down a sheet of 1/16" balsa, 43/16" x 17" on your work bench or other flat area. This sheet will be the bottom of the wing—perhaps you'll have to butt-cement 2" and 3" wide sheets to get the necessary width. Pin the sheet down and use little wedges under the leading edge portion to match the curve of the bottom of the ribs. When cementing the ribs in place, remember to have lead-out holes in the left-panel ribs. Insert a 14" length of 1/32" music wire in these holes. Form loops on inner ends to attach to bellcrank after wing is covered. Now bevel the trailing edge portion down to a knife-edge so that the bevel is in line with the rear top camber line of the ribs. The 1/16" thick top covering is added, working from the trailing edge forward, using a slow-drying cement. Trim tips square and add blocks, which are rounded off and sanded to a streamlined shape. Install the 1/16" inside diameter tubing in the tips, as the lead-out wires will bind if the tubing is omitted.

The entire wing assembly now gets a light sanding, working down to the desired cross-section as shown on the plans (see typical wing cross-section). Pressing too hard and rushing the job will only wear off the covering over the ribs, leaving a bumpy surface that will look bad and detract from the model's speed. This sanding is continued between three coats of clear dope. Using a light grade of silk (Chinese silk is excellent for this purpose) cover the wing entirely. My procedure is to wet half and cover the bottom of the wing first. Pin the wing to a flat surface and allow the silk to dry thoroughly. Then wet the balance of the silk and cover the top of the wing, working the silk around the tips and overlapping the trailing edge for added strength. Again, pin or weight the wing down on a flat surface until completely dry.

Now that we have a strong, warp-free wing assembly, slip it in place in the upper fuselage half. Check from the top to see that the wing is "square" on the fuselage. Make a final check on incidence before allowing cement to dry completely. Small strips of silk can be doped or cemented along the wing-fuselage juncture, forming a fillet and strengthening the joint. The stabilizer is also cemented in place, checking first to see that the elevator horn is attached. The elevator horn is a simple L-shaped affair, cut from brass or dural .040" or .050" thick and bent at a 90-degree angle. After cementing in place, a small nut and bolt is used to hold it securely to the stabilizer, free from the danger of shaking loose from engine vibrations. Now apply three coats of sanding sealer, sanding *very* lightly after the first coat or two. Avoid sanding down to raw silk, as it will ruin the finish that is so important in speed jobs.

The wishbone is now mounted. This will necessitate cutting a hole in the bottom of the wing to accommodate the wishbone and to provide clearance around the bellcrank. The bellcrank can be mounted to the wishbone with a short bolt, but it is better to use a longer bolt that reaches down from the top of the fuselage, so that cement can be applied over the head, making a firm grip on the slot and keeping the bolt from turning. The side bolts are added,

securing the wishbone rigidly to the top of the fuselage and wing.

The cowl base is cemented to the fuselage. Either the top of the fuselage can be flattened as necessary, or the cowl base block hollowed out to set on the top of the fuselage. Add the two sides and apply three coats of dope. Before the dope has fully hardened, add the top block, using pins to make the sides match the curve of the cowl top. When the cement is dry, remove pins and sand assembly smooth, giving the cowl three coats of sanding sealer. Sand between coats. Now the entire ship gets three more coats of sanding sealer with sandpapering in between.

Borrow a spray unit for the balance of the job—it will be worth the trouble or expense. A heavy coat of auto primer is sprayed on first, followed by sanding with No. 400 wet-or-dry paper. A light coat inside will do. Choose a "name" brand of synthetic enamel for the final coating, as the high quality finish will stand up better under the beating the model will have to take in competition. When the whole works is dry, solder the push rod together, backing up the job with sheet asbestos to protect the paint job. Needless to say, the elevator should be taped "neutral" and the lead-out wires held in "neutral" (bellcrank centered) with rubber bands during final assembly of the controls. The crutch is bolted on, followed by the engine and fuel tank.

If you're worrying about fuel, nothing will take the place of experiments to see what blend of "bug juice" is best in your location. For a start, "Powermist" glow fuel or Ohlsson & Rice No. 4 is recommended, using a 9-12 X-Cell propeller.

The balance of the ship should be slightly nose-heavy on the leading edge of the wing. Weight should be 29 ounces or less, with fuel. Use the dolly as shown on the plans, making any adjustments necessary to get the wheels lined up to track in a circle so the dolly won't "skip" or bounce.

This ship is designed around a series 20 McCoy "60." The use of other engines will require changes, as needed, due to different engine dimensions. A crankshaft extension was machined for the original job, although spacer washers can be used behind the McCoy "spool." This will require enlarging the holes in A-1 and A-2.

As is usual practice with racing jobs, the exhaust stack should be trimmed to conform with the cowling contour. Also note that the top of the intake venturi is beveled off, as the wing and bellcrank are too close for it to fit otherwise.

For the benefit of newcomers to the metal crutch idea, it may be a good idea to explain that "studs" are used at B-2, Section "D", and at the tail end of the crutch. Note that the external thread is ¼-28 (same as Froom spinner shafts, from which the studs are made) and the internal thread is 6-32. With the crutch held in place over the lower fuselage half, the studs are threaded on (halfway down in the middle and rear holes; flush with the top of the crutch at B-2). Flat-head bolts are fed up through the bottom of the fuselage, securing the crutch to the bottom. To fasten the top of the fuselage on, the flat-head bolts are inserted in the middle and rear holes; the third point of attachment being the nose ring in front of the cowl.

Banshee

(Continued from page 46)

are dry. Check templates during sanding and give particular attention to smoothing the curves in the wing roots.

The base of the fin is shaped and fitted to the fuselage first. Next the stabilizer is shaped and sanded in one piece before being cut through at the center, beveled for dihedral (see front view), then mounted on the top of the lower fin section. Last comes the upper part of the fin.

Mix a paste of dope and talc and use it to fill and smooth any cracks or blemishes in the surfaces of the model. Sand these places then dope the entire model as a primer for the wood-filling coats. Two generous coats of wood filler are brushed over the model and, when dry, are virtually sanded away. A third coat is dressed down carefully with fine emery paper.

Build up the landing gear of wire struts with paper strip wrapping and use small plastic or rubber wheels if you can obtain them in scale sizes. Otherwise wheels may be turned or carved of white pine or balsa.

The "transparent" sections of the canopy are painted silver then are covered with Scotch Tape. Standard dark blue is brushed or sprayed in several thin coats over the entire model. Gear struts, wheel hubs, and the tail pipes of the jet engines are painted silver while tires are flat black. The Banshee model is completed by adding decal insignia to upper left and lower right wing surfaces and to both sides of the fuselage

De Havilland 4

(*Continued from page 39*)

with fine soft wire and soldered well. Install the remaining bulkheads and bellcrank support.

If you use electric ingition it is advisable to install it now. Solder all connections well. Attach the control lead-out wires to the bellcrank and bolt the bellcrank to the support. The elevator is now hinged in place and the control rod connected. Install the fuel tank (plug all openings to keep out foreign matter) at this time. Use a wedge type of tank only if inverted flight is contemplated, otherwise a rectangular or cylindrical tank will do. Cement all fuselage formers in place and plank the fuselage top. Attach nose block but not bottom nose piece and carve to shape. Cover fuselage bottom but be sure to allow for the lower wing insertions. Sandpaper the fuselage well and apply a coat of clear dope. Cut out the cockpits and engine holes and add coaming. Sand and add vertical fin and rudder. Dope again.

The wings are next. With 440 square inches of projected wing area and a slim fuselage, the model D.H. is perfect for stunting. It will be noted that both symmetrical and Clark "Y" airfoils are shown. Use symmetrical for stunts and Clark "Y" for conventional flying enjoyment. Note the different angles of incidence for each airfoil.

First cut the ribs from the specified stock and sand smooth. Cut the pine spar to the correct lengths and assemble to the correct dihedral using the plywood joiners. When thoroughly dry, cement the ribs to the spars and add the notched trailing edge. Leading edge and ⅛" square auxiliary spars follow now. The soft balsa tips are added after the 1/16" sheet balsa leading surface is in place. The latter is cemented to the auxiliary spars, ribs and leading edge. Soft balsa wing tips complete the wing structure. When dry, sand the framework lightly and cover with heavy Silkspan. Clear dope twice. Leave the center section of the lower wing uncovered.

Cement the lower wing in place at this time. While this is drying, the struts can be cut from pine. These are sanded to a streamline shape. Be sure to cut the struts about ½" longer than required so the ends can be pushed into the ribs and fuselage. By this time the wing joint should be dry. The landing gear assembly is wrapped to the plywood bulkhead and joiner with strong thread. Apply several coats of cement to the joint. The bottom nose piece is now added and sanded smooth. Cover the lower wing center section bottom with Silkspan.

Apply two coats of wood filler to the fuselage and tail, sanding well between coats. Add the interplane struts to the lower wing and the cabane struts to the fuselage, using a liberal quantity of cement and inserting the struts about ¼" into the fuselage and ribs. Dope the wings twice more.

We are now ready for the paint job. As mentioned previously, a slight variety of color and insignia, is available and this is illustrated in the small profile views of the plane. At least three coats of colored dope should be applied. This should be thinned considerably for the last application. A light sanding and use of rubbing compound after the last coat will enhance the finish. The original model has five coats of colored dope.

Mark off the strut locations on the bottom of the upper wing and groove to fit the struts. Cement top wing in place. Rigging can be added now. This can be made of heavy button hole thread or fine music wire. The .049" music wire control-line guide should be liberally cemented to the struts as indicated. Optional scale detail such as Lewis gun, radiator cap and generator complete the model.

An engine of .60-cubic-inch displacement must be used for stunting and is also well suited for sport use although engines in the .49 class can be used for sport flying. The rudder should be offset as the plan indicates and the engine should be offset two degrees to pull the model away from the center of the circle. For flying, use only .016" lines from fifty to eighty feet long. Test with the shorter line. The model should balance one inch forward of the bellcrank pivot point. Shift batteries or add lead weight to achieve this balance.

Considerable power should be used for the first flights and controls should be handled with extreme care in order not to overcontrol the model. In spite of predictions to the contrary, the author's D.H. 4 flew well inverted with scale dihedral. It is suggested that the builder familiarize himself with the model's flying characteristics before trying stunts. However, if stunts are not contemplated you will still be the owner of a good "Sunday Flyer" and potential beauty winner.

Payload Winner

(*Continued from page 44*)

of the pylon jobs I have seen. R.O.G. flights were made without the slightest difficulty even though the model had a 16-ounce cargo to carry.

Now a few words of advice on the construction of the PAA-Loader. As I have said, the model has been designed as simply as I believe possible, so no one should have difficulty building it.

Lay out the two sides of the fuselage, building one on top of the other, so precision between the sides can be obtained. Build the door on the right side of the fuselage only, which would be the side next to the plan. A diagonal brace is inserted in place of the door on the left side. Note the 3/16" uprights are countersunk into the 3/16" x ½" spars around the cabin to add rigidity to the cabin and thus the wing mount. Fill in the cabin outline with 3/32" sheet balsa as indicated. Remove the sides from the plan and add the top and bottom cross-pieces. Cut the firewall from ⅛" plywood and cement securely to the fuselage. Obtain ⅜" x ½" x 5⅝" hardwood engine bearers and cement to the firewall and former 3 with large amounts of cement. Formers 1 and 2 are cut from ⅛" sheet and cemented in place. The upper cowl is made by soaking 1/16" sheet balsa in water and bending it over formers 1 and 2. Trim to shape as shown on the plans.

Make the engine cowl next by cutting the sides from ¼" sheet to the shape shown on the plan. Cement to the firewall and motor mounts as shown. Form the bottom engine cowl from a soft balsa block ½" thick that will fit between the cowl sides. Cement in place and trim to shape. Bend landing gear struts from 3/32" steel wire to the shape shown on the landing gear layout and attach to the fuselage. I suggest that the combining portions of the landing gear be bound with fine copper wire and soldered securely. The landing gear is affixed to the fuselage by binding the thread, cementing securely, wrapping with silk, and cementing again. On this model the landing gear is strained and gets much abuse, so make the attachment to the fuselage secure. The tail skid is bent from 1/16" wire and bound to a 1/16" plywood base by sewing it on with a needle and thread. Cement to fuselage as shown on plan.

Cut the cabin floor and rear cabin side from ⅛" sheet and fit into place. Hinge the cabin door to the fuselage by means of silk hinges or light cloth hinges. Note the position of the ignition parts and mount them in the fuselage at the positions indicated. Wire the model with caution, making sure each joint is soldered well, as that will help eliminate ignition troubles at the field. Sand the cowl and fuselage sides well.

Cut the required number of each size wing rib from soft 3/32" sheet. Lay out the trailing edge and main spars for a section of the wing at a time. Cement the ribs in. Cement the leading edge to the ribs after they have been set in place. Cut the dihedral braces from 1/16" plywood. Prop the wing panels up to the proper angle and cement the dihedral braces to the main spars securely. After the dihedral has been set

cement in the 1/16" sheet gussets as shown on the plan. Trim the wing tip outline and trailing edge (if not tapered) to airfoil shape and sand.

Construction of the stabilizer is self-explanatory. Cement all ribs securely so that excessive warps will not occur. Make the outline of the rudder as shown on the plan. Cut the main spar from 3/16" sheet and cut the rib strips from 3/32" sheet. Cement in ribs and main spar to form the symmetrical rudder section. Trim to airfoil shape and sand.

The original PAA-Loader was covered entirely with Jap tissue. Some may frown on this, but from past experience I have found that Jap tissue is less brittle and strong enough to stand up. This, however, is a matter of personal preference for it makes no difference how the model will fly and makes little difference as far as weight is concerned. Dope the wing and tail with about five coats of thin clear dope and the fuselage with six or seven coats if Jap tissue is used. Do not color the dope. Cabin can be trimmed with colored dope if desired.

Insert two washers under the rear mounting lug of the engine for down-thrust. This is about 3 degrees down-thrust but will vary slightly with the thickness of the washers and with how much they are countersunk into the engine mounts when the engine is bolted down. Be sure that the occupants are in the cabin before attempting to fly the model as it was designed to carry a 16-ounce cargo forward of the center of gravity and if the occupants are removed the ship will stall violently.

When the model is assembled with the occupants in place, make a few test glides, each time making the necessary adjustments until a long flat glide is obtained. If the plane dives, shift the C.G. by moving the occupants back and vice versa if it stalls. By the use of straight pins, pin the occupants in the cabin until the plane is adjusted. Make sure all surfaces are in alignment and make a flight under low power, noting the characteristics of the flight. Make the necessary adjustments and gradually increase the power until the model will handle the full power of the engine. After the ship has been adjusted I would suggest that the occupants be cemented in place so that they will not shift in flight.

1949 NATIONAL CHAMPIONSHIP MODEL AIRPLANE CONTEST

Sanctioned by the Academy of Model Aeronautics

To be held at U. S. Naval Air Station, Olathe, Kan., July 26-31
(Indoor events at Municipal Auditorium, Kansas City, Mo.)
Sponsored by Olathe Chamber of Commerce and American Legion Post 153

Entry fees: Basic fee, $1; for each event or class entered, 50c; late entry fee, $1. All fees must accompany each entry. Deadline for entries without late entry fee is midnight, July 12, 1949. Entries postmarked after that time will be accepted only on payment of additional $1 late entry fee.

Reservations for housing: Male contestants will be housed at the Naval Air Station, Olathe, for 35c linen charge for the entire six days. Both male and female contestants will be furnished 3 meals daily at about $1.05 per day, or portion thereof, at the Navy's general mess.

Send to: Jess Hall, National Contest Director, Olathe, Kansas.

Enclosed is $..... in check ☐ or money order ☐—indicate which—please enter me in the following events of the 1949 Nationals (check events):

☐ Indoor h. l. glider	☐ Free-flight gas B	☐ U-control speed D
☐ Indoor stick	☐ Free-flight gas C	☐ U-control jet speed
☐ Indoor cabin	☐ Free-flight gas D	☐ U-control novelty
☐ Outdoor stick	☐ Free-flight R.O.W.	☐ U-control scale
☐ Outdoor cabin	☐ Radio-control	☐ U-control precision
☐ Towline glider	☐ U-control speed A	☐ Outdoor h. l. glider
☐ CO_2 free-flight	☐ U-control speed B	☐ Rubber flying scale
☐ Free-flight gas A	☐ U-control speed C	☐ Pan-American PAA-Load

Reserve quarters at Station for.....(a)

Reserve trailer space for.....(a)

Reserve rooms in private home for.....(b)

Reserve hotel accommodations for.....(b)

(a) State how many nights and how many persons.
(b) State how long, number of persons, accommodations and rates preferred.

I hereby release the sponsors or directors of this contest, and the U. S. Navy, from responsibility for any claims of damage, loss, or injury resulting from any cause while attending this meet, and I also assume full responsibility for any damage or injury caused by myself or my airplane to any persons or property.

Name (print)..... Signed.....

Address..... City..... State.....

Club Affiliation.....

AMA No..... My age on July 26, 1949, will be.....

PARENTS' CONSENT, WAIVER, RELEASE (this parents' consent must be signed before entry of any contestant under 21 years of age)

As parent and/or natural or legal guardian of .....
a minor, I hereby give my full and unqualified consent to his (her) participating in the 1949 National Model Airplane Championships, and to his (her) accepting any and all awards whatsoever that he (she) may win, whether it involves travel or otherwise.
In consideration of their sponsorship of this Meet, I hereby release the Olathe Chamber of Commerce, the Earl Collier Post 153 of the American Legion, the Academy of Model Aeronautics, the U. S. Navy, and any organizations and all persons connected with said meet, from all claims which may arise with said meet.

Signed..... Address .....

Witness..... Address.....

Brayton

(*Continued from page 27*)

Brayton School is its Airplane and Airplane Engine Mechanics Division. Brayton graduates are now taking their places all over the country to accept jobs in the airplane mechanics field as the demand for such trained personnel once again exceeds the supply. Before the Airplane and Engine Mechanic Course was installed at the St. Louis institution, experts in airplane plants, military aviation leaders, base operators, and others familiar with the field were consulted in the preparation of the course. As Brayton explains it: "Who is better qualified to determine what the men need than the men who will one day employ them?" As a result of this exhaustive survey, a curriculum was worked out in which actual conditions were duplicated as nearly as possible and, in the final phases of the course, the men are given actual planes on which to work—from instruments to propellers, and from aircraft fabric and finishing to power plant installation and trouble shooting.

Closest to Brayton's heart is the actual flying division. The school offers six courses in the flight training division. The walls of his own office are decorated with the photos of some of aviation's all-time greats, with whom he has flown, and many of whom he taught to fly. At the request of General Jimmie Doolittle, Brayton trained Doolittle's son. A "hot pilot" in his youth, Brayton knows the pitfalls and tells the boys the facts of aviation life in a way they understand. He has respect for airplanes—which accounts for his robust good health, after logging over 7,750 hours.

The private pilot's course takes a minimum of ten weeks and includes ground school, dual flight instruction, solo flight instruction and gives the student full acquaintance with the local flying areas, auxiliary airfields and restricted flying zones. The Brayton instructors feel that the location of the school is a definite advantage. They contend that the small training field insures safety in training and gives the students the necessary security while training but that the school's location on a large municipal field acquaints the student flyers with traffic problems, familiarity with instructions and directions from the tower, and the problems of take-off and landing under crowded conditions.

The other flight courses which follow the private pilot course are Commercial Pilot, Multi-Engine Rating, Instructor's rating, Instrument Rating and Airline Transport Rating.

The rules at Brayton's are strict and necessary. An average grade of B or better must be earned in each term. Roll is called four times a day and promptness is mandatory in class laboratory, or shop. All time lost or absences—excused absences—must be made up within a month.

An athletic program is stimulated and sponsored by the school. There are softball teams, basketball, and other active sports being arranged. Brayton himself is an ardent hunter and he always tells the boys that the "'coon-hunting in Missouri is the best in the world."

Brayton and all the instructors deplore the fact that the aviation world loses many of its most promising men because they can't afford to study flying and the related fields of aviation. For that reason, Dorothy Burmeister, the Registrar, spends countless hours finding comfortable and reasonable living quarters and part-time jobs for the students who honestly want to attend the school and complete the courses offered. Miss Burmeister herself is typical of the Brayton institution and its genuine interest in student welfare. Her enthusiasm for aviation stems from her years as Flight Operations Clerk at Curtiss-Wright Corporation.

BRAYTON'S own career has been as colorful as any in the business. His military experience in World War I included service as a mechanic with the Marine Corps in Haiti,. under Major Geiger, now General Geiger. From 1925 to 1928, Brayton held the position of chief flight instructor for Robertson Aircraft at Lambert Field. He became vice-president in charge of flight for an air school and was chief pilot until 1932 when he formed his own corporation. An outspoken zealot of aviation in all its phases, Brayton's attacks on red tape, confusion, and the meagreness of the federal program sometimes bring the temporary displeasure of the "powers that be." But he comes out on top a fair share of the time and is ready to take the lead in whatever developments may come.

Treasurer and assistant secretary of the school is Donald C. Davidson, who brought to Brayton an interesting background which ranged from statistician for the National Automobile Dealers

Association to executive director of the National Cosmetologists Association. He has been with Brayton since May, 1941, managed the Moberly Airport, operated a war training school for advanced students and has been Brayton's right-hand man since January, 1940.

Another Brayton oldtimer is R. E. Oldfather, Director of Flight, who holds nearly every rating available. Oldfather started his flying career with Brayton in 1926. Like Brayton, he believes in training men for practical flying. With an intellectual background of five years Medical School, he was one of the famous barn-stormers of the twenties, jumped from parachutes in the air shows, and more practically, spent some time as a pioneer in crop-dusting. Oldfather was the last man to fly a C-54 off Okinawa ahead of the hurricane of September, 1945. He was instructed to "use his judgment," and beat the storm.

Superintendent of Instruction at Brayton is Cleman L. Sawyer who came to the school as an instructor in the mechanical school, rose to supervision of that division and eventually to supervisor of all instruction except flying. He brought to Brayton many years' experience in aviation electronics and aviation mechanics. A Navy veteran, he held vital jobs in Wichita aircraft plants.

Louis Bothell of Iowa City, Iowa, has just been promoted to head of the Engineering Department after several years as an aeronautical engineering instructor.

A recent addition to the Brayton staff is Mr. James Ray, Jr., director of Ground School. Mr. Ray's experience is mainly with the scheduled airlines. He was formerly with Southwest Airways as ground school instructor and assistant flight superintendent. During the war he was a ground school instructor and Link Trainer operator in the Naval Air Transport Service, and before joining the Navy was with TWA. as a ground school instructor. Mr. Ray has a CAA ground instructor license with all ratings, a dispatcher's license, and is a private pilot.

Robert E. McEntee, who first came to Brayton's in 1939, is Service Manager in charge of repair and service of the aircraft which comes to Brayton for service. The international transports from half a dozen nations are old stuff to McEntee. He has been with Brayton almost steadily the past nine years, except during the time he spent in the Navy on an escort carrier. In addition to the A & E mechanics license, ground instructor's certificate, CAA designated airworthiness maintenance inspector, he is also a CAA designated aircraft & engine mechanic examiner and private pilot.

Brayton looks forward to the day when at least one out of every ten men in aviation in the Midwest will be a Brayton-trained man.

Cruiser

(*Continued from page 63*)

apart. Cement small circular block to the rear of the front nose block. Drill a hole 3/32" in diameter with 3 degrees right thrust in the nose section. Insert the aluminum tubing which acts as a bushing and use plenty of cement.

Soft 1/16" x 3/32" strips are used for the complete tail assembly. When constructing the wing make it in one unit. After ribs and tips are dry cut the leading and trailing edges at the dihedral breaks and raise tips to the correct dihedral.

Cover the complete ship with rubber model Silkspan tissue using full strength clear dope as the adhesive. After model is covered spray the tissue with water and allow to dry, then thin out the clear dope and apply two light coats.

Don't hurry the carving of the prop. All the experts will tell you that the propeller is one of the most important parts of any flying model. The number of inexperienced modelers who don't know a rubber motor must be lubricated amazes me. The best bet is to get a small bottle of rubber lube at your local hobby shop, but if this isn't possible rub some castor oil into the strands and your new model will not disintegrate because of a broken motor.

Like the majority of rubber models the Cruiser performs best when adjusted to fly to the right under power and in the glide. This is achieved by the three degrees right thrust built into the nose block and a slight amount of right rudder. If the model still makes too large a circle or flies straight, twist the wing slightly askew so the right tip is back about half an inch. Don't forget that the center of gravity location determines the flight characteristics, so be sure the Cruiser balances perfectly level when supported on the finger tips at the spar.

For the CO_2 version use only two degrees right thrust but balance at the wing spar same as noted above. Before applying power, hand-glide first, adjusting wing and rudder for a slight right turn. Start the rudder model's test flights with about seventy-five turns, gradually building up the number.

Your first power flights with the CO_2 should be done on a partially spent cartridge. And above all be sure the prop is pulling and not pushing, for even the "experts" have made the boner of launching with the prop going in the wrong direction.

Why not get out the camera and take shots of your Cruiser on the ground and in the air? We recommend a minimum shutter speed of one hundredth of a second for gliding flight and two hundredths of a second for take-offs.

Atom-Powered Bombers

(Continued from page 22)

of one hand. Even now, only the biggest and best would make suitable B-36 bases. Disregarding the probability of an atomic bomber, it is exceedingly unlikely that any ordinary bombers much bigger than a B-36 will be built. And, if the "super bomber" proves to have high cruising speed, its landing and take-off speeds will be correspondingly high, taxing the ability of even the biggest fields. Configurations for high subsonic, or supersonic speeds, such as the angled-back wings of the Boeing Stratojet, mean special measures, like wing slats, to permit the ship to slow up in the approach without stalling out.

On the other hand, little evidence is found that the atomic-powered bomber could be much smaller than the biggest airplane flying today. It will have the never-before-encountered difficulty of having to land—disregarding bombs dropped—at the same weight as at take-off. It always returns with a full fuel load! On the face of it, it seems fairly likely that the atomic-engined machine would come somewhere between the B-50 sized airplane and a craft as big as, or moderately bigger than, a B-36. Of course, this is speculation based entirely on generally known and popular facts. For pointers on engine types, we have to search further afield.

To begin with, uranium, the nuclear fuel, is fairly abundant, averaging out at about one-third ounce per cubic yard of earth. But there is a catch. Rich deposits are rare and widely scattered. On top of that, 99.3 percent of natural uranium is the useless isotope 238. So only .7 percent of pure uranium is the readily fissionable isotope 235. Either plutonium, made on an industrial scale as the end product of the chain reaction of natural uranium, or uranium 235, separated from natural uranium, are probably fuels for the nuclear engine. Blocks of fuel placed within the reactor are surrounded by "canning" to prevent the escape of fission fragments into the working fluid, or to the outside as deadly radiations. The whole is wrapped in "shielding" to prevent other radiations harmful to humans. In passing through the reactor, the working fluid serves as a coolant. (See diagram at bottom of page 23.)

Control of the engine is provided by the carbon rod principle of varying the rate of absorption of escaping neutrons, preventing them from causing further fission. To slow down the rate of fission, the rod is inserted further into the pile, thus capturing more neutrons.

An interesting sidelight is that the reactor never holds a power level as does the gasoline engine but is continually increasing or decreasing in rate of fission and of heat development. Still another aspect is the "critical mass" of uranium or plutonium necessary to maintain a chain reaction. Coupled with the critical mass problem is the fact that the ratio of surface area of the protective shielding to its volume, and weight, increases unfavorably, permitting the excessive escape of neutrons, as the size of the reactor is reduced. For all these reasons there is a mini-

mum though here unknown size for the reactor. Knowing even this little about the reactor and its nuclear fuel, it is possible to line up further facts about each basic type of power plant that might be adapted for use with a nuclear reactor.

In the closed cycle steam turbine (see diagram at top of page 23), steam would be generated in the reactor, in this case the "boiler," then expanded through the turbine to drive the propeller. After leaving the turbine the steam is turned back into water by an air-cooled condenser, then returned to the reactor. Dr. Kalitinsky points out that the steam or mercury turbine would require both a propeller and a large condenser exposed to the air stream, which would militate against high speed. Since contamination of the working fluid is admittedly a great problem, it would seem probable that the closed-cycle system using the steam turbine would be more apt to have disadvantages, with consequent difficulties, such as servicing of the turbine. The steam turbine system does have one great advantage in that a multiplicity of power plants easily could be used. The reactor or "boiler" could be centrally located.

With the turbojet, the reactor would replace the combustion chamber between the compressor and the turbine. Air flows through the compressor, into the reactor where it is heated by convection (instead of being burned with kerosene, gasoline, etc.) and exhausted through the turbine and out the jet nozzle. The turbojet is ideally suited for high-speed airplanes, including the supersonic, a perhaps significant fact that has its puzzling aspects. The crux of the matter is: can more than one turbine be operated from one reactor? At this point, the trail of generally known clues comes to an end.

Use of more than one reactor, however, seems unlikely for the very obvious reasons that wasteful duplication of shielding, minimum critical mass of nuclear fuel, and the other reasons above outlined, call for a single reactor. Since the surface area of the shielding cannot be too great in relationship to the volume or weight of the shielding, the shielding necessary for one reactor would be vastly lighter than that required for, say two. It is hardly necessary to point out that one turbojet of the size in use today could not propel a monster airplane weighing tens of thousands of pounds. The Stratojet requires six turbojets to reach its top of more than 600 miles an hour. So, if we can assume that more than a demonstration airplane is required for atomic propulsion, and that its size and speed would be at least the equivalent of the B-47's, then a multiplicity of turbojets must be used. This puzzling thought produces another riddle, insofar as we sideliners are concerned, and that is, whether or not the working fluid, in this case air, can be led through one central reactor, thence through a minimum of six turbojets. Placing the turbojets in a cluster, using the same common inlet, and possibly outlet, is an obvious possibility, if it is really a sound engineering possibility. A more exciting, but equally obvious possibility is one large turbine, or a smaller number of larger turbines than those in use today, as, perhaps, the Northrop-Hendy. At war's end captured German documents revealed a study of a giant

turbine having 30,000 pounds of thrust, so the giant turbojet is not a figment of Buck Rogers' imagination.

The noisy ramjet is another possibility. "Flying stove pipes" long ago were tested at 1,500 miles an hour by the Navy. Air entering the diffuser, or forward section of the ramjet, is compressed by the forward speed of the airplane, passes through the reactor where it is heated by convection, and ejected at high velocity through the tail pipe. While this power plant is the simplest of all thermal engines thus far employed on aircraft, it presents severe operational problems, particularly on larger machines. The apparent necessity of placing the reactor within the ramjet interferes with the flow of air through this type of power plant. Air temperatures must be extremely high for efficiency and this aggravates the riddle of how to heat the vast flow of air passing through the reactor without impeding operation of the ramjet. On the operational side, the ramjet does not work until a fairly high speed is reached—remember the spectacular rocket-launching methods of the German buzz bombs?—and is truly efficient only well past the speed of sound. Although the engineers might easily confound the grandstand experts when their answer finally is revealed, the ramjet seems a doubtful power plant if only for the reason that the reactor—and we don't know how big it must be—probably would be located within the ramjet. How about the rocket?

THE Bulletin of the British Interplanetary Society, for May, 1947, reporting a speech of Dr. Alvarez's before the Washington Aero Club, made this illuminating statement: "Dr. Alvarez points out the fallacy of expecting that the actual recoiling nuclei could be used as a propellant jet since the production of a jet transferring the necessary momentum would require the dissipation of fantastic amounts of energy which would lead to the immediate vaporization of the rocket . . . Only sensible method would be to heat up a suitable working substance, which could be expanded through the nozzle in the conventional manner . . . Nuclear reactor would supply the heat energy to the working fluid, just as chemical reaction does the job in the conventional rocket . . .

"Alvarez says," continued the Bulletin, "liquid hydrogen would yield double the exhaust velocity of alcohol-oxygen rocket under comparable chamber conditions." And, as a matter of fact, that is just how atomic power will be applied to the long-range rocket, or as a rocket engine for propelling an airplane. Instead of relying on the combustion caused by the mixing of two chemical fuels, the nuclear reactor would eliminate one of the fuels, the remaining fuel being heated as the propellant. The rocket power-run duration remains limited due to the rapid consumption of the chemical fuel, some tons of which would have to be carried. For use in a bomber the nuclear-rocket engine seems in conflict with the unlimited range characteristic of atomic power, although for the space rocket, or certain unmanned missiles, it could well be an answer.

Dr. Kalitinsky explains that, as an example, the propellant resulting from

hydrogen-oxygen combustion is water vapor with a molecular weight of 18. If, on the other hand, he goes on, nuclear energy was used with just hydrogen, the propellant would have a nuclear weight of two. The specific impulse of pure hydrogen would triple that of water vapor at the same temperature.

If the problems of an atomic-powered airplane are troublesome, those of the nuclear rocket are infinitely greater. The successful guidance and control of the long range rocket is yet an unmastered art. Even if we assumed that guidance and control were perfected, the rocket is no simpler than the airplane. No less a person than Dr. Alvarez knocked in the head the old chestnut that, since the rocket was crewless, no shielding was necessary. Radiation would cause violent boiling of the liquid hydrogen, necessitating shielding, though not as much as required for human protection, between the reactor and the chemical fuel. Without shielding, electrical and other apparatus would fail. Ejection of hot hydrogen would result in such violent combustion that it might be necessary to send the rocket aloft with chemically fueled booster rockets. The heat exchange problem, due to the rapid speed with which the liquid hydrogen would be heated and exhausted, poses severe metallurgical troubles and, it was stated, "would require enormous surface areas of uranium." This last suggests that the extremely high cost of nuclear fuel and engines might possibly rule out the expendable war rocket, at least until the offensive airplane has been rendered thoroughly obsolete. It also suggests that the greater the volume of the working fluid that must be heated by a reactor within a given interval of time, the greater the surface areas of uranium.

AMONG the big brains of strategy it is generally agreed that the airplane has but ten or fifteen remaining years of valuable military use. That we must keep one eye on the past, or the present if you prefer, and the other on the future, meanwhile struggling to develop atomic propulsion, probably means that any sane strategist would consider imperative studies of *both* the fast, long-range airplane and the intercontinent rocket. We have already seen that the nuclear-powered airplane would probably be as big as, or bigger than a B-36. Even if its reactor and shielding weight could be kept equal to the equivalent weight of fuel and tanks on a conventional plane of similar configuration and performance, the atomic-powered machine must land with its full load of "fuel." If the machine is not to be limited to the flat beds of Muroc, it cannot, on the other hand, be much greater in bulk than a B-36, or some of the newer turboprop bombers now in the rumor stage. If the designers don't cross us up by shooting for the comparatively easy mark of a prop-driven demonstration airplane, one might hazard a guess that power would be via turbojets, either of familiar size arranged in a group, or by fewer, larger turbojets than those in service today. Perhaps the designers would count it poor percentage to power such a valuable mechanism with one turbojet, however big, since duplication of power plants would assure return to base in the

event of motor failure. Powerful Jato assisted take-offs appear necessary and special high-lift wing flap devices probably would hold down the size of the heavily loaded wings at landing. Catapult launching, with or without Jato, might be resorted to.

"Guesstimating" the size of the atomic-propelled airplane is like a poker game with deuces wild. If, for example, it proved necessary to construct an extremely large airplane, there is little reason in this case for counting out the possibility of special airfields. The atomic-propelled bomber, having unlimited range, could operate from the American heartland if necessary, independent of any advanced bases. Since the machine is such an immensely costly proposition, and its military operation so vital to security, the cost of special runways of adequate length and thickness would hardly be a deterrent. While one may form the opinion that a huge bomber is unnecessary, estimating that maximum size would be determined more by the practical aspects of operating out of present bases, it may not be a foolproof analysis to rule out the super airbase with runways of any required length to handle whatever bomber the designers say must be built.

That age-old dream of travel to the moon may be made possible by the nuclear rocket even if, as Dr. Alvarez pointed out, we can't propel the rocket by the equivalent of nuclear explosions. Writing in the *Journal of the American Rocket Society*, Louis C. Young, suggested the use of atomic hydrogen which, he claims, is 31 times as powerful as chemical fuels. As used in magnesium welding torches, atomic hydrogen is formed by passing a stream of hydrogen gas through an electric arc, so that the molecules break into separate streams and recombine a split second later to release heat. Stating that atomic hydrogen has a potential of 128,900 calories of heat at 69,000 feet per second, a 70 percent efficient engine, thinks Young, would have a thermal efficiency of 48,000 feet per second, or six times that of the V-2. *Engineering*, published in London, recently came up with this startling suggestion:

"One possibility would be an engine which included a machine such as the cyclotron, but extremely smaller and lighter than present models, to provide a supply of bombarding neutrons. The fuel would contain only a small percentage of uranium in a compound requiring enormous heat and pressure for manufacture. The nuclear fission of the uranium provides the energy for the disintegrating of the compound, and the resulting explosion creates exhaust velocities hundreds of times more powerful than present fuels."

When can we expect the atomic-powered atom bomber? Dr. Kalitinsky says that the practical use of atomic power can become a reality if physicists, engineers, and industry take an increasingly active part in its development. The over-all problem has been likened to a man building a house with match sticks. The more men that put match sticks in place, the sooner the house can be finished. The perfection of atomic propulsion is largely a matter of man power, brain power, and money. Atomic propulsion is more than a possibility. It is in the cards.

CAP School Plan

(*Continued from page* 31)

Those helping to design the new course include:

Dr. Leslie A. Bryan, Director of the Institute of Aeronautics, University of Illinois; Dr. Merlyn McLaughlin, Director of School of Aeronautics, University of Denver; Dr. Guybert P. Cahoon, Professor of Education, Ohio State University; Dr. Frank E. Sorenson, Professor of Secondary Education, Teachers College, University of Nebraska; George E. Rotter, Editor and Ass't in Curriculum Development, Department of Public Instruction of Nebraska.

Also, Arthur F. Ahr, Bureau of Industrial and Technical Education of New York State; W. Earl Sams, Aviation Education consultant, Los Angeles; Willis C. Brown, ass't specialist for aviation, Division of Secondary Education, U. S. Office of Education; Kenneth E. Newland, director of Air Age Education Research of American Air Lines and Stephens College aviation department; George Gardner, educational director of Pan American World Airways; Philip S. Hopkins, vice-president of Link Aviation Corporation and his associate, Paul E. Dittman; Dr. H. E. Mehrens, chief of Aviation Education Division of CAA, and J. Parker Van Zandt.

New CAP Training Manual

A comprehensive Civil Air Patrol manual, to be written and edited by outstanding authorities in the field of American aviation education, government and industry, will be published this year for use in CAP units and in high schools throughout the nation, National Headquarters CAP announced.

The training manual will be published in two units, one for use in CAP Wings, Squadrons and Flights, and the other specifically for use by high schools in aviation education.

National Headquarters hopes to have the manuals ready for the school season of 1949-50. The first draft should be ready sometime this month so that interested schools may have a chance to examine it before publication and to make suggestions.

The manual is now roughed out into 10 sections, each to be written by authorities in their field, as follows:

Our Air Age, by George Gardner, educational director, Pan American World Airways;

Know Your Airplane, (private, commercial, military, structure, nomenclature, types, functional use) by J. Parker Van Zandt;

Why the Airplane Flies, (aerodynamics, sonic and supersonic flight, service and operation) by Dr. Leslie A. Bryan, director of the Institute of Aeronautics, University of Illinois;

Power for Flight, (engines, jets, propellers) by Arthur F. Ahr, Bureau of Industrial and Technical Education, New York;

How the Airplane is Flown, (instruments, flying techniques, physiology of flight) by Kenneth E. Newland, director of Air Age Education Research for American Air Lines and Aviation Department of Stephens College;

Weather, by W. Earl Sams, consultant, Aviation Education, Los Angeles;

Navigation, by Philip S. Hopkins, vice-president, Link Aviation Corporation;

Communications and Control, (CAA Regulations) by Paul E. Dittman, Link Aviation Corporation;

National and International Problems of Safety and Control, by Dr. H. E. Mehrens, chief of Aviation Education Division, CAA;

Airports, by Willis C. Brown, ass't. specialist for aviation, Office of Education, and Dr. Merlyn McLaughlin, director of School of Aeronautics, University of Denver;

Teacher's Aids, by Dr. Guybert P. Cahoon, professor of education, Ohio State University.

CAP Wing Directory

(*Continued from page 30*)

TEXAS (Cont.)

Odessa—R De Wills West Odessa Airport Bx 2129
Orange—L A Hammond Bx 38
Palestine—L J Reagan 710 S Magnolia
Palestine—Leo Pagitt Firestone Co
Pecos—B H Edgar Bx 922 Municipal Airport
Port Neches—W R Atkinson Bx 57
San Angelo—L G Grupe 225 S David
San Antonio—T J Burkholder 223 W Thoraine Blvd
Sherman—Gray Swindle 110 S Crockett
Sinton—C I Jennings Gen Del
Victoria—R N Jolliff Bx 266
Waxahachie—C P Burnett 102 Harbin
Weatherford—C R Swaney 1109 N Main
Wichita Falls—A F Edwards 2160 Av H

VERMONT

Barre-Montpelier—Jachman Hall Norwich Univ Norwich
Bennington—USAF Recruiting Sta
Brattleboro—193 Western Av
Burlington—Fashion Shop
Middlebury—Middlebury College Physic Dept
Newport—108 Sias Av
Rutland—270 S Main
St Johnsbury—6 Burrows Pl
Springfield—60 Westview
Wells River—F Erb Main St N Haverhill

VIRGINIA

Bristol—J D Leftwich Comb's Airport
Fredericksburg—C W Le Gette Bx 361
Galex—Bruch Galyen 120½ S Main
Hopewell—H G Critcher Hummel Airport
Luray—C R Wagner Bx 203
Mariona—W S Menerick Bx 453
Norfolk—J F England Bx 2362
Orange—C E Morris Bx 343
Richmond—J T Burkes 2220 W Main
Roanoke—W V Hillman Woodrum Field
Weirwood—D M Kellam Dellam Field
Winchester—L G Sjostrom Va Woolen Co

WASHINGTON

Connell—R C Kelsey
Ellensburg—J A Webster Bx 446
Forks—W L Bransfield Airport
Gonzaga—D A Smith 214 C Garden Springs Spokane
Richland—A F Mitchell 1108 Williams Blvd
Seattle—D A Maunus Old Armory Western & Lenora
Spokane—B O Belknap S 2918 Grand Blvd
Tacoma—O E French Rt 3 Bx 78
Vancouver—800 W 41st
Wenatchee—C S Olsen Bx 1176
Yakima—W S Ready 1824 S 24th Av

WEST VIRGINIA

Beckley—E H Dew 403 Valley Dr
Buckhannon—H P Queen 131 S Florida
Charleston—R E Gobel 269 Daniels Av S Charleston
Clarksburg—Harold Klevis 121 Ridenour
Elkins—M J Genthon 300 Center
Fairmont—Josepa Plum Market St Extension Rt 16
Huntington—G L Minnich 1123 Madison Av
Parkersburg—K W Weekly 3311 Emerson Av
Phillippi—W L Simpson Simpson Flying Service
Pt Pleasant—F L Bowser 2320 Jefferson Av

WISCONSIN

Antigo—F A Mates
Ashland—Alvin Sell c/o Dodd Clinic
Burlington—R J Southey 660 Highland Av
Chetek—Walter Homme Airport
Columbus—C J Colotti Bx 129
Eau Claire—C W Hahn 1162½ E Madison
Green Bay—Earl Van Nelson 1691 Farlin Av
Ironwood—G H Lawyer 215 S Lowell
Kenosha—R J Coleman 7012 22nd Av
La Crosse—J W Whistleman Bx 491
Lake Mills—O F Tuller
Madison—D E Dudley 110 E Main
Marshfield—R A Flagel 809 Western Av
Medford—G L McNamar
Milwaukee—A L Stock 703 E Ogden Av
Milwaukee—E A Gmoser 5523 N Bay Ridge Av
Oconto—A C Rietz 507 Congress
Oshkosh—R A Mosteller 36 High
Pewankee—Orville Briscoe 524 Park Av
Plymouth—Edwin Juers Gen Del
Portage—Joseph Theena Rt 2 Portage Flying Serv
Racine—Richard Sorenson 1806 Park Av
Shawano—Clayton Steinhardt Bx 31
Sheboygan—J A Schurman 1824-A N 7th
Stevens Pt—Rexford Bishop 419 Brawley
Sturgeon Bay—T C West Bx 545
Thorp—A W Page Bx 245
Wausau—Val Johnson 611 Plumer
West Allis—A M Richter 1011 S 73rd
West Bend—Estelle Hilgendorf 230 N 6th
Wisc Rapids—B J Joosten Bx 198

New Era

(*Continued from page 66*)

many a contest. But a free-flight kit was just the type not in demand. And we knew so little about the business that we lost almost every cent we had invested. In November of the same year, we paid off our debts and liquidated the business. This winter I formed Enterprise."

The first items brought out by the new firm were a series of five of the most popular racing planes in exact scale control-line at $1.95 each. Brofman had learned his lesson well, apparently, for these new jobs went over so well (all of them still sell), that two slightly larger ships were rushed into production, the Howard Ike and the Winnie Mae. Ike was a real hit. Plenty of scale details, many finished parts, plus good flyability, make it popular. In the spring of 1948, Enterprise broke with a jet racer, the Cannon-Ball. This, too, went over well. Still another pleasant surprise was the success of the Pirate, a large built-up kit that was introduced on a "prefabricated market." Designed by Don McGovern, it is an eye-pleasing, nice flying ship with plenty of stunt ability. Bob Tucker, 1947 National Open stunt champion, designed Enterprise's Tuckette, a 38" stunt job. Brofman designs most of the kits but has the plans prepared by a good draftsman.

Encouraged by their hard-won success, Enterprise recently purchased the complete factory and machinery of Pioneer Modelcraft Co., and entered both the balsa sheet and strip cutting business and the toy glider field. Jerry's partner in this new venture is his father, William Brofman, who has worked with Jerry at Enterprise for the past year. This probably was inevitable for the air-minded Brofman senior started off the chain reaction years ago by carting son Jerry to various model contests.

"It began when I was seven years old," Jerry recalls. "For about three years I built nothing but dime and quarter solids. When I was ten or eleven, I made rubber jobs and towline gliders. At thirteen I joined the original T.A.M.B.E. (a lively Brooklyn model aero club), among whose members were the late Scotty Murray, Maurice Schoenbrun, Sal Taibi, Carroll Moon, Jerry Stoloff, and Leon Shulman. I began gas models when I was thirteen and dug many holes in the ground with same! My first real success was a towline glider that flew for 53 minutes."

Jerry saw his first Nationals at Detroit, in 1939, and in 1940, at Chicago, took a fourth with an original design in Class A, Junior free-flight. In 1941 he won first in Class C with a modified Gladiator, and a sixth and a 16th in Classes A and B. In 1947 he took first in Class C open and sixth in Class A free-flight at Minneapolis and, in 1948, at Olathe, a first in Class D (see "Cosmic Rave 1," February, 1949, Air Trails). All these winning ships were original non-pylons ("I hate pylons"). Jerry took two years of aeronautical engineering at New York University and joined the Air Force in 1943. But they didn't need pilots when his class came up so Jerry wound up as a second lieutenant and a flight engineer on a Superfort. He has held a private license since learning to fly at sixteen. Now 23, he is married. Mrs. Brofman—Vivian—is a school teacher with a good understanding of kids. More than one suggestion around the shop has been sparked by the female side of the family.

"A new kit starts out as a vague idea," Jerry explains, "then, if we find there already is something like it on the market, we decide whether or not we can beat that kit. If we can't, we forget the idea. If there is nothing on the market like our idea, then we try to learn if there is a need or a call for it. Maybe it can open a new field, creating its own demand, as did our small scale racers. We do not like to copy and believe that competition has done great things for the industry."

Having flashed the green light on the new idea for a kit, the next consideration is the size. What size plane is lacking in the type of model they wish to produce? Can it be produced at a profit in that size? If the answer is favorable, a model is built for testing in flight and for strength. This usually leads to many changes, sometimes downright rejection. After the exact dimensions have been set, special jigs and dies and machinery are prepared. Pictures are taken of the display model. An advertising campaign is launched. Picture post cards and circulars follow.

Other tricks of the trade contribute to the successful sale of a new kit like New Era. Brofman believes in continual advertising of all the firm's products, and not just in splurging when the product first appears. Enterprise's canny publicity pays off. By creating steady demand in the hobby shops, this consistent publicity helps the distributers who handle the firm's products. Ads are timed so that kits usually are on the dealers' shelves before the campaign breaks.

Safely over the hump, Enterprise now has its eye set on new horizons. Balsa cutting and the toy glider field dovetail nicely. As everyone knows, tens of thousands of youngsters who haven't had their first bite on a gas job, or even a rubber model, get a big bang out of tossing around wooden gliders. Being a chap with ideas—there's the animated figures on the scale model plans for example—Brofman's firm is one with a future. The new plant taken over from Pioneer will provide three times the floor space of the old quarters in Ozone Park, New York.

One of the many possibilities is another New Era kit, this time a little one for the new small engines. The combination would be ideal. The small engine-airplane combination would put modeling within reach of many new people, especially in the younger groups, in Jerry's opinion.

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Dope Can

(*Continued from page 41*)

(Since penlights don't have much oomph, he says it's necessary to connect them in series, giving 3 volts. Don't worry about burning up the plug; the amount of current flowing through the element is quite small.) The batteries are installed at the C.G., so that when removed when testing is complete the model's performance will be unaffected. When starting the engine, pull out the timer shaft and insert a piece of wood (a non-conductor), with one end under the knob holding the fuel valve open, and with the other depressing the contact spring, thus cutting off the penlights. Connect the 1½-volt booster as usual, and when the engine is running to your satisfaction pull the timer knob out, letting the piece of wood fall free, and immediately disconnect the booster. The engine will continue to run at low speed and when the timer kicks in the penlights will cut out as well as the fuel.

Tribute To Olathe comes from Walter G. Read of Auckland, New Zealand, who wrote Dale Dorst, 1948 Nationals Meet Manager, and asked how to run a National meet. Mr. Read is saddled with the responsibility of the New Zealand Nationals and wants to do a good job. We don't think anyone who flew at Olathe last year will argue with the opinion that Mr. Read went to the right place for advice, nor with the cheers greeting the announcement that we go back to Olathe again next July. With the sponsors having the benefit of last year's experience, the '49 Nats oughta be a double-decker doozie!

Vet In A Sweat for an Elf engine. W. M. Christiansen writes from U. S. Veterans' Hospital, P. O. Box 161, Lyons, N. J., that seeing Dan Calkin's name in the column brought on a yen for an Elf Single, preferably new, and can an Elf be glow-plugged? Who can help him?

Channeled To Us is the letter of Charles E. Wolverton, of Lockridge, Ia. The Custer Channel Wing tickles his fancy and he'd like to build a model utilizing the principle. Since it's definitely on the unorthodox side, though, he's puzzled in certain respects and does this corner the undeserved honor of assuming that we have all the answers. His first three questions have to do with the lift generated and it must be confessed that he knows as much about it as we do—or more. Conventional aerodynamics go out the window in the case of such wings, so that the airfoil giving the most lift at model speeds can only be found by "cut-and-try" methods. Generally speaking, we'd say that the wing should be a little thicker, percentage-wise, than the full scale prototype.

The best chord length, in terms of percent of propeller diameter, will have to be found by experiment, since none of the full scale data can be applied "as is" to model design. For example, the same wing, slowed to half-speed, has only one-fourth the lift.

He asks for the lift per horsepower when the plane is rising almost vertically, and to this we can only reply that this depends upon the amount and contour of the effective lifting area, the

rate of climb, the weight of the plane and a great number of other variables.

It can be safely said, in answer to his fourth question, that in the near-vertical climb condition the propeller would be in low pitch, since the forward speed is not great.

The lift/drag ratio of such a wing would be terrifically high in order to produce such a climb, as would the ratio of lift to drag of the entire airplane. As a guess, we'd say that with all factors increased proportionately, an 8- or 9-foot wing would be more efficient than the 6-foot version; however, we're probably wrong, as usual.

L. A. Don Has His Say about rubber and glider rules. The "Don" in this case happens to be Don James, who has won his share of contest awards. He writes that it's his belief that the rubber and glider rules should be written so as to help eliminate lost models. He went for the increased wing loadings put into effect in '48, but just can't see the new towline length of 200 feet. As to the latter, we timidly venture the observation that handling a glider during the tow is a real art, particularly in a breeze and with the job adjusted for a tight circle, and the flyer who can get the full 200 feet out of the line deserves to have his skill pay off. In other words, it's similar to the R.O.G. rule in free-flight gas; many ships are so "touchy" that they have to be launched in a bank or they'd spin in. These ships wouldn't get off at all if required to R.O.G., which means that the R.O.G. rule is more of a test of the design of the ship and of the ability of the flyer.

One of the main reasons, we're told, for the enactment of the "one ship per event" rule is the elmination of the advantage held by the modeler with available time and money to build a fleet of models, and to whom the loss of a ship doesn't mean catastrophe. We therefore lean a little in the direction of Don's contention that the one-model rule shouldn't apply to hand-launched gliders, which cost little in time or money and in which a reliable dethermalizer can't be installed. Finding a hand-launched glider after two o.o.s. flights is more often than not a matter of luck.

"Give Me A Ring: As a matter of fact, give me two of 'em," writes Richard Relyea, secretary of the recently-formed "Flying Fools" club of Norwood, N. Y. Someone gave him a Pioneer Brown, minus the rings, and he'd like to get some for it. As a guess, we'd say that the rings for a "Buzz" Class B engine would fit. America's Hobby Center, whose ad appears in this issue, would know and could quote prices.

Cleveland Women Are Old Hands (Pardon us, ladies, we mean expert hands!) at running a contest. Mrs. "Red" Hillegas writes that the indoor meet, sponsored by the Cleveland Women's Chapter of the National Aeronautic Association, was so good that contestants are clamoring for another one. The meet, held last December at Central Armory, attracted nearly 100 boys and girls of 8 years of age and up. Among the "boys and girls" we see the names of Dick Obarski, Chet Lanzo and Dick Korda. Proof that we're getting old is the appearance of such names among the winners as Dick Korda, Jr., Sylvia Lanzo and Al Nagy, Jr.

Get That Cup Back! The Los Angeles "Thermal Thumbers," believing that lack of preparation and interest was a major factor in our loss of the Wakefield Trophy last year, have decided to do something about it. "Doing something" consists of running a team contest with Wakefield rules observed to the letter. Teams consist of five flyers each, with flights being made according to numbers drawn before the contest begins. If you're in the Southern California area and have four flying pardners with whom to team up—no individual entries will be accepted—send the names of your team members to Lo Salisbury, 2507 California St., Huntington Park, before May 14. A registration fee of 50c per ship will be collected at the contest, scheduled for May 22, 9:00 A.M., at Western and Rosencrans.

Another Sponsor For Fresno: In addition to the ever-faithful Exchange Club of Fresno, sponsor of the F.G.M.A.C. since 1939, the James W. McAlister Co. of Fresno will also back up the club from here on in. In addition to the above interesting news, the latest issue of the club paper contains still another report of a modeler, Ralph Holcomb of Madera, who nearly lost his life when his control wires touched a 12,000-volt power line. Thanks to Don Catching's Boy Scout training, he could apply artificial respiration and at last word Holcomb was expected to recover. *Read and heed,* control-liners!

Dusters Shine As Usual: Although Carl Rambo of the Oakland (Calif.) Cloud Dusters has been flying a lot of free-flight gas, we see that he hasn't lost the old touch in towline. Last Oct. 24 he hung up a 3-flight official total of 20:57.2 with a Class E ship. Actual time was 25:14.0, with which *you* would be satisfied. Mom Robbers hit the 10-minute limit on her first flight with a Class D cabin job; the ship going o.o.s. overhead after 22:37.6. The letter she got from the guy who found the ship is a classic.

More of the Elmhurst Prop Busters turned out for the free-flight gas set-to with the Dusters than did the latter. However, when the shebang, run at the Livermore Sky Ranch Nov. 28, was over, the total time of Messrs. Andrade, Bilgri and Pottol was 17.6 seconds better than the best three performances of the Busters. Nov. 28 seems to have been Joe Bilgri day, since he took first in R.O.G. gas, towline and hand-launched glider, having to be content with a 2nd in rubber.

Don't Club Members, advises Philip A. Mercier, Jr., of the Nashua (N.H.) Cloud Chasers. Treat 'em nice by providing a library and plan service, he says, and their number will grow. His letter, which accompanied his order for one of the nice, full-size plans we provide, tells us that the comeback of the Chasers from near extinction is due to the library-plan service arrangement.

Poole Makes Splash in Greenville, Texas, by starting the Greenville Model Club. Tom R. Poole, Jr., knows the value of advertising since he does it for a living, being with the Greenville "Herald." It's not surprising, therefore, that we get word from him as to the formation of the organization,

which boasted 17 members, even though only two meetings had been held. Bet it's 17-plus plenty by now!

Contrailers Get Rolling in Victor, N. Y. According to Leslie Searle, club secretary, the eight members with which they began September 15 were eighteen in less than three months, with six more to be voted on. The club has an ambitious contest program scheduled for this year, with four club meets and two invitationals slated. Immediate club project is the acquisition of an AMA charter.

It's Chilly In Chillicothe as this is written, and club members are anxiously awaiting the arrival of good flying weather. Another reason why they're so anxious for summer is that they expect to get their own flying field in the park to replace the catch-as-catch-can deal they now have on the local softball diamond. Although most of the activity is in control-line, the gang builds and flies everything in the outdoor categories. (Note to Gene Osborne, secretary: how's about giving us the club's name next time, huh?)

The Sun Shines Bright on the new officers of the Louisville A. B. C. Model Club, headed up by Art Strobl, president. "A. B. C." might possibly stand for "Always Be Careful," since Norman Robinson tells us that the club is thinking of taking out a blanket public liability insurance policy. He asks if we can furnish him with information of similar action by other Clubs; if memory serves, municipal authorities in a number of cities in Massachusetts—Lynn in particular, we think—wouldn't allow any flying whatever in public parks without proof of liability coverage.

Li'l Rhody News comes from Roy Van Wart, secretary-treasurer of the R.I. Aeromodelers. Club is incorporated in the state as a non-profit organization (how true!) to protect its name and emblem. Club's "Flying Circus" has gone on interest-arousing junkets throughout Massachusetts, Connecticut and Rhode Island for the past two years and the 'Modelers are therefore well known in these areas. State authorities have extended a helping hand in the form of flying space on state land opposite the state airport.

Kat's Clause in club bylaw ensures true sportsmanship on the part of club members at all times while they belong to the Kokomo (Ind.) YMCA Flying Wildcats, since they all have to "cuss" to abide by it. As so happens, the "Kats" were asked to put on a show between races at the Kokomo Midget Speedway and captured the fancy of the crowd to the extent of being cordially asked to return.

Mahieu L.A.A.M. Prexy, with Russ Barrera v.p. and Frank Greene as treasurer, reports Andy Petersen, secretary of the Los Angeles Aero Modelers. The organization is an association of clubs, and meets at the new Parkview Recreation Center, 412 S. Parkview, the second and fourth Mondays of every month. Andy asks all outfits who are interested in supporting an organized program of model flying and who are located in Southern California to affiliate. Club had swell

Christmas party with gifts for everybody, plus movies and legerdemain, whatever that is. You'd think they might have had a demonstration of magic, at least! Wonder if Greene made one of his colorful speeches?

Although Hard To Believe, the second issue of "Prop Wash," voice of the Akron, Ohio, Rubber City Aeronauts, is even better than the first one, about which we raved last month. Besides containing a complete history of the club during its two-year existence, the plans and complete instructions for building and flying Dick Fox's smooth indoor glider are also given.

Oldershaw Reelected as '49 president of the California Association of Model Clubs. Other officers include Ocie Randall, vice-president; Roy Mayes, secretary-treasurer; with Mom and Pop Robbers sharing the office of corresponding secretary. Will there be a CAMC meet this year?

Do You Have Frijoles instead of pancakes for breakfast? Do you live in or near Hermosillo, Sonora, Mexico? Do you build and fly models? If you can answer these in the affirmative the Aero Club Aguiluchos is for you. The muchacho for you to contact is Lorenzo Garibaldi, Jr., Vildosola No. 12, Hermosillo, telefono 4-9-4. Perro caliente, what Spanish!

"Flypaper" Stuck On Wakefields: According to the latest edition of the South African publication, Otto Curth's fine performance as a proxy flyer at Akron has caused many of the "model bods," as they call themselves, to think about clearing a space on the mantlepiece for the Wakefield Trophy. "Maybe," they maybe, "one of the tyre corporations might nibble at proposal of sponsoring S. A. Wakefield team for England." We're pulling for them to get a team there in person, so we can beat 'em man to man (we hope!).

Kanadian Korner Konsists, for one thing, of a fine letter from Joseph F. Rose, who originated the Montreal Sleepless Knights 'way back in '47. In spite of its brief existence, the MSK's are large enough to permit dividing the club into two sections. The Southern group, of which Rose is president (each group has its own officers), is the larger. Both, however, operate under the same constitution, a copy of which was sent along with his letter. Contact man for Northern section is Jack Beauregard, 3478 Westmore Ave., Montreal 28, whose phone number is Elwood 9528. If interested in joining the Southern section, Mr. Rose's address is 6051 Hutchison St. and his telephone number is Talon 0770.

In spite of a late start last summer, Toronto's West-end Strato-Cats have come through the winter with colors and control-liners flying. Jack Schuster, secretary, says the 'Cats would like to write to you and to your club if you'd let him know who and where you are. His address is 875 Lansdowne Ave., Toronto, Ontario, Canada.

Blaaah, goes the beautiful paint job on Neville Piggott's snazzy scale model when hot fuel gets on it. This also happens to other members of the Saskatoon Gas Model Club, so member Piggott asks that a reader help them out by sending him the formula for mixing a good, foolproof, fuel-proofer. He advises that their inability to obtain commercial products is due to trade restrictions, so if a reader can help the Saskatooners they'll appreciate it no end. Address is (as he abbreviated it) 102 Sask. Cres. W., Saskatoon, Sask., Canada.

Collector's Bug Bites R. Francis, ex-RAAF pilot, who lost a leg and an arm during the war, and who is paralyzed from the waist down. In order to occupy his time he would like to start collecting things, such as medals, swords, knives, curios, books, magazines or anything which would help the hours pass swiftly while in the bed to which he's confined. If you're a collector of anything at all, tell him what it is and if possible send him enough material with which to get started. The address: Box 2141W, GPO, Brisbane, Queensland, Australia.

They'd Waltz In Vienna if they could get some balsa, rubber and cement. Oskar Czepa, Boschstrasse 10/II/7 Vienna XIX, Austria, appeals to American modelers to help out, if possible, by sending him these materials which he and his buddies so sorely need.

Where Are The Plans for that Class B stunt job you're flying? If you're through with them, why not send 'em to P. Barlow, "Firwood," Eastern Rd., Willaston, Nantwich, Cheshire, England? As the proud possessor of a new Cannon "300," Mr. Barlow would be tickled pink to have an authentic American stunt model design for it.

New Address for the Forster engine folks is Lanark, Ill. If you have occasion to write the company, contact them at new location.

Contest Calendar

Contest directors are invited to send listings of meets to Contest Calendar, c/o Air Trails, Box 489, Elizabeth, N. J. Such announcements must be received at least 90 days before contest date.

To secure more information on a contest, write to the individual listed. His or her city and state address is same as location of meet unless otherwise noted. Where different city is listed in address, the state is the same.

April 24—Fresno, Calif., Ocie Randall, 716 Waterman Ave.
May 22—Charleston, W. Va., Dr. Jules McCracken, Box 82, Milton.
July 4—Philadelphia, Pa., Bulletin-Plymouth Flying Circus. Contact the Bulletin newspaper.
June 5—Parkersburg, W. Va., Dr. Jules McCracken, Box 82, Milton.
July 3-5—Tulsa, Okla., Ralph Roof, 815 S. Trenton.
June 5—Bethpage, L. I. N. Y. Mirror Model Flying Fair, N. Y. Mirror.
June 12—Omaha, Neb., Oscar Olson, 2122 N. 56.
June 12—High Point, N. C., Walter Thomas Jr., 711 Sunset Dr.
June 14-16—San Francisco, Calif., Annual trade show and convention of Model Industry Assoc., Franklin Butler, Model Industry Association, 30 W. Washington, Chicago 2.
June 19—Ashland W. Va., Dr. Jules McCracken, Box 82, Milton.
June 18-19—Atlanta, Ga., H. R. Hudson, 881 Glen Arden Way N. E.
July 24—Portsmouth, W. Va., Dr. Jules McCracken, Box 82, Milton.
June 25-26—Hiawatha, Kan., D. B. Allerton, 628½ Oregon.
July 2-3—Newport News, Va., Vincent Serio Jr., 7005 Park Dr.
July 10—Huntington, W. Va., Dr. Jules McCracken, Box 82, Milton.
July 10—Crossville, Tenn., Roy A. Stone.
July 17—Aurora, Ill., Hart Betts, 7 Fox Promenade.
July 26-31—Olathe, Kan., National Championship Meet, Jess Hall, American Legion.
Aug. 7—Beckley, W. Va., Dr. Jules McCracken, Box 82, Milton.
Aug. 21—Grand Island, Neb., W. H. Parmenter, 1634 K Lincoln.
Sept. 5—Far Hills, N. J., Harold J. Dobbs.

Air Briefs

Testing:

The Convair XC-99 military transport, the world's largest landplane, is again undergoing flight tests after a lapse of several months during which a new ten-wheel landing gear was installed . . . The Navy's second Lockheed Constitution has been delivered with a non-stop flight from Moffett Field, California, to Washington, D. C. . . . Two experimental models of Chance Vought's XF7U-1 Cutlass have been flown from Patuxent, Maryland, to the Vought Dallas plant in the first cross-country flights of this new twin-jet Navy carrier fighter.

The Bell X-1 supersonic research plane which first flew faster than sound has accomplished everything that was expected of it and is near the end of its flight program, according to test pilot Captain Charles Yeager. Flights have been made "from near deck level to 60,000 feet," Yeager said, and he has pierced the sonic wall "25 to 30 times" with the ship. USAF now has on order four X-1A's, which will incorporate a turbo pump fuel system to give greater flight endurance and more speed.

Packet Tracks:

Track-type aircraft landing gear is now being applied to operational use on 18 C-82 Packets of the Ninth Air Force. Fairchild is equipping the 18 planes and building five spare sets of track gear, which uses a miniature caterpillar tractor belt on the nose and main gears instead of wheels. This distributes weight and increases braking action. On the Packet, track gears cut landing pressure from 60 to 20 pounds per square inch. Future military tactics may be greatly influenced, since forward landing areas can be planned for any reasonably level region, without time and cost of heavy construction and surfacing.

Cold B-36:

USAF has been finding out how its big bombers will perform in the Arctic regions which would probably be key areas in any war of the future. B-50 Alaskan assignments were followed by cold-weather testing of a B-36, to find out how the Air Force's largest bomber would do in polar weather. The B-36, with a 24-man specially trained crew, spent a two-month testing period at Ladd AFB, Fairbanks, Alaska. Under test was the functioning of such equipment as electronic instruments, weapons, bomb racks, hydraulic systems.

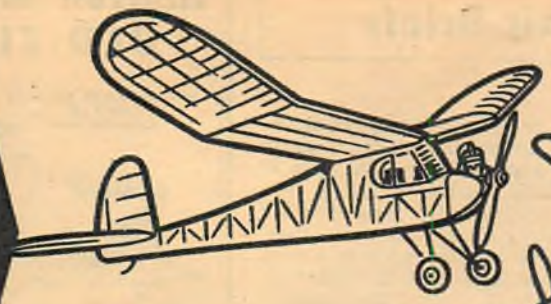
Fighter Fuel Gages:

Fighter plane pilots, for the first time, are soon going to have a fuel gage to tell them how much gas is left. Such systems are standard equipment on bombers and commercial planes, but until now there's never been a fuel gage on a fighter. Navy F9F Panthers and USAF F-89's will be the first to sport the new Minneapolis-Honeywell electronic gages.

Cross-Wind Boost:

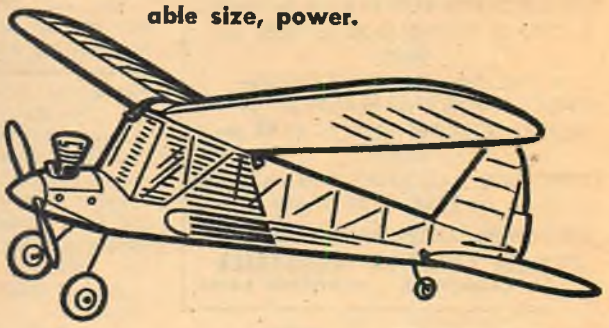
CAA is going all out to have more private planes equipped with cross-wind landing gear and more airports for them to land on. John H. Geisse will head the new promotional campaign.

AIR TRAILS FULL SIZE PLAN #109



PAA-LOAD WINNER: Right now is the time to start on a payload model for the Pan American Airways events which will be held throughout country and at Nats.

RADART: Fran McElwee's dependable radio-control job for use with D-E Aerotrol system. For powering with Drone Diesel or engines of comparable size, power.



"903"—stunt champ Tucker's remarkable U-control ship for engines of .49 disp. 40-in. wingspan. Plan 102.

Curtiss Pusher—famous old timer for Herkimer CO_2 engines. Free-flight, 33 in. One of 4 on 101.

Laird Super Solution bipe for U-control. Has span of 26 inches. Takes Class A engine. Part of Plan 103.

Knight Twister—most popular of U-control ships. Takes B or C engine. Spans 30 in. 104 for this.

Waco—another swell U-control scale job. 34" span. Uses Class D motor. A scale bipe. On Plan 101.

Jerseyette—Frank Ehling's C1. A or B free-flight or U-control "goat." Span of 40 in. Ask for Plan 103.

Lil' Moe—control-line half of Multi-Moe combo. Good beginner's 18" speed job. C1. A or B. See Plan 102.

Wakefield—Claude McCullough's fine rubber-powered contest model of 40-inch span. On Plan 104.

Sizzler—hot rock U-control speed ship by Bill Seidler. Class D power, span is 22 inches. Part of Plan 103.

Cabin Pylon — attractive free-flight 52" plane for large A or small B engines. It's found on Plan 105.

Bojo Bipe — easily built, fast stepping control-line biplane for C1. B motors. Span of 30 in. Plan 101.

"Goat" — control-line trainer for Ohlsson 23 motor. Has span of 33". Just right for novice. 104.

Big Moe—free-flight biplane half of Multi-Moe combo. Take A or B engines. Span of 40". On 102.

Jet Job—world's fastest model powered by Dyna-Jet engine. Span is only 18 inches. Part of Plan 105.

Climax—Charlie Folk's national free-flight record holder for B or C motors. Span, 50". Ask for 101.

Hand Launched Gliders—take your choice: Fizzle is 12" Class A job; Sizzle is 18. C1.B. Part of Plan 103.

Rubber Bipe—neat, easy-to-build rubber powered cabin biplane of 24" span for sport flying. Plan 105.

Minnow — famous winner of Goodyear trophy. U-control scale model of 38" span for C1. D. Plan 106.

Super Phoenix — remarkable C1. A free flight plane by Frank Ehling. Span is 64". For new rules. 106.

Upstart — Claude McCullough's 57" stunt model for Class D engines. Trim lines, easy. Part of 108.

Stinson L-5 — semi-scale profile control line job for Drone Diesel. Span is 36 inches. Part of Plan 102.

Half & Full Whammy—famed control-line speed jobs by Stanglin & Clem. For B and C. Plan 107.

Senator—Carl Wheeley's B & C free-flight record holder for new rules. Span is 61". Part of Plan 108.

Aeronca C-3—Chuck Hollinger's fine U-control scale model of a famous old ship. Cl. B. 50". 107.

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Solo Club

(*Continued from page 32*)

inexperience and bad judgment. Present day airplanes are designed to fly, not to crash, in the viewpoint of CIR, who makes no bones about the fact that the principle danger in flying, that of crashing, and one of the fundamentals of safety, prevention of injuries, are left to chance, with "the dice heavily loaded against survival under severe conditions of force." In other words, a plane must be designed to crash as well as to fly.

Until funds and facilities are made available for adequate investigation of materials and structures to absorb energy and carry heavy loads during collapse, built-in safety will continue to be a haphazard affair. Although the designers didn't plan it that way, there is sufficient variation in structures and design to make fatal crashes in some types survivable in others. Obviously, there are lessons for manufacturers who want to learn. The two principle factors are the energy absorbing qualities of forward structures, such as wings, and landing gear; and the distance between the nose and the pilot's seat. Your chances of surviving a crash really are determined when the ship is built.

Crash Injury Research has reviewed more than 100 cases of ships striking the ground vertically at 30 to 70 mph in which energy absorption of wings and forward sections spared serious injury, even though no engineering effort had been made to design for crash protection. Improvements have been made in a few ships which promise to give pilots a better chance in the future. Improved structure, better distribution of force by safety belts, seats, control wheels, and shoulder harness will protect from serious injury in many crashes that now cause fatalities.

Because so little is known about absorption and crash force, a large program of research on structures and materials must be undertaken before engineering data can be made available to increase crash protection. Crash Injury Research believes that research with multi-G acceleration-deceleration devices would allow rating of types of structures according to their absorptive qualities and protective values. This rating would condemn certain structures now used in planes for novice pilots.

Among the improvements that CIR thinks would effect a radical increase of safety in small aircraft are the following:

1. Hold down landing speeds to 60 mph or less.

2. Provide adequate stall warning in fast and slow turns. (Such warning is available to anyone who wants it in the Safe Flight Indicator and at reasonable cost.)

3. Provide crash protection at slowed down speeds through rugged cabin structure; increased energy-absorbing characteristics of landing gear, wings, and forward sections to increase the protection of cabin and its occupants; individual safety belts, for each passenger with holding capacities as installed in the aircraft of 4,000 pounds; anchorage points for shoulder harness so the pilot wishing to install the harness can do so; control wheel installations with an impact drag to check high relative velocities between the

head and forward structure; redesign and rearrange dangerous objects and structures within striking range of the head—instrument panels, seat backs, doorposts, tube clusters, and so on.

News of the Members: "In reference to the letter written by Donald Crape," begins Peggy Lou Sanders, a private pilot from Pelican, La., "it seems that he is having financial trouble in obtaining his private pilot rating. Well, I still stick to the old saying that where there is a will there is a way.

"I finished high school in 1946, and started to fly the following May. A year later I had my private ticket. It is true that I took a year and at the time of my training I had never received more than $26.00 a week, where Mr. Crape said he received $37.50. I don't see why he can't learn to fly, if it is only one hour a week.

"This past June my girl friend and I made a trip out west in her plane, a Piper Cub," Peggy Lou goes on. "We flew over the Grand Tetons into Yellowstone and followed the Rockies into California and Grand Canyon, and then back home.

"I had a chance to work for a flying school this past summer at Louisville, Ky., where I logged time on my commercial license. I now have about 170 hours and have time in a Stinson, Cub, Aeronca Champ, Cessna 120 and 140, and a Super Cruiser.

"I am sure if Mr. Crape will try hard he will soon have his license. I hope he does very soon."

Well, how about that, men? Plenty of you say it can't be done. But here's a gal to say it can be done. She seems to be getting a lot out of flying, too.

After the January meeting, Eric R. Wren, England, got together information on a unique promotional idea tried in that country. Before Eric takes the floor, we'd like to remind members contacting headquarters on matters of this kind to include their membership numbers and pilot rating so proper introductions can be made. Your ship, Eric.

"One of the announcers of the BBC's West Region studios at Bristol was instructed up to an A license standard at one of the local aerodromes," said Eric Wren, "by a series of weekly lessons, and a radio feature was built around it. The program came over weekly for 15 and 30 minutes and was composed partly of narrative of the pupil, instructor, spectators, and partly by recordings and live broadcasts made while in the air. This program lasted some months.

"Although your radio time is sponsored, I see no reason why some of the people most interested in promoting private aviation, such as airplane manufacturers, airport owners, and the like, could not sponsor such a series. In the case of the local station, if the airport operator provided the facilities and instructor, I see no reason why it should not be a very useful unsponsored item for gaining listener interest and at the same time boost private flying."

Sounds good, Eric. We already reported on a similar deal involving a newspaper and a girl reporter, in which case the publisher was forced to set aside a page for aviation news. Why shouldn't it work on the radio? Ideatired radio people should be looking for things like this. Small local stations would be good material for us to work

on, just as Wren points out from across the sea. Any members who have contacts with local radio stations have a chance to boost private aviation. Why not pop in with the idea? Or suggest it to the operator?

Jack Foster, Peoria, Ill., comes through with dope on the Caterpillar Club. No, Jack didn't bail out. He's talking about the flying club organized by employees of the famous tractor company. Jack's first solo was at the Mt. Hawley Airport, Peoria, Howard Aviation, Inc., in a Luscombe, after seven hours and twenty minutes. Checked out since then in a Champion, Jack regards the Aeronca as an ideal pattern flyer and trainer. Now checking out on the club Taylorcraft, he wonders if other pilots have trouble going from stick to wheel, especially in making landings. They sure did, Jack, so don't worry about it.

"Our club is formed by members who work for the Caterpillar Tractor Co., here in Peoria," Jack explains. "Our initiation fee is twenty-five dollars, dues two dollars a month, the cost of flying the plane four dollars an hour which includes cost of hangar fees, insurance, gas, oil, etc., which is a jolly good deal, I think."

Before this month's session runs out let's quickly meet a sampling of new members. First is Denton D. Christiansen, commercial #187432 and, since 1945, a pilot for Northwest Airlines. Denton soloed at Uvalde, Texas, in 1943 and, at the time of writing has 3,262:47 hours. Sure wish these more experienced hands would tell us more about themselves when they join up. . . . Ed Trinkleback, private #367184, logged most of his time in the army glider program. Learned to fly at College of Paterson, Paterson, N. J., then went to dead stick school at Tucumcan, New Mexico. Stationed at Kirkland Field, Albuquerque, when the program folded. Got ticket in 1943. Ed is from Bergenfield, N. J. . . . William Crossley, Jax, Florida, has 140 hours toward his commercial. Looking forward to either instructor's or multi-engined ticket. Spent two years with the Navy and trained since then under the G.I. bill. Wants to know what the F.A.I. is. . . . As does Donald Robb, Binghamton, N. Y. Have to explain later. . . . Jay Daniel Zorn, began building models at seven. Now seventeen, just soloed at Edward's Flying Service, Flushing, N. Y. . . . Corporal Floyd L. Stedham, USMC, at Cherry Point, N. C., checked out on two types. . . . A. Seavers, St. James, Manitoba, Canada, wants to know if Canadians can join. Natch. . . . Peter Shepherd, having soloed an Ercoupe at TriCities, Endicott, N. Y., also is puzzled by the F.A.I. . . . Ronald McTaggart, who is with Ditto, Inc., Albany, N. Y., waited sixteen years after soloing for his ticket. "Soloed officially on April 28, 1948, flying a Piper J-3 at Troy Airport, Airport Operator's, Inc. Soloed unofficially at Syracuse Airport in 1932 and amassed a great deal of stick time up until the start of the war, then added more unofficial time during my three years with the Seventh Air Force. During all these years was unable to get ticket due to an eye weakness. Made the grade this year and hold student certificate."

To answer some questions: Energetic members who want to know about getting additional applications for their friends, will be pleased to know that these applications can be obtained from headquarters by sending in a self-

addressed envelope with the request. One thing is imperative: endorse the back of your friend's application, giving your membership number. Canadian members welcome, like we said. Since you have no student licenses above the border, get your instructor to verify with a brief note the fact that you soloed. To you members worried about oxidation of the pins, try a good silver polish or buffer. The pins are sterling silver. And now for the F.A.I.

F.A.I. stands for Federation Aeronautique Internationale. With headquarters at Paris, the F.A.I. dates back to the real early days of flying when it was the only organization acting upon records and allied matters. Its purpose is to promote sporting and competitive flying. All international records are cleared with the F.A.I. by representative aero clubs, such as the Royal Aero Club in Britain, The Royal Canadian Flying Club, in Canada, and the NAA in our own land. The F.A.I. is held in such high regard internationally that when the Germans occupied Paris, the F.A.I. papers and records were kept hands off.

Any other questions? By next month, headquarters hopes to have received enough comments and suggestions as a result of the last meeting, to formulate definite resolutions for the membership to act upon. Meanwhile, don't forget to send in your pictures. CAVU!

Standing Wave

(*Continued from page 28*)

high forward velocity will still be less than the lift of the standing wave. It is therefore not inconceivable that flights of over 500 miles can be achieved.

As yet comparatively little is known about the standing wave but observations seem to indicate that altitudes equal to and even exceeding those of high altitude airplanes can be reached in motorless craft equipped with pressurized cabins. It is now believed that the wave condition sometimes extends well into the stratosphere and may explain the origin of the nacreous (Mother-of-Pearl) cloud, highest cloud known, found as high as 100,000 feet. This cloud consists of minute particles of water suspended unfrozen in atmosphere where the temperatures range from -80° to -90°. The moist lower air mass is carried up to these heights on the crest of the wave lift where the super-cooled droplets form the Mother-of-Pearl cloud.

The extreme turbulence identified with the standing wave can spell danger to any aircraft whose pilots wander into its boiling confines, and may easily result in a crash. Erratic pressure changes within the air mass can easily affect the altimeter, resulting in incorrect register of altitude; especially dangerous when flying at night in mountainous country. Several major accidents attributed to severe turbulence and collision with mountains under meteorological conditions favorable for formation of the standing wave indicate that better understanding of the phenomenon is imperative, since it can be worked to the advantage of the pilot if properly exploited. Here again the benefits of soaring are evident, as it teaches us how to interpret correctly a given atmosphere condition and to utilize the tremendous energy of a moving air mass.

Record Flight

(*Continued from page 29*)

of my power time, had been about fourteen hours dual in Robert Symons' (Bishop) Pratt-Read almost a year before, one soaring flight and two autotows in Richard Lyon's Schweizer TG-2 last fall, and three dual-instruction flights of four hours total in my husband's LK-10A. Harland Ross, a sailplane pilot of 20 years' experience, was my co-instructor and co-technical advisor along with Bob Symons. Each have Golden "C's" the highest rating a sailplane pilot can receive. There are only about 20 American men, no women, who hold this award.

Besides the flight experience, I had about two weeks of ground crewing for Dick Lyons (Los Angeles), another Golden "C" pilot, at the National Glider Meet in Wichita Falls, Texas, in 1947. There I had the opportunity to see how the champions do it. Incidentally, Dick got his Golden "C" altitude at Bishop the first flight he made after he came back from Texas! Several others have also made the altitude requirement of a soaring flight to at least 10,000 feet above point of release there.

Perhaps I should picture the peculiar conditions that prevail in the Owens Valley where Bishop lies. The High Sierras, stretching 12,000-14,000 feet above sea-level, lie to the west. The White Mountain range, rising 8,000-14,000 feet, lies to the east. The two ranges are many miles long. At Bishop, altitude 4,000 feet above sea-level, the valley is about 12 miles across and becomes somewhat narrower south where it eventually ends in a bottle neck shape at Little Lake, about 100 miles from Bishop. The valley floor consists mostly of sagebrush, an occasional green field with cows and horses grazing, the Owens River meandering down the upper middle of it, some swampy spots, and large Owens Lake.

While I was snapping on the parachute I had borrowed from Paul MacCready (a Golden "C" pilot and holder of the International Out-and-Return Record of 230 miles) Ross suspended the sealed barograph in the rear seat of the sailplane. He turned it on then so we'd not forget it. All sailplane flights for which claims might be made must be recorded by a barograph. Another barograph was placed in the BT-13 tow ship by Bob Symons, who had just taxied up.

"There'll be no excuse for your not doing something today," he said. "A couple of hours ago I was flying the P-38 just south of the field. I was in the wave at 14,000 feet, both engines throttled back, and going up 1,500 feet a minute!"

Bob got into the BT-13 and started it moving slowly down the runway. A moment later the rope was stretching out. Then a little tug came and the sailplane was moving swiftly down the runway. Then it rose into the air, flying a few feet above the tow ship. The tow ship rose very slowly but steadily. The air was rough upstairs and we were both bounced around a lot. In a few minutes we were on the slopes of the Whites. The orange wings of the tow ship moved rapidly up and down. Reaching for the bright red release bar, I gave it two swift pulls—the first to release the towline, the second to make certain. The altimeter read approximately 6,800 feet.

I made a climbing turn to the right, the ship rapidly losing flying speed from tow-speed of 80 mph to a normal speed of 47 mph. The green (up) pellet in the Robinson rate-of-climb continued to do more bouncing than the red (down) pellet, and the Kollsman rate-of-climb dial instrument gradually showed a continued upward climb of about two-to-four hundred feet per minute. It was very turbulent near the slopes and the sailplane was tossed about roughly.

When the altimeter read 11,000 feet, I began thinking about crossing to the center of the valley to catch the "second wave." Since I didn't want to go through the downdraft to it until there was plenty of altitude, I continued to ridge-soar down the valley toward Black Mountain, a 9,000-foot peak about 10 miles from Bishop. A high-velocity southwest wind was blowing, creating both a good ridge wind and the standing wave. The wave had been in evidence for two days and nights. I glanced out now toward the spectacular clouds lying above the valley. Over the Sierras themselves lay several of the long cigar-shaped "lenticular" clouds. They were probably around 35,000 feet mean sea level. At about 13,000 feet and directly beneath the lenticular clouds were rolls of strato-cumulus clouds, evidently showing the turbulent, and moist, mixing zone of air. On the east side of the lenticular clouds, the air was going down at a terrific rate—3,000 feet per minute.

A few thousand feet above the terrain it started its upward swing to form the "second wave." Lenticular clouds were again in evidence at great height over the center of the valley to mark the place of the wave. Another roll of strato-cumulus lay at 13,000 feet beneath the lenticular clouds. All the clouds lay parallel to the Sierras. A third wave was in evidence slightly behind the range of White Mountains.

Reaching Black Mountain with about 12,500 feet, I decided to start across. I pushed the ship up to 65 mph, going through the downdraft as quickly as I could. The rate-of-climb showed 1,500 feet-a-minute *down*. With the altimeter swinging past 10,000 feet, I entered an extremely turbulent condition. Slowing the ship to just above stalling, I managed to keep the plane from being tossed on its back. At one point, in spite of all my efforts, the ship spun. But all the time the ship was climbing. Suddenly the air got as smooth as a sheet of glass. The rate-of-climb needle moved slowly upward toward 1,500 feet-a-minute. The altimeter swung past 13,000 feet, and the sailplane passed through the edge of the strato-cumulus. At 14,000 feet I turned to my left and started down the middle of the valley, parallel to the Sierras. Carrying no oxygen supply with me (a grave mistake) I decided I had better not go much higher. I pushed the nose down to 65 mph. The rate-of-climb still showed 1,500 fpm climb. The altimeter went past 16,000 feet. I pushed the plane down to 75 mph. The instruments showed 1,400 fpm. The altimeter went past 17,000 feet, and I realized I had gotten my Golden "C" without trying.

When the altimeter shot past 18,000 feet I became very alarmed. I didn't want to go higher, neither did I want to leave the wave. I shoved the stick farther forward. At approximately 22,000 feet I got the ship to stop going up. And, by moving the speed up to 95 mph, the ship lost height slowly. I went down to between 21,000 and 21,500 and flew there for 35 minutes at 90 mph. Almost twice its normal speed!

This was the way I liked to soar! I was sailing effortlessly through the sky in a straight line with no circling in thermals or figure eight-ing back and forth in front of a point on a ridge.

I tried to remember Ross's instructions on flying the wave. About all I could recall was that I was to tack back and forth across the wave, making the turn toward the center of the wave only when I had reached the turbulence at the edge. That might be the right way, I told myself—but it's so much more pleasant just to sit still, fly in one direction and not be tossed about like a cork in a stormy sea. The anoxia effect—lack of oxygen—must have been pretty bad by that time.

I remembered Paul MacCready's warning to watch my fingernails. If they turned blue I would be suffering from anoxia. I watched them, and sure enough they were turning blue! But, I reassured myself—I'm feeling swell—they're probably turning blue from the cold!

I turned from watching my fingernails to more interesting things. Over to my right and far beneath me were the Sierras, looking like hills. The heavy cloud layer over the San Joaquin Valley lay packed tightly against the western slopes. Over to my left the White Mountains were but tiny bumps on the earth and beyond were cuts and wrinkles and finally Death Valley.

Directly beneath me was Independence. Then it slipped swiftly behind me and Manzanar airport took its place, then Lone Pine was showing up fast. Owens Lake was in view, just beyond Lone Pine.

Looking down at the strato-cumulus, I noticed that it was turning away from my flight path and seemingly away from the Sierras. I remember being curious about it, but it didn't strike any bell in my dull brain.

The clouds and the wave were not moving away from the Sierras, but were following the contour of those mountains. I was the one not doing the correct thing. I continued in a straight line, not thinking much by this time.

Glancing over to the altimeter, I saw the hand beginning to creep up again. I was feeling mighty cold by this time and very tired. A headache started.

I shoved the stick way forward and the needle moved back down—then wham! I was back in the rough stuff again—the turbulence that marks the edge of the wave.

If I had been more experienced in wave flying and had been more alert, I would have recognized the situation, made a slight turn to the left, thus entering again the smooth center of the wave.

But, the lack of oxygen from flying more than 30 minutes above 21,000 feet plus the extreme turbulence finished me off. I vaguely remember trying to slow the plane down before the wings should come off.

Then, very suddenly, I realized I was staring directly at the Sierras and the peaks seemed to be growing horribly fast. A glance at the dial rate-of-climb confirmed my fears. It registered 3,000 fpm down.

A look back had told me that I was about halfway between the second and the first wave. Pushing the speed up to 75-80 mph, I tried to go through the downdraft and reach the first wave. The sailplane sank rapidly and my heart just

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as fast. I wanted my Silver "C" very badly. Lone Pine Airport was in easy gliding distance. The distance one is supposed to go is based on the altitude at which one is released and the altitude of the place one lands. If our calculations were right, the 60 miles from Bishop to Lone Pine would do it. But suppose they weren't right? I decided that I had better try to go to Olancha—if I could make it! That possibility looked exceedingly small. My altimeter was showing 9,000 feet—and the valley floor was 3,900 feet above sea level. The green pellet on the Robinson rate-of-climb had not bobbed up once. Then—8,500—a little bob of green—the red pellet moved down to the bottom then bounced up—then the two started battling it out.

Slowing the ship up, sharply, I swung it around to begin the circling. The slopes of the Sierras were close to the wing tips. The altimeter moved slowly upward, a few feet at a time. After what seemed to be hours but probably was ten minutes, the altimeter was registering an easy 12,000 feet. That was all I seemed able to get. I moved closer to the slopes. The red pellet shot up. I moved back out hastily and the pellet went down. I could find only small areas of lift among big areas of down. And the "down" always seemed so much faster than the "up"!

The altimeter started moving determinedly downward. At 9,500 feet above sea level I decided I was too low for any further attempts to get into the first wave. The valley floor may be about 4,000 feet above sea level, but that was a long mile away, and the actual terrain right underneath me was about 1,000 feet lower than I was and looked very rugged.

I had drifted past Lone Pine Airport, but it still looked as though I could make that field should I want to. Having decided to make a try for the center of the valley and the second wave again, I hunted around for a little more lift and finally pushed the altimeter back up to 11,000 feet.

Then, looking across the north end of Owens Lake, I pushed the nose of the plane down, got the speed up to 65 mph—and plummeted downward. There was 6,500 feet on the dial when I neared the center of the lake and saw the stratocumulus still much too far away. I made a 180° turn and headed for the west side of the lake and the main highway. If I had to land somewhere, it had better be where we could get the car and trailer to the plane. The middle of the lake was obviously not it.

Looking the matter over I decided if I really concentrated on the matter I could make Olancha.

As the sailplane neared the shore, the green pellet bobbed up. I circled immediately. The lift was small, but by circling tightly I was able to get the ship up to 7,000 feet again. The terrain at this point was about 3,600 feet above sea level, so I really had only half of what my altimeter read to play around in. Seeming to have reached the top of that bit of lift, I moved nearer the shore, but at an angle, always moving in the general direction of Olancha. It still was a long way off, and sinking steadily into the horizon as I got lower. I went through more downdraft and reached the shore with 5,000 feet.

Working south along the shore, I circled in every spot of "up" I could find. The altimeter showed a definite downward trend, in spite of everything. I was circling in purely thermal lift—rising warm air—and it was pretty weak stuff.

The fields next to the well-traveled winding road were covered with sagebrush and boulders. I decided to land on the edge of the drying lake when the time came—and it seemed awfully close, now. The altimeter showed 4,000 feet and tapping the instrument only made it read less. (Since there is no engine vibration to keep sailplane instruments from sticking, we have to tap them occasionally.)

I flew along the highway as it was only a few hundred yards from the lake shoreline and the lift seemed stronger there; at least the rate-of-climb was beginning to behave itself and was only

AIR TRA

ADVERTISERS' INDE

May 1949

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this May, 1949 index.

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sank rapidly. About two feet from the ground I closed the spoilers for the landing—only the plane stopped sinking immediately and drifted on down the field! Apparently "ground effect" was in action—that is, there was just enough lift to prevent the plane from landing, but not enough to make it rise!

The end of the runway was looming up with its row of telephone poles. There was only one thing to do. I pulled the spoiler handle again and the plane sank abruptly and the one wheel touched, *hard*. Hoping the axle wasn't bent, I opened the spoilers full on, thus also applying brake to the one wheel. After an age the sailplane came to a halt, and one wing dropped slowly to rest on an embankment on the edge of the runway.

I climbed slowly out of the ship, turned off the barograph in the rear seat, and began inspecting for possible damage. Roy Adamson, manager of the airport, roared up in his car. Between us we discovered some small but reparable damage. Getting the necessary help, we towed the ship off the runway and tied it down securely.

So much help and attention was extended by the people of Olancha that I really felt the keys of the town had been presented to me. After a phone call to Bishop had started Bob Symons down with a car and trailer I nursed my splitting headache with coffee and sandwiches in the Adamson cafe.

A little later Bob came in with the trailer behind the car and a big grin on his face. He confirmed my belief that, instead of breaking the Women's National Distance Record, I had broken the Women's National Altitude Record for sailplanes. He had brought some official record papers with him and started immediately collecting affidavits from the witnesses of my landing.

Since then, both the Soaring Society of America and the National Aeronautic Association officially confirmed my record. Calibration of my barograph showed that I reached an altitude of 14,496 feet.

So that's how my attempted distance flight ended. The 78 miles I did make was enough to give me the 91st Silver "C"—the second one to be held by an American woman.