AIR TRAILS®

Pictorial

AUGUST 1950

25 CENTS

Want to Build Your own Airplane?

See "The Home-Bilts are Back"—pg. 20

AIR TRAILS

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THE READERS WRITE:

Correction on Argander Special . . . This is the second time that I have tried to impress upon you people that my airplane, #39 the Argander Special or more preferably Deer Fly, is in no way the hashed-over Deer Fly which participated in the 1947 National Air Races, regardless of having the same number, and absolutely in no way connected with (Rodney) Nimmo. It is a completely new airplane.

The new ship was started shortly after the 1948 Miami Air Maneuvers after realizing that the old Deer Fly was too heavy, since it weighed 640 pounds, and was too far gone for improvement. A completely new one was started with a minimum weight our main objective. There was very little predesigning done, this being taken care of by Mike (Argander) and myself, as the ship progressed. The ship was built with a midwing this time instead of low, hoping for a cleaner design. A new airfoil was used and the fuselage widened.

Original "Deer Fly" (also known as "PFTTTT")

The plane was about 25 percent done at the time Mike was killed testing one of the late Art Chester's ships here on the coast prior to the 1948 Cleveland Nationals. After Mike's death the plane sat idle for a few months until I felt up to going back to work on it. From there on out I did the work, finishing it in the early part of 1949.

I raced it in a series of races here on the coast, improving it between each race with helpful advice from a few fellows who had been in the game longer than myself. I received much advice from "Fish" Salmon.

New "Deer Fly" (also known as the "Mike Argander Special")

By the time Cleveland came around I was ready to go, and I feel that it was very fortunate to get second place that year.

The plane was painted and named in remembrance of Mike who was a nice guy and an asset to racing.

Keith C. Sorenson, La Crescenta, Calif.

Parasite Fighters . . . In "Air Notes" you say the B-36 parasites were given up because of the lack of a suitable launch and retrieve mechanism. I believe planes were satisfactorily carried many years ago in dirigibles or some type of airship. Could not these be used in high altitudes?

Has the wing slot system mentioned in the article "Lubricated Lift" been used lately, or is it going to be tried on the XB-49?

M. Benzon, Galt, Ont., Can.

• The idea of parasite fighters itself has not been abandoned, but the method altered. It was decided that the trapeze as used in connection with XF-85 launching and retrieving was too cumbersome and apt to slow up the mother plane during both operations and thus expose it to attack. The slot system of controlling boundary layer has not been tried on the XB-49 yet.

AT-6 Flight Trouble . . . I've built your AT-6 as outlined by Cal Smith and must admit she looks mighty fine. But as for flying——! It rolls, it wallows, it sideslips. Is it me? Or my model?

Jerry Sullivan. Fort Knox, Ky.

• Says S. Calhoun Smith: "At the time the article appeared in Air Trails, our original AT-6 model had only been test-flown a few times. Later on further flights showed up some interesting characteristics similar to those described. When the ship was climbed so that the wires were about 45 degrees to the ground, it tended to roll and pitch.

"The main difficulty seems to be with the high bellcrank location in the fuselage. We say high because it is actually above the c.g. You can readily see what happens when the centrifugal force takes hold—the c.g. tends to move outward rolling the model around the bellcrank pivot resulting in a bank toward the center of the circle.

"The best way to remedy this would be to lower the bellcrank location at least ½". The line leads would have to come down too. This means they would have to pass through the wing part 'way out toward the tip. We have changed the location on our model so that the bellcrank is level with the top of the wing with the leads passing out through the wing, and emerging from the bottom of the wing about halfway out to the tip. This is rather difficult to do after the model is completed, but is worth the trouble.

"Another thing that will help matters along is to move the c.g. forward about ½" by adding a bit of lead weight in the nose. The line leads need not come out straight from the bellcrank. The front wire can be slanted back so it is even with the L.E. at the tip as on the original. The combination of slant front and straight rear makes up enough of an angle to yaw the model outward slightly."

Stalling at High Altitude . . . I have a question which I think you can answer. Here at Modesto High School we are lucky to have an aero course. Seeing as I'm interested in model airplanes I took the course. Since I'm also interested in the engineering side of aviation, we've had several disagreements. The other fellow claimed that (a) as the altitude increased, so did the speed of sound, and (b) that the stalling speed of a plane remained the same regardless of altitude. I claimed he was wrong on both counts because (a) air density varies according to altitude and therefore (1) since air density was less at higher altitudes (2) the sound traveled faster (3) because any fool knows that the denser the subject, the faster sound travels through it, and (4) therefore sound traveled slower at 40,000 feet than at sea level.

He was also wrong on (b) because (a) air density varies according to altitude and therefore (1) since there are less molecules of air at 50,000 feet than at sea level, (2) therefore the plane's wing would create less lift and (3) therefore the airplane would stall faster (whew).

Well, a book soon confirmed my argument as to speed in relationship to altitude (speed of sound, that is). He couldn't argue against me there because he didn't have a stand. But on the second part of the argument he remained firm, using personal experience gained while in the Navy in preference to my mathematical formulas.

He keeps on saying that if I won't take his word for it that if he stalled out at 60 knots at 10,000 feet and at 60 knots at sea level, according to a *true* airspeed indicator, I must really be a sad case. Please straighten him out, and quote some authority. Am I correct in saying that his precious "60 knot" plane would stall at 180 knots or thereabouts at 50,000 feet?

Dick Crawford, Modesto, Calif.

• You are correct in your statement that an airplane will stall at a higher speed at higher altitude. However, the airspeed in-

(*Continued on page 9*)

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Sefior Puddlejumper 25" A-B	1.95
Sharpy 47" C-D	4.95
Sky Boy Trainer 28" B-C-D	3.95
Sky Boy Stunt 42" B-C-D	3.95
Snorky 24" A-B-C	1.50
Sophomore 9 26" A	2.48
Sophomore 19 34" A	2.98
Sophomore 29 39" B	3.48
Speedster 12" AA	2.25
Speedwagon 20 12" A	3.95
Speedwagon 30 15" B	3.95
Speedwagon 19" C-D	4.95
Sportwing 36" A-B-C	3.95
Sqauw 33" A-B-C	4.95
Stinson Sta. Wagon 42" B-C-D	5.50
Streamliner 28" B-C-D	4.00
Stunt Ace 40" A-B-C	2.95
Stunt Kust 16" AA	1.00
Stuntmaster 40" B-C	4.95
Stuntwagon 30 44" B-C	4.95
Stuntwagon 38 52" C	7.98
Super Bipe 22" B-C-D	4.98
Super Cinch 36" B-C	2.98
Super Sky Box Stunt 47" C-D	4.80
Super Snorky 40" C-D	2.95
Super Solution 18" A	2.25
Super Squirt 21" (Jet)	4.95
Sweet Cheriot 18" AA-A	2.50

BURIED IN THIS AD are most of the new items. Sometimes there isn't time or space to include them. But, if available, we have it.

T-36 N.A. Trainer 36" B. C.	4.95
Taylorcraft 35" A.B.C.	2.98
Texaco Jr. 28" A-B	2.50
Texan Sr. 36" C-D	2.98
Topper II 16" A-B	2.25
Topper III 20" B-C	3.00
Trail Blazer 24" B-C-D	2.98
Trainer 36" B	3.95
Trixter Babe 20" AA	1.00
Trixter Invert Jr. 40" A-B	2.50
Trixter Profile 32" A-B	1.98
Trixter Profile 38" B-C	2.98
Trixter Twin Profile 47" B-C	3.98
Tuckette 35" C-D	3.95
Tuffy 24" AA-A	1.98
Waco 33" B-C	4.95
Warrior 36" A-B-C	3.98
Wee Willie 18" AA-A	1.50
Whirlwind Jr. 20" B-C-D	7.98
Wildfire 25" B-C-D	1.98
Wing Ding 18" AA-A-B	2.00
Wing Dingus 16" AA	2.00
Zing 24" B-C-D	4.95

ACCESSORIES

FUELS (Continental U.S.A. Only)

	Pts	Qts
Ohlsson #1, #3	.75	1.40
Power Mist #6	.70	—
Reg. Pink	—	1.25

For Glo

Ohlsson #2, #4	.75	1.40
Ohlsson AA	.25	—
Ohlsson #2 or #4 Econ.	.45	—
Powermist Glo	.80	—
Powermist Spitfire	.80	—
Ranger Glo	.80	—
Red Devil	.80	1.10
Testors 29	.75	—
Dynaglo	.75	—
Ranger AA	.80	—
Spitfire AA	.80	—
Blue Blazer #1	.80	—
Blue Blazer #2	.70	—
OK Cub	.75	—

For Diesel

Drome	—	1.00
Ranger (Fixed Head)	1.00	—
Ranger (variable head)	.85	—

Pouring Spout For pint cans .10

Hot Fuel Proofer .25, .35 & .45

PROPELLERS

Buzzard 9", 10" in 12", 14" p 11" to 18", 12" pitch ... Sve for 1.00

Excel 5-blades 8, 9, 10, 11" to 8p; 8, 9" in 10p. ... 1.25

Rite Pitch Stunt 8, 9, 10, 11, 12, 13, 14 in., 6 and 8 pitch ... .35

Rite Pitch 8, 9, 10, 11, 12, 13, 14 in., 6, 8, 10 or 12 pitch ... .35

Super Spit. 8", 9", 10", 11" in 6 & 8" p. ... .25

Also all sizes of Ohlsson

RUNNING & TEST BLOCKS

E-Z Running Stand ... 1.25

Universal Running Blocks ... 1.20

Wright Test Block ... 6.95

METAL GAS TANKS

Dale Tanks—All Sizes ... .85

#1—1½x1½x¾ Stunt
#2—2¼x1½x¾ Stunt
#3—2½x1⅞x1 Stunt
#4—4x1¼x1¼ Stunt
#6—1¼x1¾x1 Stunt
#12—¾x1x¾ Half R.
#15—2¼x1½x¾ Half R.

Frosm: 1¼x1½ or 2 hor. or ver. .75
1¼x1¾x2 Sq. .80
1¾x 6½x2¼ Wedge .95
1¾x1x2⅝ ¼-Rnd Stunt .90

Mason ... .85¢ & 1.00

FLYWHEELS

A & B—1.00; C & D ... 1.50

Def.ave 3 /16" shaft—1.25; 1/4" shaft—1.50; 5/16, 3/8" sh. 1.75

IGNITION COILS

Aero Featherweight			2.50
Aero Qual.	3.00	Regular	1.50
Arden	2.50	Bogey	2.00
O.K.	1.50	Wico	2.95
G.K. Twin	2.50	Winston	2.00

Smith; Competitor—1.95, Firecracker 2.75—Dual ... 4.50

CONDENSERS

Regular — .20 Smith Metal .35

SPARK & GLO PLUGS

Arden Glo (V2 or V3)	.65 & .85
Arden AA	.49
Champion Glo V, V2, V3	.75
Champion V, V2, V8, VR1, VR2	.50
Infant Glo-plug (.09ff)	.85
McCoy Hot Point	.49
Ohlsson Glo (V, V2 or AA)	.85
Ohlsson Economy V3 or AA	.50
O.K. Glo-plug (V2 or V3)	.49
Plug washers	.08

IGNITION ACCESSORIES

6 ft. Hook-up wire ... .25

Alligator clips ... .10

Arden Booster Jack ... 1.25

Austin Booster Plug-in ... .30

Midget S witch: slide—30c Turn ... .50

Ohlsson Snap-Pack ... 2.95

Arden Battery Cord Kit ... .25

PROP SPINNERS

Adapter Nuts (state engine) ... .20
⅝"—20c; 1¼" ... .25

1½"-85c; 1¼"-.90c; 2"-.30; 2½"-1.00

2" Needle Nose 1¾" dia. ... 1.15
2" ... 1.20

Plastic 1½" ... .30

Scamper Plastic 1¼", 1½", 2", 2½" ... .45

WHEELS

Semi Pneumatic (pr) 2"	.55
2½" — 1.00, 3"	1.50
Sparky Tail Wheel Assembly	.25
Sponge Rubber, Dural hub (pr) ⅞"—.20c, 1, 1⅛"-.25c; 1¼", 1⅜"-.30 1½"—.45c, 2½"	.80
Sponge Rubber, Wood Hub (pr) 2"—.40c, 2½"—.50c, 3½"	.90
Tail Wheels ⅞"—.10c; 1½"	.15
Trexler Duo. (pr) 1½" or 1½"	.40
1¾", 2"—.50c; 2¼", 2½"—.60c; 2½"	1.00
3"—1.25; 3½"—1.50; 4½"	1.75

FLIGHT TIMERS

Austin metal	1.50
D-T Shut Off Valve	1.00
Elmic (gas or glo)	1.95
Hillcrest plastic	1.25
Stutler-off Valve	.75

AA ACCESSORIES

Shut-off Valve (state engine)	.65
E-Z Minimount	.85
.004 or .006 x 2—25	.35
.006 x 2—.50	.50
Spinners (state engine)	.40
Presto Starter (state engine)	.25
Props (state engine)	.25
Tanks (state engine) .50, .80, .75	
Neoprene (ft)	.20
Fuel Meter	.50

MISCELLANEOUS

Batt. Box Pen. and Medium	.40
" " Reg.	.50
Brass Tubing 1/16", 3/32", 1/8"	.15
Coil Holder	.15
Copper Tubing ⅛" OD, per ft. Fill-In.	.20 .05
Finger Guard	.49
Fuel Line Filter	.35
Fuel Pump	.65 & .85
Metal Motor Mounts, Set—30c; Lg.	.50
Metal Pump Can .75¢ & 1.50	
Needle Valve Exten. flexible	.25
Neoprene Tubing, per foot	.20
Transparent .15 AA Transparent	.25
No. 70 oil, 5 oz.—.25; pint	.60
Plastic Fuselage 15" set of 2	.50
Plug Wrench, 3-way—15c; 4-way	.25
Plywood (6"x12") 1/32"	.20
1/16"—.25c; 1/8"—.30c; 1/4"	.35
Silk per yard	1.50
Silkspan, light 18"x24" (white) heavy 24x36" (white)	.05 .10
Red, Blue, Yellow 24"x28"	.10
Socket Plug Wrench, 4-way	.50
Soldering Set	2.95
Spinner Starter	6.00
Tissue (most colors) 20"x24"	.05
Universal Needle Valve Flexible	.50 .75
Vibrator	2.00

U-CONTROL ACCESSORIES

Adjustalink Control Handle
5" or 6" ... .20

Adjustable Push Rod set ... .25
Aristrol Plastic Handle ... .75

Bellcrank 2"or 3"—.10c; 4" ... .15
BERKELEY control lines
.008, .011, .014 2-70 ... .85
2-150' ... 1.00
Stranded .015, .021, .35', .75; 70' 1.00; 200' ... 2.75
Berkeley Metal Flight Reel ... 1.25
Berkeley Metal Handle ... 1.00
Elevator control horn ... .10

Plastic Balsa, 4 ozs. ... .70
Thinner, 4 ozs. ... .45
BERKELEY DOPE
Clear Dope ... 4 oz. 30c, pint 90c
Colored Dope ... 4 oz. 35c, pint $1.00
In: Light Blue, Dark Blue, Silver, Green, Yellow, Gray, Black, White, Red, Olive Drab, Brown, Cream and Orange.
Banana Oil or Thinner ... 4 oz 30c
Cement or Thinner ... pint, 90c

Elevator hinges 4 for ... .10
E-Z Plastic Control Handle ... .85
Lanco Clips A. B. C or D Pr ... .10
PYLON control lines
.006, .008, .010, .012, .014, .016 dia. 2-42' lines ... .80
.010, .012, .014, .016, .018, .020 dia. 2-70' lines ... .85
Flexible 2-52' 1.20; 2-70' ... 1.98
Pylon Control line Reel ... 1.00
Reel Pal Reel ... 1.00
Simplex Handle & Reel ... 1.25
Stunt Bellcrank & Elev. Horn ... .25
Swivels, small 10c pr.; large ... .20
Take-off Dolly kit ... 1.00
U-Ready Contr—7.50; cable ... 3.50
U-Ready Remote ... 12.50
Vaco Bellcrank ... .20 & .25
Wood Control handle ... .25

CEMENT & DOPES

Cement in tubes ... .10, .15 & .25

COMET DOPE: (.10 and .25)
Fire Red; Sunshine Yellow; Horizon Blue; Jet Black; Regal Maroon; Silver; Gloss Top Coat; Thinner; Banana Oil; Midnight Blue; Radiant Orange; Bright Green; Snow White; Dusky Gray; Rich Gold; Aircraft Green; Sanding Sealer; Clear Dope;

AERO GLOSS
Colored Dope, 4 ozs. ... .60
Silvaire Aluminum; Taylorcraft Cream; Corsair Blue; Fokker Red; Lambert Gray; Cub Orange; Stinson Green; Swift White; Stearman Red; Cessna Gray; Cub Yellow; Cessna Green; Jet Black; Waco Maroon; Curtiss Blue.
Clear Dope, 4 ozs. ... .55
Balsa Fillercoat, 4 ozs. ... .60

MODEL BOATS

Chris-Craft Cruiser 25" C-D	4.00
Chris-Craft Express 25" BCD	3.50
Chris-Craft Runabout 25" BCD	3.50
Haven 25" B-C-D	3.50
Owens Yacht 25" B-C-D	3.50
Vineyard 25", BCD	3.50
Dumas Electric Drive Unit for 6 above ships	5.00
Buckeye prefab. 17" A-B-C	4.95
" Cabin Cruiser 17" ABC	5.95

16 DIFFERENT GAS POWERED BOATS LISTED IN OUR CATALOG

THIMBLEDROME

Cox .15 or .099 Engine only	7.95
Cox .199 Engine only	7.95
Cox car ready to run with engine	12.95
Cox Dirt Track	2.00
Champion car ready to run with Cox Engine	18.95
Thimbledrome Race Car	8.45

ALSO ALL COX UNITS

RACE CARS

McCoy Midget	7.50
McCoy Complete	16.98
Ohlsson Race Car	4.35
Ohlsson Complete	19.88

DECALS

Black or Yellow: Any Numeral or A, M, N, R, C, 3 1" 4 for .65
2" 2 for .65 ... 3" 1 for .10
Trim-Sim—3 x 12 Booklets ... .25
A) Red, Blue, Yellow
B) Alum., Green, Orange
C) Black, White, Gold
Checkerboard—¼" or ½" ... .25
Red, Black or White

SPECIAL! BARGAIN!

Complete FLYING OUTFITS

WORTH TWICE OUR COMBINATION PRICE!

IT ISN'T OFTEN that you get the chance to buy, at less than half price, a U-Control Plane, Engine and All-Accessory Outfit with your own choice of 23 well-known FACTORY ASSEMBLED ignition or glo engines. Everything carries the famous America's Hobby Center as well as the manufacturer's guarantee.

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Your own choice of 23 well-known, factory assembled engines, all guaranteed by the manufacturer and America's Hobby Center.

Plus Your Choice of


TRAIL BLAZER

TRAIL BLAZER Model Plane with carved lower fuselage-half, fully formed aluminum upper half. Balsa sheet wing, no tissue used. Balsa tail surfaces, plywood engine mount. Schematic drawings with step-by-step plans. Rubber wheels, detail paint schemes. 24" wingspan.


MAVERICK

Completely prefabricated Stunt TRAINER Model, particularly good for beginners. Die cut and slotted fuselage, finished center spar, silkspan, decal, formed landing gear, step-by-step instructions, 24" wingspan.

Plus not 75, not 100 but ALL **ACCESSORIES including:**

●PLUS: Correct size finished propeller ● 3-way plug wrench ● Presto Engine starter with handle and cord ● Speed indicator tables ● Log Book ● Motor cover ● Spark or glo plug with gasket ● Complete engine instructions ● 24 page Gas Engine Theory Manual ● Engine adjustment chart ● Metal fuel tank and gas line ● Metal Battery box ● Wilco Quality Coil ● 12" Hi-tension lead wire and end clips ● 18" insulated ignition wire ● Ignition slide switch ● Coil holder and mount ● Everlast condenser ● SAE # 70 Oil ● 4 ignition wiring lugs ● Spark plug guage set ● 2 plane identification tags ● 72 Insignias ● 72 page book on Control-liners, How to build and fly them ● Cement ● Sandpaper ● "Pro" all-metal knife and blade ● Metal bellcrank with bolt, nut and washer ● Elevator horn ● Elevator hinges ● Lead-in wire ● Push-rod wire ● U-Control handle ● 100 feet U-Control stainless steel wire and seal ● Membership in Modelcrafters of America ● 64 page giant 2-color catalog ● Postage ● Packing ● Insurance.

Ignition parts not needed with glo engines not included.

YOU WON'T GET OTHER BARGAINS LIKE THESE!

NEW .099 UNITS

Includes all 3 items

For ease of assembly, for trouble-less operation and for real effortless U-Control flying, these units are the answer to the modeler's dream. Even the beginner will have no trouble in assembling the outfit in one evening and be completely ready to fly the next morning.

1 You get your choice of

2 PLUS Your choice of 3 completely prefabricated kits

3 Plus all accessories

You get the same accessories listed in our other flying outfits (except those not needed for a glo engine, of course)

COST ONLY McCoy 9 Glo Outfit $10.95
O.K. Cub .099 Outfit $8.95

Scoop! Complete PEE-WEE FLYING OUTFITS

These are the new pint-size glo engines that are so tiny (1 to 1¼ ounces) but develop plenty of power for free-flight or U-control flying.

Your own choice

of 4 of the best, all fully guaranteed:

Plus your choice of planes:
All planes prefabricated, easy to build and fly

Plus all accessories

You get the same accessories listed in our other flying outfits (excluding those not needed in a glo engine, of course). Everything needed to build and fly planes shown except fuel and 1½ Volt battery.

Complete CO-2 FLYING OUTFITS

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!

CAMPUS BEE **$6.45** (includes refillable tank, capsule charging unit). Costs only 2c per flight to run. Plus Cavacraft Stinson, Berkeley Profile Powerhouse or 19" Puddle Jumper. Kits are completely precut and shaped, ready to assemble!

O.K. CO2 Engine **$6.95** (largest CO2 engine made) with the famous contest-winning 33" Powerhouse kit, (Most CO2 contests during 1948 were won with this matched combination of plane and engine)or 19" Puddle Jumper.

CAMPUS A-100 **$7.95** (Smallest CO2 engine made, includes refillable tank). Costs only 1c per flight to run. Choice of Cavacraft Aeronca kit with Cava-Cut parts, completely precut and ready to assemble or the World War I fighter biplane, the S.E.5.

Plus all accessories

CO2 Engine, ready to run ● CO2 Capsule holder ● 2 CO2 Capsules ● Correct propeller ● Complete Engine instructions ● Complete suitable airplane ● Landing gear ● Wheels ● Complete plane plans ● Cement (if needed) ● Flight log ● Insignia ● Identification tags ● Packing ● Postage ● Insurance ● Membership in Modelcrafters of America ● 24 pg. Giant model Catalog ● Full A.H.C. Guarantee.

NOTHING ELSE TO BUY!!

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Do you know about our Special Services Division of America's Hobby Center? Created to handle the problems of ordering through A. P. O or F. P. O., this department will insure your receiving your order promptly. As one of the largest American companies dealing in modeling equipment, we ship a very large amount of merchandise to Servicemen throughout the world. We understand their problems and we give extremely fast service. The Special Services Dept. makes sure that the material we ship is what is ordered; that nothing is missing; that it is carefully wrapped. This eliminates the necessity of returns or delays. Write today for our

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$4.95 "BUZZ" IGNITION and GLO ENGINES $4.95

ONLY $4.95 – WORLD'S LOWEST PRICE

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FULLY GUARANTEED

AN ENGINEERING TRIUMPH... *Never Before at So Low a Price!*

Indeed an engineering triumph—accomplished by outstanding designers and engineers, who have constructed into the Buzz motors everything that years of exhaustive scientific aerodynamic research could produce—geared to the highest possible degree of perfection. But more than that, the acid test... an overwhelming response. Thousands of users in all parts of the country are praising, recommending, and endorsing this engine. It seems as if everyone in America wants one. The most hair-raising thrill you've ever experienced will be yours with the Buzz motor. EFFICIENT FOR BOATS, MIDGET CARS AND STATIONARY USE. Easy to start and simple to run.

BIGGEST NEWS IN YEARS!! We are the largest model motor headquarters in the world. We have sold over 200,000 model engines (made by 117 different manufacturers) in the last 15 years. We know engines. When we were approached by one of America's largest companies in this field and offered the exclusive agency for the sale of the BUZZ, we knew we had the biggest bargain ever offered to the American Modeler.

WHO MAKES THESE ENGINES? The BUZZ Engines are manufactured by a company that for years has been the world's largest maker of automobile replacement pistons and other precision gasoline engine parts. Thousands of gas engines and parts were made during the war by this company for the War Dept. for use in walkie-talkies, field generating sets, etc., etc. Since the war, thousands of gas engines have been made for scooter, lawn mower and other industrial uses. When we say unconditionally that the BUZZ engine is well engineered and well constructed, will give you plenty of good service, this is no idle boast, but a fact!

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PRECISION ENGINEERED! Despite its low price, the BUZZ Engines have been engineered to the last decimal point. Pistons and cylinders have been carefully burnished by a special patented process within .0002 of an inch. All bearing surfaces are made of selected materials and finished with the most costly care and equipment. Every BUZZ Engine is indeed a jewel of precision engineering.

FULLY GUARANTEED! With each and every engine is included a full 30-day written guarantee against defective parts and workmanship. You take no chances with BUZZ Engines.

HIGHEST QUALITY AT LOWEST PRICES! Do not judge the BUZZ Engines by their low prices. It is true we make very little money on each engine sold. But because many, many thousands of these engines have been produced by the latest modern processes, the cost has been reduced so that they can sell at the lowest prices ever seen.

PRECISION ENGINEERING OFFERS:

- Construction and materials that permit use of engines in boats and cars as well as airplanes.
- Complete Instructions.
- Streamlined for cooler operation and longer life.
- Easier to start.
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- All wearing surfaces especially finished for longer wear.
- Requires shorter break-in period than any other engine.
- Invertible and runs in either direction.
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- Smooth, velvety power that never lets you down.
- Last but not least, we maintain an inspection and testing department where your engine gets the last word in care not only before it is shipped, but where it can receive expert attention if anything goes wrong after you own it.

Now You Can Afford the Best!

ORDER FORM

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Please rush me "Buzz"

- ☐ "A" Ignition at 4.95
- ☐ "B" Ignition at 4.95
- ☐ "C" Ignition at 4.95
- ☐ "D" Ignition at 4.95
- ☐ "A" Glo at 4.95
- ☐ "B" Glo at 4.95
- ☐ "C" Glo at 4.95
- ☐ "D" Glo at 4.95
- ☐ Ignition Accessory Unit at 2.49
- ☐ Glo Accessory Unit at 1.49
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- ☐ "C" Glo Kit

} Including Glo Accessory Unit at 4.44

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BUZZ ACCESSORY UNITS

For IGNITION Engines... only $2.49

Spark Plug & Gasket • Wilco Quality Coil • Hi-Tension Lead Wire & End Clips • Everlast Condenser • Correct Size Finished Propeller • Ignition Slide Switch • 3-Way Plug Wrench • 4 Wiring Lugs • 4 Mounting Bolts & Nuts Presto Engine Starter, with cord and handle • Spark Plug Gauge Set • Motor Cover • 24 Page Gas Engine Theory Manual • Log Book • Engine Adjustment Chart S.A.E. No. 70 Oil • Coil Holder and Mount • Metal Fuel Tank • Gas Line • Metal Penlite Battery Box • Insulated Ignition Wire.

For GLO Engines... only $1.49

Glo Plug & Gasket • Insulated Ignition Wire Correct Size Propeller • 3-Way Plug Wrench Mounting Bolts & Nuts • Presto Engine Starter, with cord & handle • Motor Cover Log Book • 24 Page Engine Theory Manual Fuel Formulas • Metal Fuel Tank • Gas Line

SPECIFICATIONS

	19	29	35	60
Displ.	.199	.299	.350	.610
Bore	.660	.812	.880	1.000
Stroke	.562	.562	.562	.777
Horsepower	1/7	1/6	1/5	1/4
R.P.M.	7,500	8,000	8,500	9,000
Prop	8"	10"	11"	12"
Weight	4	4½	4½	9

BUZZ A, B, and C Glo Engines

In Kit Form only $2.95

BUZZ A, B, and C Glo Engines are also available in fully machined, ready-to-assemble kits. Five minutes and a screwdriver are all you need. Complete directions. Due to the extremely low price, these kits can only be purchased at the same time you buy the Glo accessory unit for $1.49... everything you will need except fuel and battery.

a complete set only $4.44

A. H. C. IS ALSO HEADQUARTERS FOR: RUBBER, GLIDERS, DISPLAY, BOATS, JETS, ETC.

RUBBER

HERKELEY — 33" Aeronca Sedan, 33" Cessna "140", 29" Culver "V", 36" Fairchild "24", 35" Interstate Cadet, 36" Piper Super Cruiser, 33" Stinson L-5 "Sentinel", 34" Stinson "Voyager" — $1.95

27" Bell Aircobra $1.00
24" Brewster Buffalo 1.00
30" Conqueror 1.00
25" Curtis Dive Bomber 1.00
40" Executive 40 ..... 1.50
44" Flying Cloud 1.50
20" Folkerts Racer 1.50

Buckaneer, Jr., Brigadier, Jr., Musketeer, Jr., Chieftan, Jr., Sky Buggy, Jr., Flying Cloud, Jr., Powerhouse, Jr. — 20" to 30" .50

American Ace 30" 1.00
Sportsman 30" ..... .75
Buccaneer 30" 1.00

CLEVELAND — Aeronca Chief, Beechcraft Bonanza, Erco Ercoupe, Fokker D-8, Globe Swift, Grumman Panther, Luscombe Sedan, Luscombe Silvaire — 20" $1.00

Minnow, Piper Cub, Ryan Navion, Shooting Star F-80, Stinson Voyager — 20" $1.00

"20" MASTER ¾" SCALE KITS

Beechcraft Bonanza 25" $1.50
Curtis P6-E 23" 3.00
Fokker D-7 21" 1.75
GEE-BEE 17" 1.75
Mr. Mulligan 2.75
Republic Seabee 28" 2.25
Ryan Navion 25" 1.75
Spad XIII 19" 1.75

Aeronca Sedan, Beechcraft Bonanza, British WWI SE-5, Cessna, Fokker D-7, Great Lakes Trainer, Midget Mustang, Ryan Navion, Thunderjet — E-Z TO BUILD MODELS 16" to 20" .50

FOR RUBBER, GLO-PLUG, & CO2

Baby Fleetster 32" $1.25
Black Widow 36" 2.00
Lancer 32" 1.25
P-38 Lightning 36" 2.00
Topper I 15" 1.00

COMET — Piper Cub, Taylorcraft, Aeronca — 15" STRUCTO-SPEED .25

Stinson Voyager, Cessna, Globe Swift, Fokker D-VIII, Beech Bonanza, Ryan Navion, Globe Swift — 15" STRUCTO-SPEED .25

Tiger Shark P-40 ..... $ .25
Globe Swift ..... .25
Taylorcraft ..... .25
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Navion ..... .25
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Jupiter ..... .25
D-7 Fokker ..... .25
Spad ..... .25
Phantom Fury ..... .25
Aeronca "K" ..... .25
Stinson SR-7 ..... .25
Bluebird ..... .25

20-26"

Doug. Daunt ..... $ .50
Sup. Spitfire 1X ..... .50
Grum. A-6M TBF-1 ..... .50
Corsair F 4U-1 ..... .50
Vultee Ven. A-35 ..... .50
Piper Cub ..... .50
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Thunderbolt 24" 1.00
Hellcat F6F 24" 1.00
Lightning P-38 34" 1.00
Clipper, Jr. 36" 1.00
Pepper 32" 1.00
Taylorcraft 54" 1.00
Aeronca 54" 1.00
Piper Cub 40" 1.00
Gull 42" 1.00

JASCO

Jasco Special $1.50
Jasco, R.O.G. ..... .35
Jasco Kid ..... .50
Jasco Jr. ..... .85
Jasco Sr. 1.25

MONOGRAM — Piper Cub, Aeronca, Monocoupe, Ercoupe, Boeing Kaydet, Midget Mustang, Prowler 28", Pirate 31" — SPEEDY BILT 75c

Piper Cub 1.25
Pirate 31" 1.25

SCIENTIFIC — Atlantic Ace Skipper, Yellowbird — 27" 50c

Scient. R.O.G. ..... $ .95
30" Brewster Buffalo ..... .50
30" Bullet ..... .50
30" Circle King 1.00
30" Clarion ..... .50
30" Mustang P-51 ..... 1.00
42" Olympic 1.00
42" Spartan 1.00
30" Thunderbolt P-47 ..... 1.00
30" Whippet ..... .50
42" Zephyr 1.00
All America 42" 1.00
Flea 36" 1.95
Firefly 36" 1.95

Hornet, Royal, Major — Windsor, Bantam, Ranger — 25" 35c

Miss America 36" 1.95
Miss Worlds Fair 50" 1.50

GLIDERS

Sindbad Jr. 30" ..... $ .50
Sindbad 40" ..... .75
Sindbad Sailor 50" 1.50
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Imperial 72" 1.00
Zenith 33" ..... .50
Condor 60" 1.00
Baby Condor 36" ..... .50
Thermic C ..... .80
Thermic 70 ..... 3.50
Thermic 50 ..... 1.00
Thermic Trio ..... .35
Thermic 72 ..... 3.50
Thermic 60X 1.00
Thermic 30 ..... .50
Trooper ..... .65
Floater 2.50
Sailwing 50 ..... 1.00

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HOD-AC

Brougham $1.95
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Surrey 1.75
Horseless Carriage 1.50

DYNA-MODEL

F6F, P51, F8F, F4U, P40, F.W. $2.75
P38 ..... 3.50
P47 ..... 2.95

HAWK

F84, Constellation, S6B $1.00
GeeBee, Curtis, Ike, Laird ..... .50

FADOR

1905 Reo $2.50
1909 EMF 2.95
1909 Hup 2.50
1903 Cadillac 1.95

ALSO

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Stage Coach 1.50
Covered Wagon 1.50
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- Dept. TC-80 965 Gas & Electric Bldg., Denver 2, Colorado

The Readers Write

(Continued from page 4)

dicator will not show it, indicating the same speed as at sea level. In order to obtain true airspeed it will be necessary to apply correction for pressure altitude, temperature and installation error.

Roughly speaking, the indicated airspeed will read 2% lower for each 1,000-foot increase. Thus, an airplane which stalls at 60 mph at sea level, will have an increased stalling speed of 20% at 10,000 feet, or stall out there at 72 mph. It does not make any difference whether the calibrations are in mph or knots. At 50,000 feet, the increase in stalling speed will be 100% or over. Anybody who is an active pilot knows that, and all flight computors used by military and civilian pilots are equipped with true-airspeed, pressure-altitude and temperature correction scales to work out this probem.

You will find confirmation of the foregoing in such books as "Technical Aerodynamics" by Karl D. Wood, and "Aircraft Instruments" by Wright, Dyer and Martin.

Convair Model 39 . . . I am interested in knowing about a model Convair put out around 1945, the Convair Model 39. I heard that it was on trial with American Airlines but nothing else since then.

Tom Hendrix, Charlotte, N. C.

• **Model 39 was designed as a cargo transport. The plane was owned and operated by Convair, with American Airlines handling cargo arrangements. Retired in 1946.**

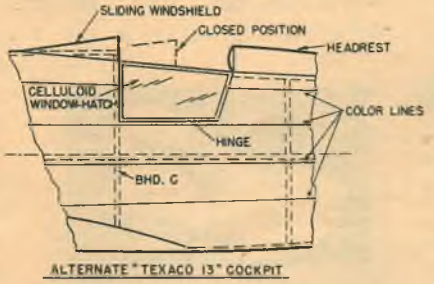
All-American's t.m.a. . . . Your "All-American" free flight feature was very good. I built the job and it flies fine. But weren't you wrong when you stated "the tail moment arm is 39% when figured from midchord of wing to midchord of stab"?

Duncan Campbell, Alton, Ill.

• **You're right; we were wrong. Figure should have read "49%."**

What's Wrong with "Texaco No. 13"? . . . It was nice seeing Mr. Musciano's "Texaco No. 13" model-building article as this plane has always been one of my favorites. However, the plans and model are incorrect because they do not agree with a photograph that I have of the real "13." Your model's cockpit is entirely different from my photo in that the windshield shape is wrong and it does not have windows on the sides of the cockpit as did the real "13." Also, the real "13" had a sliding windshield which the model doesn't specify. What gives?

Carl Hodges, Wilmington, Del.



ALTERNATE "TEXACO 13" COCKPIT

• **Walt Musicano's plans and model are correct (information from the Texas Company and the Travelaire Company plans were used to prepare the article) but you are also correct because Frank Hawks did have the craft redesigned and streamlined the cockpit as the plans shown herewith indicate.**

C.A.P. Reference Book . . . We of the Seattle Squadron of the Civil Air Patrol wish to take this opportunity to thank you a million times for the wonderful job you are doing by giving C.A.P. such grand articles.

Every month the "C.A.P. Newsletter" is taken from Air Trails and placed under separate cover whereby we now have a very informative book which is being used for reference as well as shown to prospective new members.

Lt. James H. Dilonardo, Seattle Sq. C.A.P., Seattle, Wash.

CONTEST CALENDAR

July 8-9—Bismarck, N. D., North Dakota Plymouth Dealers Model Airplane Contest. Arthur J. May, R.F.D. #2, Bismarck.
July 9—Pittsburgh, Pa., Control-Liners Meet. L. J. Stoutenberg, 21 So. Emily St.
July 9—Falls Church, Va., Eastern States Model Airplane Meet. W. S. Hinman, Jr., 410 W. Great Falls St.
July 9—Wheeling, W. Va., Exchange Club Activities Model Plane Meet. M. H. Brandt, 105 Eddington Lane.
July 9—Winston-Salem, N. C., Skywriter Model Airplane Club Meet. E. D. Aldridge, 853 Watson Ave.
July 9—Piseco, N. Y., Adirondack Control-Line Championship. J. H. Schneider, 355 Mohawk Ave., Scotia, N. Y.
July 9—Anaconda, Mont., Team Racing Contest. Robt. Carroll, Box 1000.
July 14-16—Chattanooga, Tenn., National Pilots Air Meet (full scale). F. B. Gorman, Municipal Airport.
July 16—Riedsville, N. C., Control-Line Championship, Allen Carter, 715 Somers St.
July 16—Watertown, N. Y., No. New York Model Airplane Meet. W. D. Tracey, 270 Mullin St.
July 16—Akron, Ohio, Society of Model Plane Engineers Contest directed by Akron Women Chapter NAA.
July 22-23—Helena, Mont. Plymouth Dealers Model Airplane Contest. R. Carroll, Box 1000, Anaconda, Mont.
July 25-31—National Championship Model Meet. Dallas, Tex.
July 29-30—Adelanto, Calif. Soaring Regatta (full scale) Wm. G. Brieglеb, El Mirage Field.
July 30—Decatur, Ill., Plymouth Dealers Model Airplane Contest. D. Hartman, 2700 W. Main St.
July 30—Missoula, Mont. Scale Model Contest. R. Carroll, Box 1000, Anaconda, Mont.
July 30—Fresno, Calif., Fresno Gas Model Club Record Trials. O. Randall, 716 Waterman Ave.
July 30-August 13. Grand Prairie, Texas. 17th National Soaring Contest (full scale) Dr. W. G. Sellman, Jr., 313 Medical Arts Bldg., Dallas.
August 5—Great Falls, Mont., Free Flight Meet. R. Carroll, Box 1000, Anaconda.
August 6—Pittsburgh, Pa., Control-Liners Meet. L. J. Stoutenburg, 21 So. Emily St.
August 6—Alton, Ill. Invitation Model Contest. R. Hovey, 110 W. Elm St.
August 6—Cleveland, Ohio, 3rd Annual CO-2 Meet.
August 6—Royal Oak, Mich. 3rd Annual Cloudbusters Meet. J. R. Kates, 604 So. Edison Ave.
August 13—Lancaster, Pa., Model Meet, Paul Liller, 567 Pershing Ave.
August 13—Schonectady, N. Y., R.O.W. Free Flight Gas Contest. D. M. Springsted, 837 Eastern Ave.
August 13—Springfield, Ohio, Stratohawk Model Meet. A. M. Smith, 1813 Woodward Ave.
August 13—Salem, Ore., 12th Annual Model Airplane Meet. E. J. Roth, 2080 Market St.
August 13—Great Falls, Mont., Control-Line Meet. R. Carroll, Box 1000, Anaconda.
August 14-21—Detroit, Mich., 4th International Plymouth Model Plane Contest. W. E. Bartlett, P.O. Box 3118.
August 20—Shelby, Ohio, Invitational Model Plane Meet. H. L. Robinson, 18 West Madison Ave.
August 20—Akron, Ohio, Society of Model Plane Engineers Contest directed by Women's Chapter NAA.
August 27—Pittsburgh, Pa., Control-Liners Meet. L. J. Stoutenburg, 21 So. Emily St.

Showcase

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

North American Model Products' answer to the "lookin' for something different?" question is the Viper Air Boat, a pre-fab'd affair taking engines from .02 to .09. This air-boat is 10 in. overall length, has 3-point suspension hull. Comes with hardware, decals and die-cut firewall, $1.50. . . . Somebody who appreciates that old motor of yours is the All American Model Motor Exchange; like an auto dealer, they allow you a trade-in. . . . Berkeley Models, Inc., is importing the HIVAK SFG-1 r-c tube for use in late model Aerotrol receivers. It fits earlier rcvrs, too. B-M says tube has longer life, twice power and half the weight of former tubes. Made especially for radio-control work. Priced at $3.50 each. . . . Acme Model Engineering Co. now offers its "B-type" tank for stunt use with mounting bracket; all Acme tanks now come with the bracket which can be purchased separately two for 15c. The "B" tank comes small, medium or large for 69c; same tanks in kit form are 50c each. . . . Machin Products Co., mfgrs of Rev-Up props, announces new sizes. For stunt and free flight: 8 in. dia./4 in. pitch; 9/4; 10/4; 11/4; 11/6; 12/4 and 12/6. Added to the Rev-Up Miniature prop line: 7/4 and 7/6. . . . Top Flite, Models, Inc. is the new name for American Hobbies Specialties, the Chicago firm founded by Carl Goldberg and Mike Schlesinger. TFM announces that Carl's new free flight for engines from .19 to .36 and called the Cumulus is now at dealers priced at $4.95. Model features a drop-out engine compartment, fully sheeted fuselage. Has single-wheel retracting take-off gear. Wingspan is 54 inches, length 35 inches and the weight without motor, 16 ounces. Wing area is 3 square feet. . . . Comet is now selling 35¢ size Hot Fuel Proofer.

One of the many fine features of an Academy of Model Aeronautics' model flyer's license is the public liability coverage ($50,000 and $100,000 personal injuries; $10,000 property damage). By subscribing to the safety rules of the AMA, you can obtain the license and liability coverage. All licenses are on a calendar year basis, so the sooner you sign up the more you get for your money.

Academy of Model Aeronautics
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On July 1, '50, I was ..... years old (license classification is based on your age on July 1). Please issue license checked:

Class III— (up to and including 15) . . . $1 ( )
Class II— (16 through 20) . . . . . $1.50 ( )
Class I— (21 years and over) . . . . . $2.00 ( )

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Name (print)
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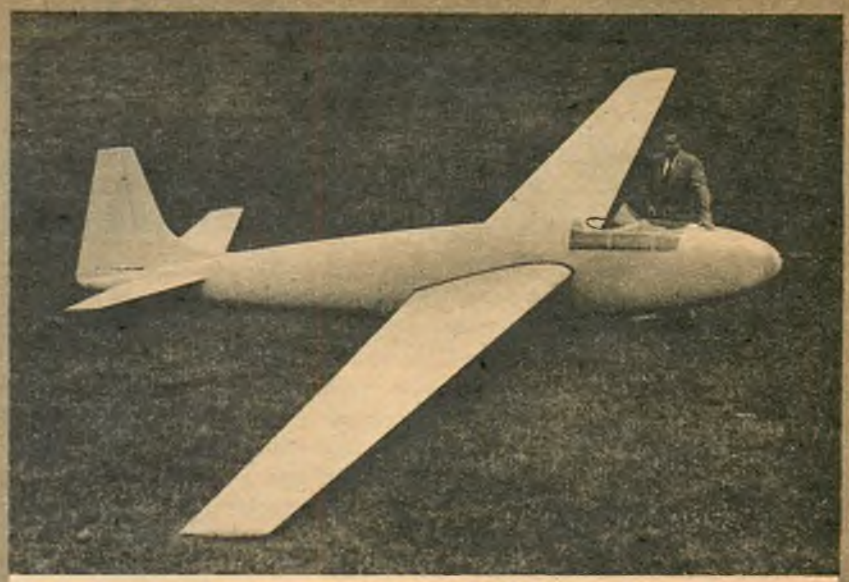
Showcase

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

The Flo-Torque Corp. has recently reestablished its service to consumers through regular trade channels. Until recently its prop output went to leading engine manufacturers exclusively. F-T props are machine made of kiln-dried birch, sanded and finished with hot fuel resistant wax. The Invader line includes props designed for free flight, stunt and speed flying. Sizes presently available are from 5 to 12 inches in diameter. Prices are 20c each for propellers up to 6½ inches; 25c for those 7 to 12 inches. . . . A new line of aircraft finishes manufactured by Speed-O-Laq Products Co. is now available in 23 colors plus 7 other finishes. Speed-O-Laq has been making full-size aircraft finishes for more than a decade. Identical to standard aircraft colors are the finishes available in 10c bottles and 35c (4 oz.) and 60c (8 oz.) jars. Colors are: Cub and Taylorcraft Cream; Aeronca, Taylorcraft, Cub and Army Yellow; Aeronca and International Orange; Insignia and Tennessee Red; Universal Maroon; Cessna Gray; Waco, Cub, Insignia and Metallic Blue; Stinson and Cub Green; Olive Drab; Chocolate Brown; White; Black; Silver. Other finishes available are Clear, Gloss Top Coat, Thinner, Banana Liquid, Sanding Sealer, Hot Fuel Proofer Clear and Hot Fuel Proofer Thinner. A color chart showing real aircraft finishes is available from Speed-O-Laq at no cost. . . . "If it will run a Spinit will start it," says Streed Electric Co. of its Spinit starter. This simple-to-operate affair comes with standard or heavy spring for A-B and C motors. It also can be had for 3-bladed props. And if that doesn't satisfy you, both clockwise and counterclockwise models are available. The Spinit is priced at $5 for the 2-blade models, with short or long drive; 3-bladed one is $6.



● French Fouga CM.18-3. Span 42.6 ft., aspect ratio 13, sinking speed 2.6 ft. sec.

Sailplane Parade

Highlights and news of motorless flight activity among soaring clubs in this country and overseas

Soaring Nationals. Soon employers throughout the country will be flooded with requests for extended vacations starting with the last week in July and ending around middle of August. Applicants for leave of absence will be soaring pilots aiming to attend the annual National Soaring Contest to be held this year at the Grand Prairie Airport, Grand Prairie, Tex. The meet will be run by the Texas Soaring Association under the sanction of the Soaring Society of America, and the sponsorship of the Grand Prairie Chamber of Commerce and Arlington State College. Official dates are July 30 to August 14.

The first three days will be given over to organization and practice flying so that participants can get better acquainted with the particular brand of thermals originating from the Texas plains and the terrain of surrounding country. Competitions will be held for: National Soaring Champion, Feminine National Soaring Champion, National Championship Soaring Club, National Aerobatic Champion, and Texas State Soaring Champion. Other events of interest will be meetings of members of the Soaring Society of America, joint technical sessions with the local chapter of Institute of the Aeronautical Sciences, special air shows, test and measurement flights of various types of sailplanes, and a series of social events.

All in all it should be a bang-up affair. We who have had occasion to visit with the Texas Soaring Association look forward eagerly to these two weeks. Those who haven't had the opportunity are urged to make plans. The pleasant taste of Texas hospitality lingers on for a long time.

New Sailplane. A newcomer to the National Contest this year will be the RJ-5 high-performance sailplane that has lately been undergoing finishing touches at the Engineering Research Station of the Mississippi State College. The design of the sailplane was originally laid down by Harland Ross, who last January attained a record altitude of 24,600 feet above release with a passenger, and Richard Johnson, holder of U. S. distance record for two-place sailplanes. The ship has an all-metal wing and wood fuselage. The span is 55 ft. and the aspect ratio is 24. Unusual features of the ship include the use of spoilers for lateral control in conjunction with small ailerons, called feelerons, the purpose of which is to retain some stick loads and thus give "feel" to the stick. Dive flaps are used for glide-path control instead of habitual spoilers. Gross weight of the ship is 600 lbs., and the exceptionally clean aerodynamic form coupled with a laminar profile wing give it an estimated glide angle of 35 or 40 to 1. With this sailplane, Johnson should be able to break the present distance record of 465 miles.

And in California. At Gus Briegleb's Gliderport, El Mirage Field, Adelanto, Betsy Woodward and Jim Carr reached 17,800 feet using standard-wave lift over the Sierra Madres, 15 miles south of the field. Gus, who is well known as designer and builder of the famous BG sailplanes (*Continued on page* 83)

OPPORTUNITY

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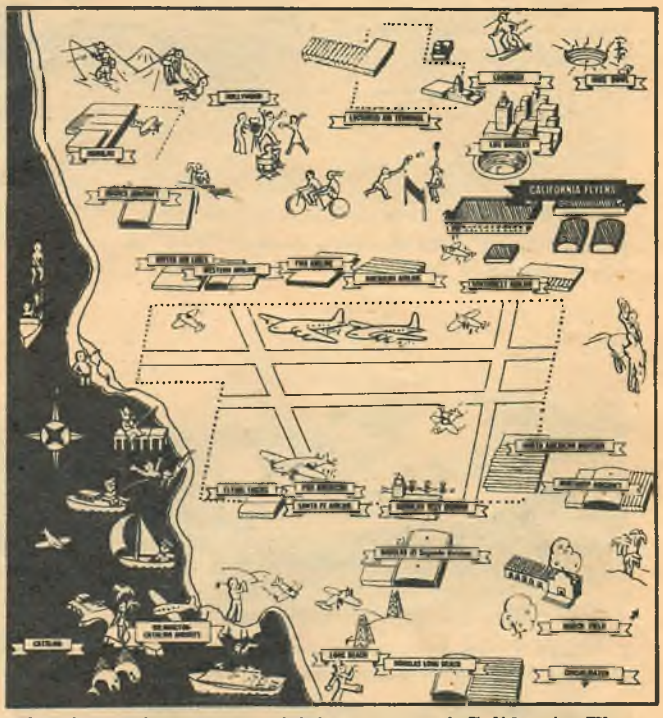
This map is important!
Please study it carefully



The shops, classrooms and laboratories of California Flyers close to the busy Los Angeles Municipal Airport. Nearby are the plants of Douglas, North American, Hughes Aircraft and Lockheed. Muroc, and other great testing centers, are but a few hours away. Close by are some of the world's finest recreational facilities for your week-end relaxation.

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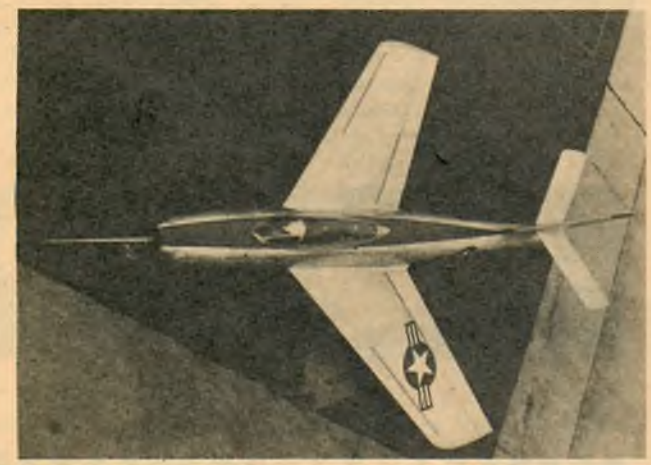
Development Highlights

● Latest model of the Goodyear Aircraft "Duck" equipped with NACA type hull for faster take-off. Sketch on left shows step modification as compared to old type hull in right sketch. This planing-tail hull eliminates porpoising and shortens take-off run considerably.

● Piaggio P. 136, five-place all-metal Italian amphibian. Powered by two 215 hp Franklins. Span 43 ft. 11 in. Top speed 175 mph.

● Sikorsky H-19 helicopter. Used by AF for air-sea rescue and cargo work. Pilot cabin directly under rotor. 600 hp engine in nose.



● Republic YF-96A, a swept-wing version of the famous F-84-E. Span 34 ft., length 38 ft. Powered by an Allison J-35. Wt. 25,000 lbs.

● Super Constellation. 18 ft. longer than standard, has more powerful engines. Cruises at 330 mph. Recognizable by square windows.

● A new winged tow target glider designed by Chance-Vought Aircraft. Has been towed at speeds in excess of 450 mph at 35,000 ft. by North American B-45 bomber. Has 19 ft. length, span of 24 ft.; equipped with tricycle gear. Note bi-furcated rig for towing.

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See for yourself the Record of Northrop Graduates... Here in cold black and white are the facts on *Northrop* graduates over a period of 18 months. This "Graduate Employment Report," compiled by the *Graduate Placement Department* of Northrop Aeronautical Institute is a printed record of the constant demand for *Northrop*-trained men throughout the Aviation Industry.

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*Jim R. "Thanks to you for starting me off on this immensely interesting field of helicopters. For your satisfaction and mine, too, J (another Northrop graduate) and I received a healthy raise the 15th of April."

*Robert B. "I wanted to let you know how much I appreciate your help in securing this position. I work in the Missile Flight Test and Analysis Department and am very satisfied with the type of work. Mr. (another Northrop graduate) is also employed in the same department, and Mr. (still another Northrop graduate) of my own class is here but in another department. We're looking forward to seeing future Northrop graduates down here."

*Roy B. "I have been working for (name of aviation firm) and have been putting in some terrific overtime. We manage all the way up to 70 hrs. a week and it doesn't make anyone angry either, with time-and-a-half and double time."

*These are actual quotes from only a few of the letters on file in the N. A. I. Graduate Placement Department. Names are abbreviated out of respect for personal privacy.

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air notes | AVIATION TODAY AND TOMORROW

Fast Props: The airplane propeller, once thought likely to become obsolete with the general advent of sonic speeds, may receive a new lease on life that will keep it spinning right past the speed of sound, judging from descriptions of high-speed propeller research at United Aircraft Corporation.

It had been generally believed that props would not be able to compete with pure jet propulsion at speeds much faster than 450 miles an hour, but, say United's Hamilton Standard engineers, four years of fast-prop research have shown that propellers are capable of driving planes at 600 mph and may soon be able to operate efficiently even faster. That is good news for the air transport people, because use of props on high-speed planes would mean longer ranges and higher payloads, with shorter take-off and landing runs needed.

More than 2,000 hours of testing have been chalked up by Hamilton Standard's turbo-props. Strange designs, including boomerang and motorboat-prop shapes, have been tried, but best so far is simply a thin-as-possible version of the standard square-tipped rectangular shape.

Testing: The variable-incidence-wing Martin XB-51 three-jet bomber, through its first 50 hours of flight test in record time, underwent stiffer phase-two tests by an Air Force pilot at the company's Baltimore airport. USAF's first jet plane designed specifically for ground support, the XB-51 thus far has made record time along the lengthy route from design board to production.

Also making progress in flight tests are two USAF fighter possibilities of the future: a sweptwing version of the Republic Thunderjet, designated the YF-96A, and Convair's XF-92A delta-wing interceptor which has been undergoing high-speed evaluation tests under the deft hand of Captain Charles Yeager who flew the Bell X-1.

The world's first turbo-prop flying boat, Convair's XP5Y-1, which made its initial flight late in the spring, is now on a program to prove its design and experimental equipment, including a central-pressure refueling system and new-design gas turbine compressors.

Flight under overload conditions is next on the test docket for the YC-124A Globemaster II transport, also at Muroc.

1950 Plane Procurement: The Boeing B-47 Stratojet bomber, number one item on USAF's fiscal 1950 shopping list, is coming out in a more powerful version with increased range and load capacity, droppable wing tanks, and the latest bombing and navigational radar. It'll also have RATO (liquid Rocket-Assist Takeoff) which gives more thrust than old-style JATO. Orders for 82 Stratojets and 49 long-range B- and RB-36's, only other bomber on the list, indicate USAF is sticking, for the present at least, to existing planes for its heavy armament.

Bulk of the 1950 procurement of 1250 planes was fighters, where proven designs also dominate, among them F-86 Sabres and F-84 Thunderjets with new droppable wing tanks to extend their range beyond 1,000 miles; F-95 interceptor version of the Sabre; Lockheed F-94 and F-97 radar interceptors developed from the F-80; and Northrop's F-89 Scorpion all-weather fighter.

Other USAF orders for the year were for C-97 and C-124A transports, several different trainers, Grumman SA-16 rescue amphibians, and Piasecki rescue helicopters.

On the Navy side, with 798 planes ordered, Grumman F9F-4 Panthers topped the list. Other fighter acquisitions: McDonnell jet Banshees, Chance Vought F4U-5N's, and Douglas F3D-2's. Lockheed Neptunes and Martin P5M's in the patrol bomber class; Grumman, Douglas, and North American attack bombers; and Piasecki HUP 'copters complete the bulk of Navy buying.

The Wind and the Rain: The wind tunnel, long familiar in aeronautical research, has been given a new twist by Douglas engineers. Rain has been added. Any type of rain, from light mist to tropical cloudburst, can be simulated in the Douglas tunnel, with winds ranging from zero up to 100 miles an hour. This enables test engineers in a cockpit mockup to study windshield visibility on all types of "wet" approaches.

Winged Bull's-eye: A new tool for gunnery training that will help to make sharper sharpshooters out of the Air Force's jet fighter pilots is the recently developed Chance Vought X27A winged tow target, to be pulled behind jet planes as fast as 450 miles an hour. Twice as speedy as banner targets, which are limited to about 200 miles an hour by their own turbulence, or cone-shaped sleeves, which can do about 250, the new all-metal target has the added advantage of reality.

With a 24-foot wingspan, it resembles a full-fledged glider, so simulates airplane appearance, and being metal reflects radar well for detection. When a pilot hits the metal target the path of his bullet is clearly shown. From this, the position of the attacking plane can be gauged and effectiveness of various flight patterns at high speeds and altitudes judged.

Higher Flyer: No bombers in the world can fly 60,000 feet high at present, but when such are developed, the Army will have an anti-aircraft rocket ready to meet them. So General J. Lawton Collins, Army chief of staff, said recently. He reported such rockets are in "advanced stages of development" and also revealed work on a guided missile "which gives promise of attacking planes at even greater ranges" than the rockets.

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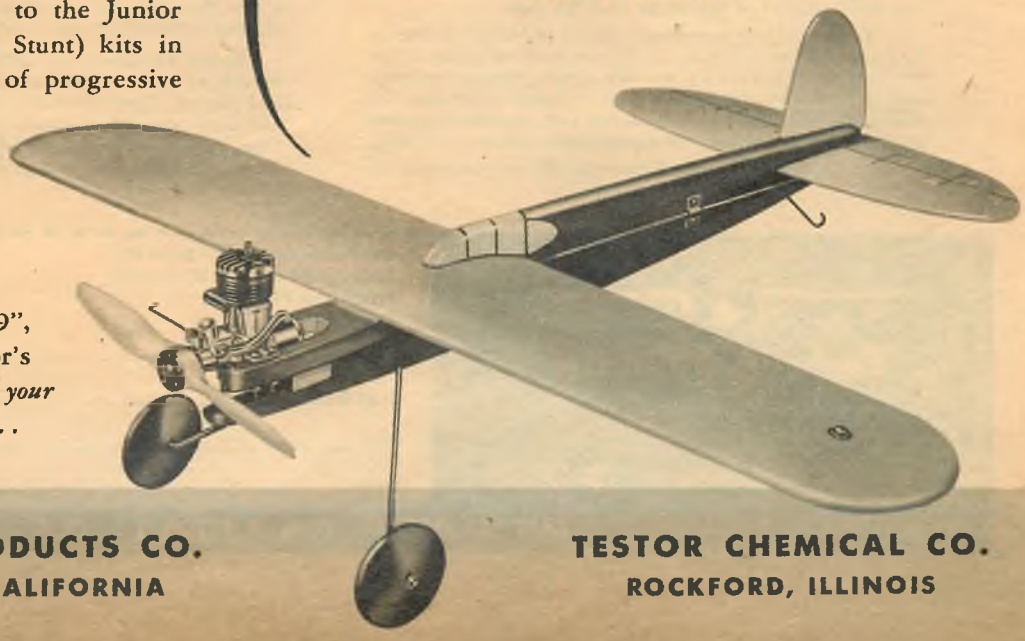
(TESTOR'S FRESHMAN "19" TRAINER)


(McCOY "19" ENGINE)


(McCOY "19" PROP)

(TESTOR'S "39" FUEL)



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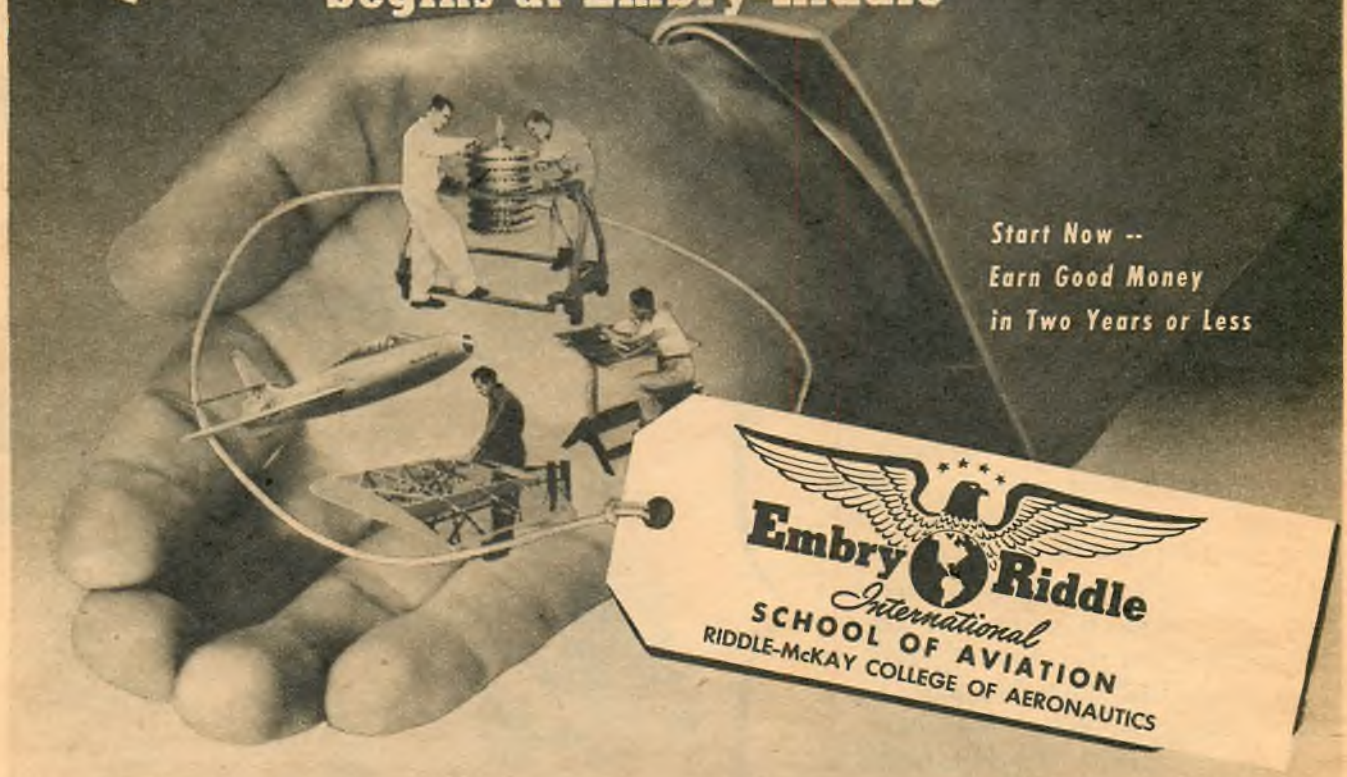

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TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

AIR TRAILS
AUGUST, 1950

What Happened to the Great American Aircraft Industry?

This is a jet-powered airliner, the Avro "Jetliner" built by Avro-Canada. It is the first transport plane in the Western Hemisphere to use turbo-jet engines. These are four Rolls-Royce Derwent V's of 3,200 pounds' thrust each. The Jetliner can carry 40 to 60 passengers in a large, comfortable cabin which maintains sea level altitude up to 21,500 feet in contrast to American transports which are pressurized at 8,000 feet when flying at 21,500. The Jetliner flew 450 miles from Montreal to New York City in just under 1 hour; normal transports take 1 hr., 45 min.

This is New York City, business capital of America. Most Americans believe that their nation has the greatest aviation industry in the world —an industry which embraces the most progressive manufacturers and the best in aeronautical brains. How, then, could first honors for a jet-powered transport go to the Canadians instead of to our own fabulous aircraft industry? In the race to get a jet liner into the air, Canada won hands down. United States designers had not passed the "doodling" stage when the Jetliner appeared. Our hat's off to the Canadians.

An Air Trails "Phototorial" with picture by Avro-Canada and text by Æsop: "We may often be of more consequence in our own eyes than in the eyes of our neighbors."

● Prewar Pietenpol Air Camper. Still flying, powered by a 60 hp Franklin.

● Another vintage craft still in use. Modified 2-place Pietenpol, 40 hp Salmson. Has flown all over Oregon.

● Built in 1933 by A. Becker of N. Y., this Pietempol had Ford engine; now has Continental.

● Postwar design, Bogardus' Little Gee Bee. Shown below over Long Island.

● Modified Heath with larger wing and Heath B-4 engine, 30 hp. Had improved landing gear, leading edge tanks.

● Yates geodetic structure plane, the Striper, built in '30. Had 4,600 hours when retired.

The Home-Bilts Are Back

By WILLIAM WINTER

● G. Yates and twin engine, 3-pl. geodetic plane: 2 were built and flown.

● Typical meeting of home-builders at Beaverton Airport, Ore. The field was mecca for home-built craft before war.

● Prewar Flying Flea built by Frank Easton at Beaverton. Was powered by 32 hp Cherub.

● Built from Cub parts and flown since the war in Plainview, Tex., this plane has 75 hp engine.

● No longer flying, this standard 2-pl. Pietenpol employed Ford A engine. Was available in kits. Wingspan 28 ft.

● Rupert Special, not in circulation. Had 40 hp Salmson, cruised over 100 mph.

● Postwar Thalman Special, Salt Lake City .41' span, 65 hp engine. Lands 30 mph with flaps.

● Prest Baby Pursuit, powered by 60 hp Lawrance. Still flying, this plane is used by its owner in Calif. for farming.

● Krum-Sheppard low wing, powered by 65 Velie. Prewar; no longer in air.

You just can't keep a good home-made plane down; if you've dreamed of building your own here's the dope

■ When, on a hot August afternoon in 1947, George Bogardus, president of the American Airmen's Association, climbed his home-made *Little Gee Bee* out of Portland's Division Street Airport and headed east on the second of his "missions to Washington," the cause of the home builders got a terrific boost. The Little Gee Bee not only paid an effective call on the CAA in the nation's capital, making the first transcontinental flight in history by a home-built, but went on to New York and Boston, then flew back west, landing at forty airports and many pastures, visiting diehard members of the organization that had championed the "hopeless cause."

Earlier, in 1946, a special meeting of the "Triple A" in desperation had voted all funds to Bogardus and sent him to plead the amateur's cause with CAA. Now, less than two years later, it was possible to make the same trip legally in a home-made aircraft to work for still broader regulations.

As recently as last December CAA advised the Triple A that not only were home-built aircraft eligible for experimental certificates, but that eligibility requirements had been greatly amended to allow experimental certification of ships made from sets of drawings, or even kits of rough materials, provided all fabrication is completed by the home builder. The main requirement is that the project be undertaken for educational or recreational purposes. CAA has written a more realistic sample CAR for CAB consideration which it hopes to see enacted into the official rules and regulations.

Things may become better but they never will be the same as when the Pietenpols, the Heaths, the Corbens, and the many other glamor home-builts of yesteryear lifted their frequently overweight and underpowered structures from cow pastures all over the country. There were some good ships then but in general the movement was plagued by a lack of good engines (though the Ford conversion, with a 200-pound penalty for a Pietenpol, was as reliable as anything running today, and so was another exception, the Salmson), by inadequate flight experience of the would-be birdmen; and by a generally unenlightened use of poor and sadly inefficient

● Redesigned Driggs Dart, by Jack McRae of Long Island. Cessna l. g., 65 hp Lycoming.

● Long Harlequin, engine and prop built by Les Long and used on his Longster plane. Weighed 90 lbs, had 30 hp.

● Bogardus refueling his Little Gee Bee at Salt Lake City after trip East.

● Modified Pietenpol with 65 hp Velie. Plane so rigged it could not spin.

● Cockpit view of Begardus' Little Gee Bee. Stable Plane, good performance.

● A. Campbell, Iowa, still flies this 65 hp Lycoming "Piet." Climb 1000 ft. min.

● 1932-built, now hangared, Lark had 65 Velie, seated 2 side by side.

● Still active is this Corben Baby Ace from Chicago. Has 9 cyl., 40 hp. Salmson.

airfoils, such as the Clark Y with its bad stall traits.

Today's home-built, on the other hand, benefits from modern stable airfoils, good engines, better structures—and who hasn't or can't get flight experience? Consider Little Gee Bee.

A redesign of Les Long's famous *Wimpy*, which Bogardus obtained in assembly form from another enthusiast, it ordinarily would have set him back about $500, including good instruments, wheels, brakes, and propeller. He picked up a 65 hp Continental from a wrecked 1946 T'Craft for $75. Add another $75 for new parts and magnafluxing. Mags and carburetor he had already collected. As a true home-builder, Bogardus isn't apt to beef that his finished ship is not worth the same as an NC'ed job. Little Gee Bee has been going ten years and still does not need a recovering job. Amortized over a ten-year period, such a ship would cost $75 a year including overhaul if it is flown 100 hours a year.

Spanning less than 30 feet, the Little Gee Bee has a nice cruising speed of 105 miles an hour, yet lands at 40 without float, can do 121, climb a spectacular 1,200 feet per minute, attain 25,000 feet altitude, yet range 325 miles. Ailerons are effective and the stick loads provide feel of the ship, unlike many old-timers whose light stick loads led to overcontrol, overloaded structures, and difficult landings. Long's Wimpy—still in one piece—cruised 70 miles an hour on only a 26 horse Aeronca. Many a pilot soloed Wimpy after an hour or two dual. Nor are these exceptions.

The Rupert Special, a cute parasol with open cockpit and Salmson motor, probably flew more hours than any home-built in history in the 12 years up to 1942. On 55 horses, it stepped along at better than 100 cruise and had a really terrific climb of 2,000 feet per minute. With it, Rupert won the "Pilot of the Year Award" for 1938 in Oregon, reaching 18,000 feet in one event. Years ahead of its time, the Rupert Special had slotted ailerons that gave real fingertip control, a split oleo gear, a truss system in its welded steel tube fuselage which was later used in factory craft. Basically, it was the old Heath, strengthened and refined.

Still kicking around is at least one of the seven little Prest Baby Pursuits designed and built prior to 1930. With a 45 hp Szekeley, one Prest set an FAI record in its class of better than 100 miles an hour. A wealthy West Coast farmer uses a rebuilt Prest to commute between his various holdings.

How safe are the home-builts? In Oregon—where until recent years state law said merely that a plane must be airworthy, and asked for a brief empirical stress report on conventional structures and a sandbag test on ones that were unconventional, and flight tests for stability and control—there were for years more private planes per capita than in any other state. Over a ten-year period there was not one fatality due to structural failure of a state licensed craft, and this includes the many home-builts that were turned out in that last strong-hold of the amateur. Nevertheless, many home-builts were not safe.

Engines like the early Hendersons, Szekeleys, Anzanis, Velies, and so on, might stop any time, freeze up, or even fly apart. Before 1930, the heyday of the famous home-builts that were made by the hundreds if not thousands from plans and kits, you had a choice of the three-cylinder Anzani or Szekeley; of various V-twins and straight four motorcycle powerplants; and the then war surplus Lawrance.

The V motorcycle engines were so rough they were limited to snowsleds. The straight fours were better but overheated because no one knew much about air scoops and cooling baffles. The planes themselves were overloaded so that continuous full-throttle operation was necessary. Cross country often consisted of a series of three-minute hops terminated by a succession of forced landings.

The imported Anzani invariably burned off its head within two or three hours. The Szekeley threw con rods, crankshafts, cylinders and heads. Appearing about 1930 but not in real production until 1935-36, the Continental 40's eventually hit the home-built field via factory plane crack-ups. Today Franklins, the very reliable Lycoming, and the Continental 65 hp engines may be picked up second hand at prices ranging from $100 to $200. You can shoot for an empty weight of 400-500 pounds, and get as much as 1,500 to 2,000 feet per minute climb from a smooth dependable engine.

Though the majority of home-built planes before the war were poor flyers, both because of engines and aerodynamic layout, there were some remarkably safe designs. George Yates' first geodetic, built before 1930, could not be spun. When war broke out this ship had 4,600 hours and had worn out three engines. Most of the Oregon home-builders soloed on this plane at Beaverton Airport. Buz Johnson rigged a Pietenpol that could be spun only with difficulty. In most flying you try to stay level, or to bank in order to turn. In a good airplane this is done with aileron, and directional and longitudinal stability is handled by the stabilizing surfaces. In kits and plans of yesterday these often were mysterious fine points. Today and tomorrow, home builders would demand such features.

What problems does the home-builder face? Design, for one. The home-made (*Continued on page* 66)

The CAA's View . . .

CAA has no written specifications for home-built aircraft, because they have appeared in such widely varying samples that it has been impossible to get them into the framework of strict regulation. Our Safety Regulation Release No. 236, for example, merely says that the Administrator may give a certificate to a home-built aircraft.

The award of such a certificate is left to the Aviation Safety Agent in the field, and he is guided by an administrative manual of procedure which seeks to give him the broad policies governing his decisions.

We are not eager at all to say that if thus and so are done, then the plane which results will be eligible for an experimental certificate of airworthiness. The matter is never that simple. There are many attempts at home plane building which we would never recognize, nor look favorably on even a taxi test. At the other extreme are really excellent jobs built by skilled engineers and mechanics for special purposes, and we willingly recognize their ability and workmanship and grant the certificate.

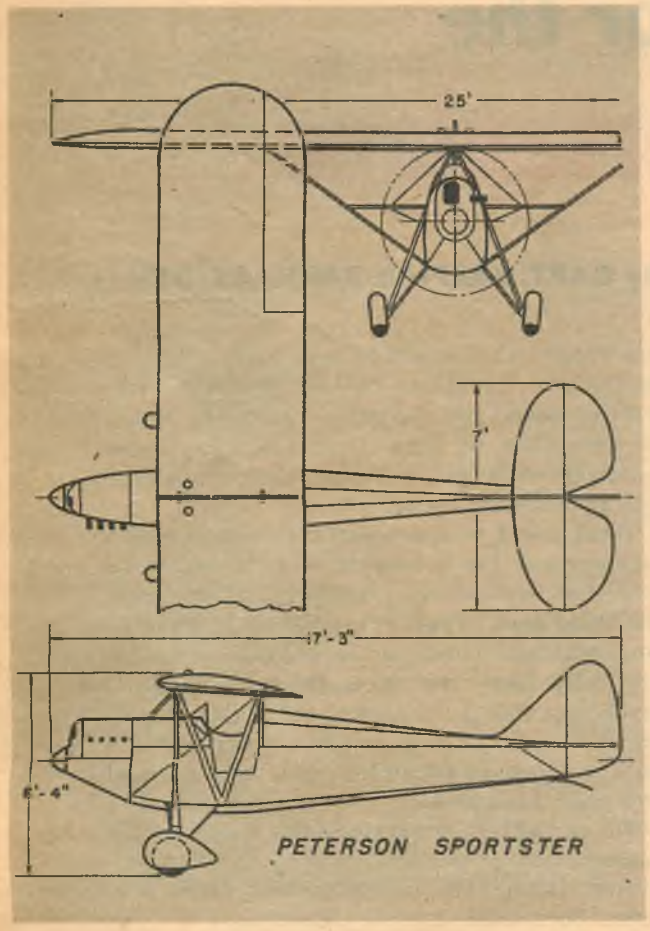
Between these two extremes lie the majority of home-built planes which are submitted for certification, and in these cases the judgment of the Safety Agent is the basis upon which a certificate is granted or refused.

The Agent may require flight demonstrations by the builder, and he may want to examine the aerodynamic features of the plane. (*Continued on page* 67)

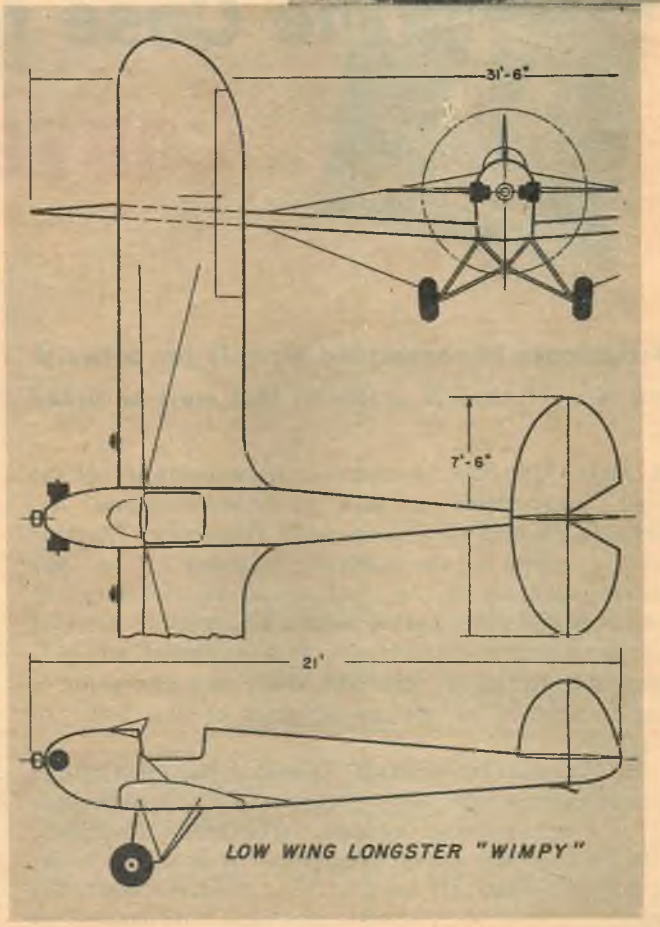
● Long Longster, 26 hp Aeronca. Span 30 ft., lands at 33 mph. Retired.

● Harth Special, a postwar model, has Davis airfoil, cruises 75 mph. on 3[illegible] hp.

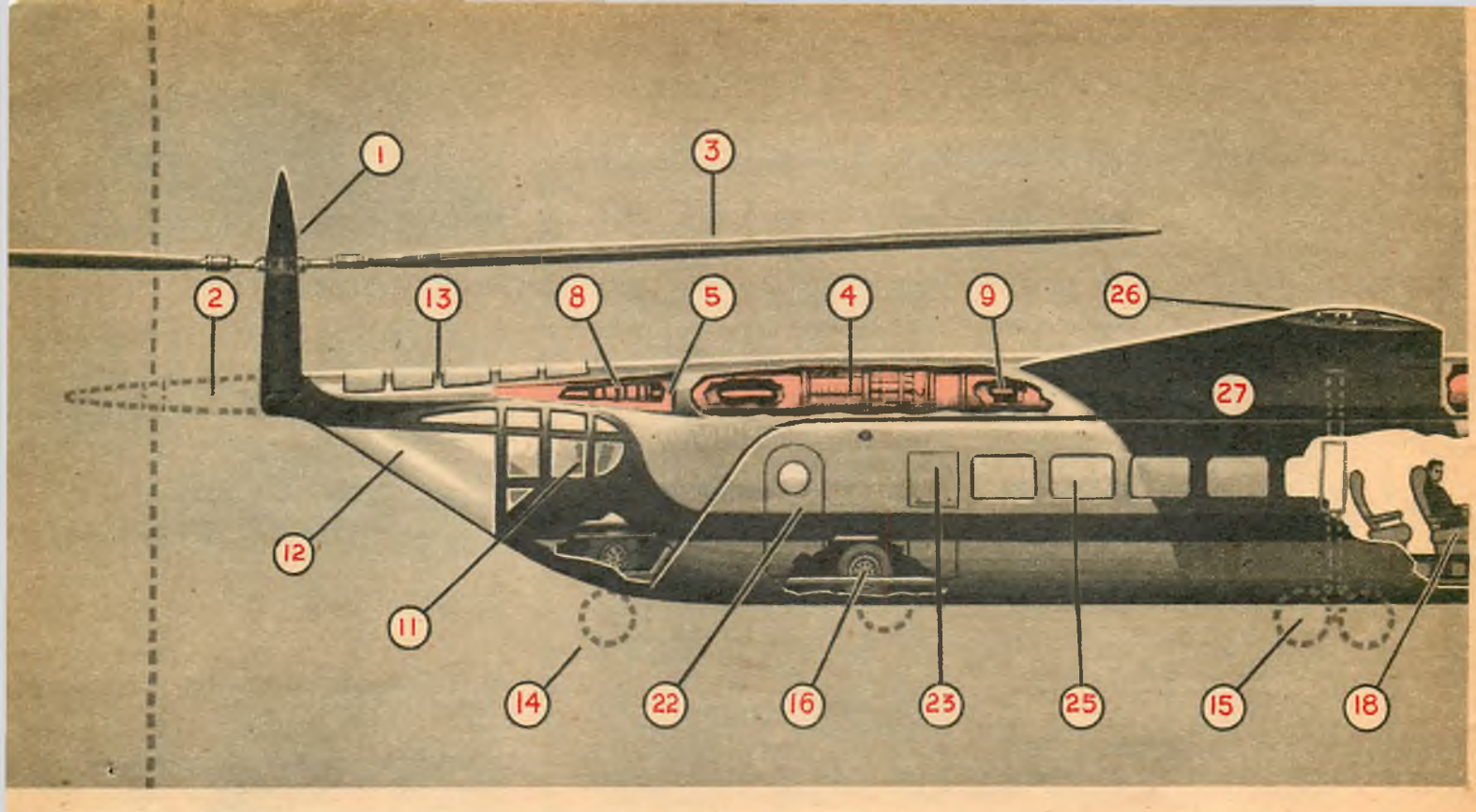
● Long's Wimpy, 26 hp Aeronca. No longer flying. Shown below in 3-view.



PETERSON SPORTSTER



LOW WING LONGSTER "WIMPY"



The Case for the Convertaplane

By CAPT. RALPH S. BARNABY, USN (Ret.)

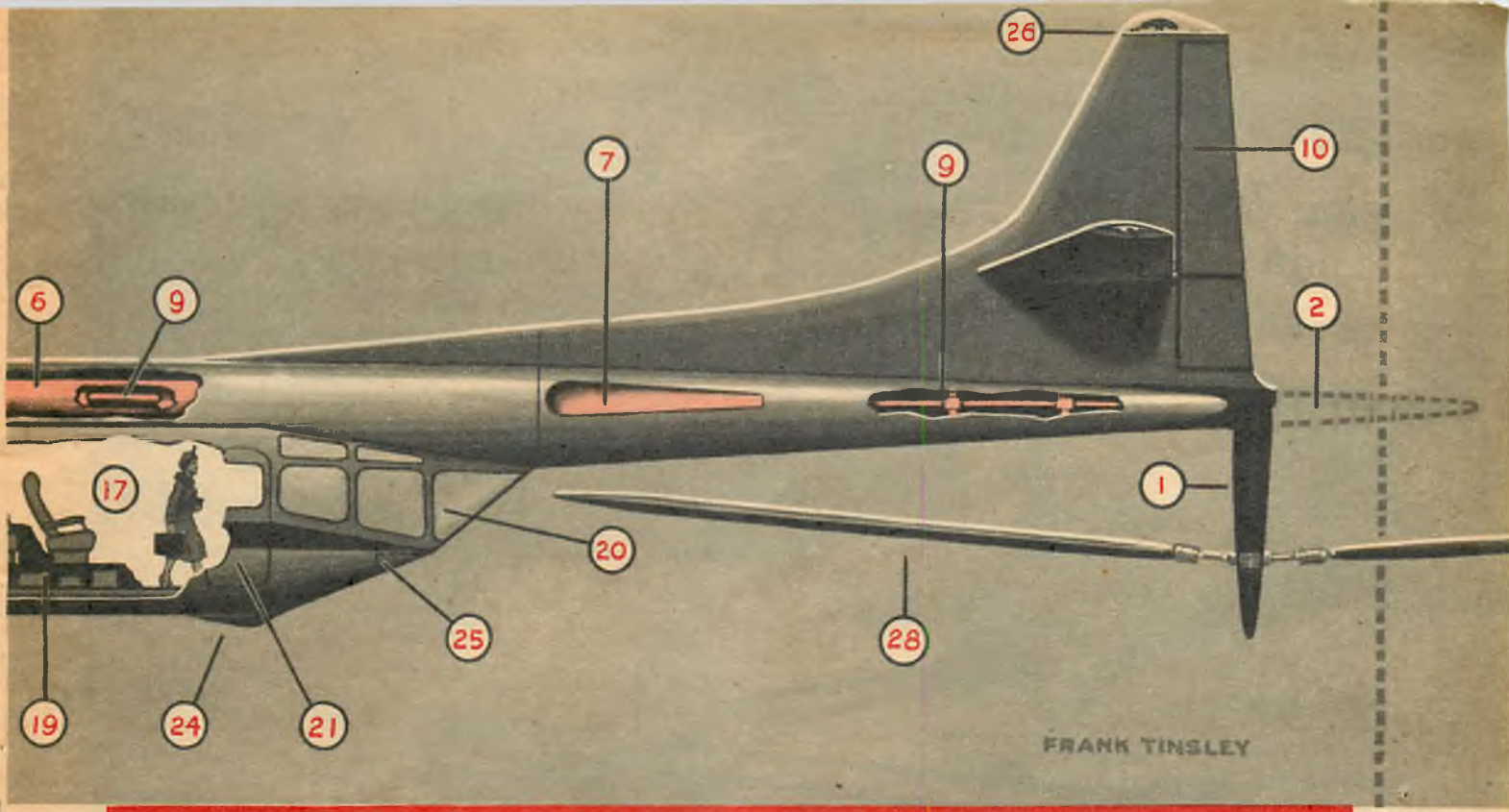
Advantages of convertible aircraft far outweigh the many technical problems that must be licked

■ During the past 18 months, the appearance of the term "convertible aircraft" or "convertaplane" has been mentioned with increasing frequency. Starting with a paper on the subject presented at the 1949 annual meeting of the Institute of the Aeronautical Sciences and culminating with a Convertible Aircraft Congress held in Philadelphia last December, an ever-growing amount of technical study and discussion is being devoted to the possibilities of this form of aircraft.

By "convertible aircraft" is meant the form of flying machine which may operate either as a helicopter or as a conventional airplane. The modern airplane can fly fast and fairly effectively. It is controllable, stable and relatively easy to fly at normal speeds; but stalling and landing speeds are high, and control at low speed leaves much to be desired. The helicopter, on the other hand, can rise and descend vertically as well as hover. Its control is practically independent of speed, but its high speed and fuel economy are relatively poor and it is comparatively unstable, requiring constant flying.

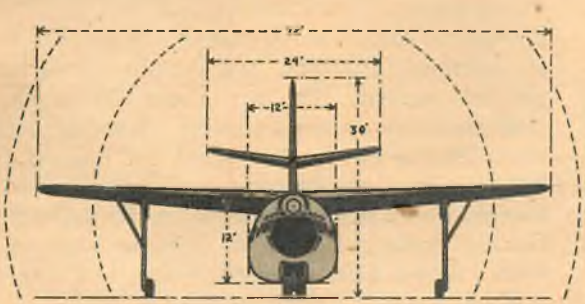
What could be more natural than to combine the airplane and the helicopter so as to realize the good points of both without adopting, at the same time, their bad ones. That, in a nutshell, is the idea of the convertaplane. Imagine an aircraft which may rise vertically from restricted areas and hover over a given spot like a helicopter, but which at your command can fly like an airplane from place to place with an airplane's stability, piloting ease, fuel economy, and high speed.

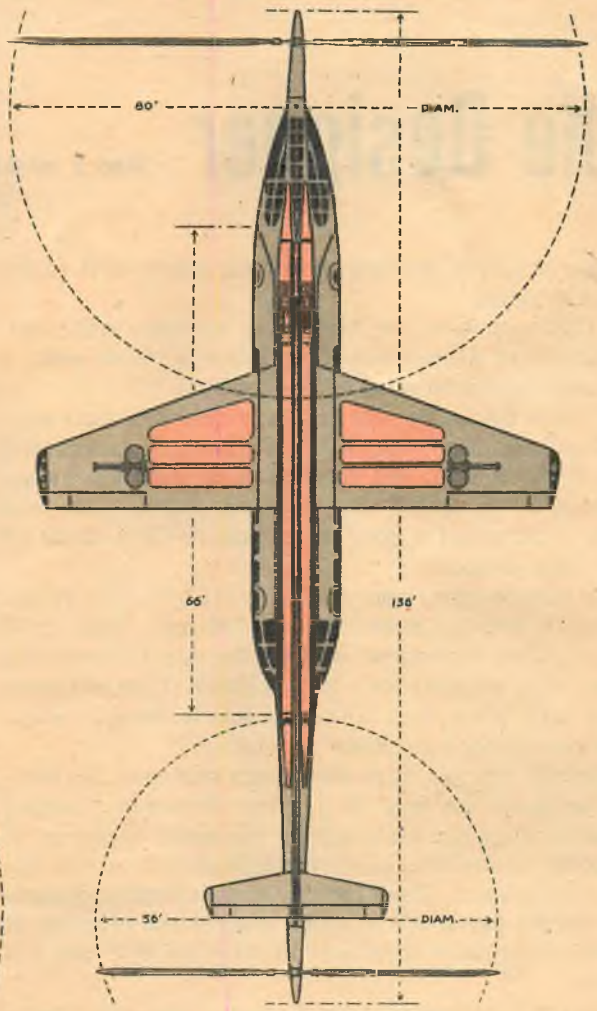
We can afford to overlook the relatively high fuel consumption of the craft when operating as a helicopter, taking off, hovering, and landing, because these operations are of (*Continued on page 81*)



CONVERTAPLANE CUTAWAY KEY

1. Rotoprops in vertical position act as helicopter rotors.
2. Rotoprops in horizontal position act as plane props.
3. Three-bladed main rotoprop—80' in diameter.
4. Twin propjet gas turbines.
5. Flush air inlet on each side for turbine.
6. Twin tail pipes for jet exhaust.
7. Flush exhaust outlet on each side.
8. Central reduction gears permit engines to be used singly or together.
9. Coupled drive shafts connect gear box to both rotoprops.
10. Smaller control areas used only at hi-horizontal speeds.
11. "Front office" connects with door in end of bus body.
12. Full vision Plexiglas nose.
13. Top vision windows in shaft tunnel.
14. Dual nose wheels retract into pilot's compartment.
15. F-91 type tandem main wheels retract into wings.
16. Dual bus wheels for ground towing of cabin.
17. Detachable airbus seats 40 passengers.
18. Passenger seats face rearward for safety.
19. Stowage space for hand luggage beneath seats.
20. Extra fare observation bay seats four.
21. Rear exit door on each side.
22. Forward emergency exit doors on each side.
23. Outside hatches facilitate mail and cargo loading.
24. Safety skids.
25. Large rectangular windows permit good view.
26. Radio antennae in plastic fin and wing tips.
27. Fuel tanks in inner wing panels.
28. After rotoprop—56' in diameter.





The Designer

And a mighty important man he is in the world of aviation

■ George Doyle dreams of the day when he'll really get a toughie.

"This airplane," he hopes the problem will read, "must carry 60 persons 2,000 miles at three cents a ton mile and land on a 6,000-foot strip."

George thinks he will be ready. He will start with fuel consumption. He will calculate the power and figure the weight. He will come up with the dream passenger transport. By then, of course, jets may have superseded turbo-props and he will dash off on a new tangent.

Or maybe the specs will say: "5,000-mile range, carry 10 two-ton bombs, cruise 500 mph, land at 80 mph." That, of course, will be the Air Force laying down requirements for a new bomber. George's company will want very much to win a design award, and eventually a production contract.

George, you see, is in the design business. No matter whether he now is tracing drawings, making drawing changes, undertaking assembly drawings or actually supervising an entire department, he will remain a designer. Each tedious step, including designing simple detail parts, looks toward the creation of a better airplane than any in its class that yet has flown.

George is representative of those chaps who graduated from an aviation technical school two, three, four years ago. He's on his way up rapidly, for he has the benefit of a concentrated engineering training designed to push him along fast. It's up to him now.

It wasn't long after enrolling in technical school before George realized engineering training could start him in any of 50 directions. What lay ahead? Let's look briefly at a few jobs.

Engineering designer. Perhaps seven years' schooling and experience. He'd have to show considerable initiative, for this field involves complex problems of design. He'd have to be more than ordinarily dependable and accurate. But job conditions are good, with no disagreeable elements. And he might earn $630 a month, before going on up the ladder to better things.

Flight test engineer. Another year—make it eight. He'd have to come up with new ideas, make decisions on equipment, learn cooperation and tact. He must become an expert aerodynamic analyst. He might fly in cramped quarters, and would encounter some physical hazards. Top pay, about $630 a month.

Mechanical design engineer. Another eight-year stint. But he eventually would find himself developing new ideas, working independently in a field where success would depend upon ingenuity and originality. Hazard: some gas or oil on clothing while inspecting work. About $595 a month, before tax take-outs.

Rocket motor design engineer. This classification represents a new field. Not stabilized yet, but its future is certain to be very promising.

George elected to go for (*Continued on page* 61)

MCAF (Magyar-Croatian Air Force)

Iron-curtain country steals aircraft designs to build up its air arm! Can you help us identify the plagiarized planes?

● PBF-5(1)594-Y ground attack-fighter bomber. Formidable weapon incorporating some of the best design features of American aircraft (note that the Magyar-Croatians copied craft down to the last detail, including insignia!). To obtain this picture we used a special camera capable of taking photographs through an iron curtain.

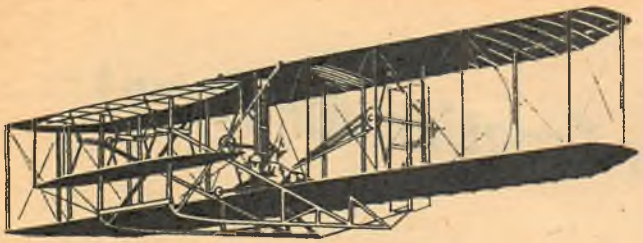
● Here's a stumper which taxed the brains of our recognition experts. A little job designed as a liaison plane and light transport for officers up to (but not including) the grade of Major, it's known as the Aero-ATF6b-10A. Powerful engine permits helioplane-like take-offs; light in weight for short landings. Suitable for ex-dictators.

● The brass-hat special, a super-deluxe plane for MCAF colonel-generals and their aides. Very fast. One of these PUC-404345's was found recently in lower Libuschke abandoned by General Slapowiczhke who fled his country after having been caught drinking the imperialistic Coca-Cola. Airplane is a direct steal from 3 U. S. designs.

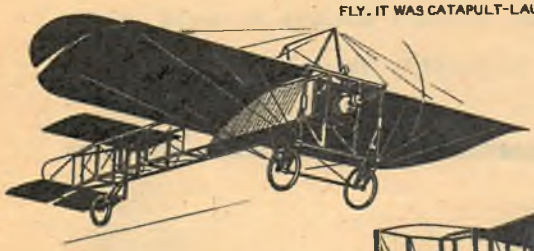
● Super-secret single-place fighter, the ADO-2335 (Mark IX). Said to be the only plane in the air today capable of flying backwards and forwards with equal speed and maneuverability. Hybrid incorporates design features from 3 countries. MCAF engineers took liberties with power plant since it appears to have 8 cylinders.

Check your answers with page 84

Air Progress



▲ 1903 ORIGINAL WRIGHT 12-H.P. HORIZONTAL 4-IN-LINE WRIGHT ENGINE. FIRST AIRPLANE TO REALLY FLY. IT WAS CATAPULT-LAUNCHED

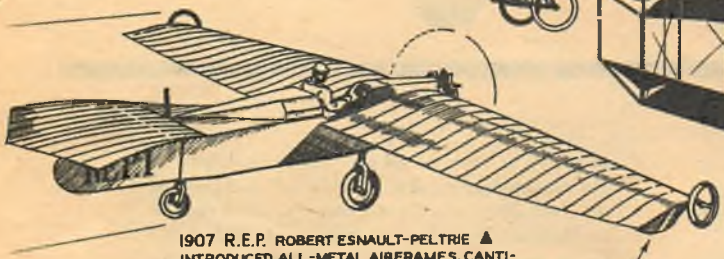


1907-08 BLERIOT PROTOTYPE OF FAMED 1909 CROSS-CHANNEL TYPE AND WORLD'S FIRST PLANE TO COMPLETE A SUCCESSFUL CROSS-COUNTRY (OFFICIALLY RECOGNIZED) FLIGHT ▲

NOTE TYPICAL HARGRAVE BOX KITE CONFIGURATION

▲ 1906 SANTOS-DUMONT (VOISIN-BUILT) 50-H.P. ANTOINETTE V-8 ENGINE.—FIRST EUROPEAN AIRPLANE TO FLY

◄ 1907 HENRI FARMAN (VOISIN-BUILT). FIRST EUROPEAN PLANE TO COMPLETE A ONE-KILOMETER FLIGHT, RETURNING TO THE POINT OF DEPARTURE BEFORE LANDING.



1907 R.E.P. ROBERT ESNAULT-PELTRIE ▲ INTRODUCED ALL-METAL AIRFRAMES, CANTILEVER INTERNALLY-BRACED WINGS, RADIAL AIR-COOLED ENGINES, THE STICK CONTROL SYSTEM AND TANDEM-WHEEL LANDING GEARS.

WING-TIP SKID

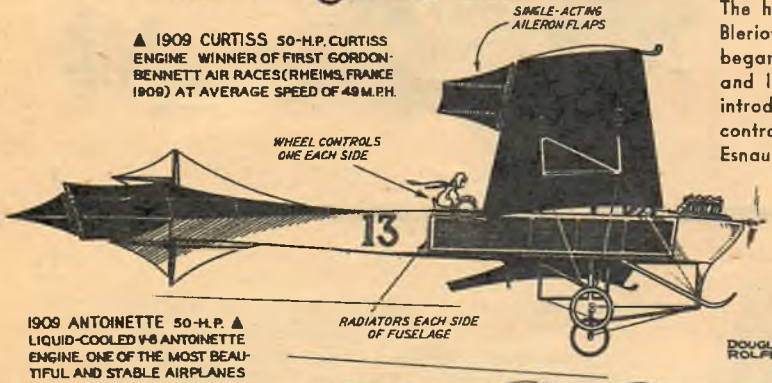
WING-TIP AILERONS

1908 CURTISS "JUNE BUG" FIRST GENUINE CURTISS ▲ DESIGN AND WINNER OF FIRST U.S. SPONSORED AIRPLANE FLIGHT TROPHY. POWERED WITH CURTISS V-8 A/C ENGINE

▲ 1909 CURTISS 50-H.P. CURTISS ENGINE WINNER OF FIRST GORDON-BENNETT AIR RACES (RHEIMS, FRANCE 1909) AT AVERAGE SPEED OF 49 M.P.H.

SINGLE-ACTING AILERON FLAPS

WHEEL CONTROLS ONE EACH SIDE



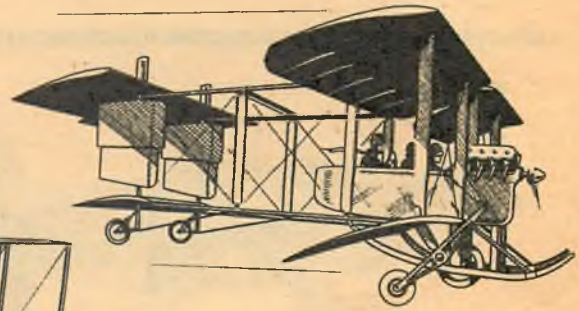
1909 ANTOINETTE 50-H.P. ▲ LIQUID-COOLED V-8 ANTOINETTE ENGINE. ONE OF THE MOST BEAUTIFUL AND STABLE AIRPLANES EVER BUILT BUT HANDICAPPED BY SERIOUS STRUCTURAL WEAKNESSES NEVER TRULY SOLVED

RADIATORS EACH SIDE OF FUSELAGE

DOUGLAS ROLFE

1909 WRIGHT 30-H.P. FOUR-IN-LINE WRIGHT ENGINE. MODIFIED VERSION OF OLD MODEL B ►

The Wright Brothers made the first successful heavier-than-air flight December 17, 1903. News of their great achievement was greeted with general skepticism throughout the world. Quietly they went ahead improving and perfecting their ideas. 1907 saw a burst of renewed activity both here and abroad. This was further stimulated by the Wrights' triumphal tour through Europe where they demonstrated the nature of their success and established many notable records for distance, speed and passenger-carrying. The heroic age of the "aeroplane" began now and such names as Bleriot, Curtiss, Farman, Santos-Dumont, Breguet, Roe and others began to appear in the news. French engineers took the initiative and led the field until the end of this era. Robert Esnault-Peltrie introduced the stick control system and Deperdussin the wheel control. Both remain as the basic forms of control in use today. Esnault-Peltrie, Voisin and Breguet developed all-steel airframes,

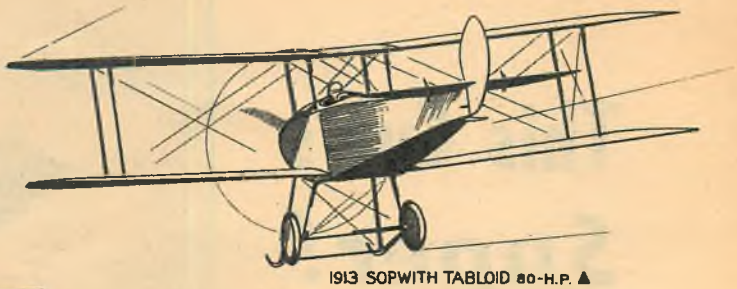


▲ 1910 BREGUET ONE OF THE EARLY EXAMPLES OF STEEL TUBE CONSTRUCTION IN WHICH THIS DESIGNER EXCELLED. MONOSPAR FLEXIBLE WINGS WERE WELL SUITED TO THE WARP CONTROL THEN IN GENERAL USE ON MOST TYPES OF PLANES

DEVELOPMENT OF THE AEROPLANE

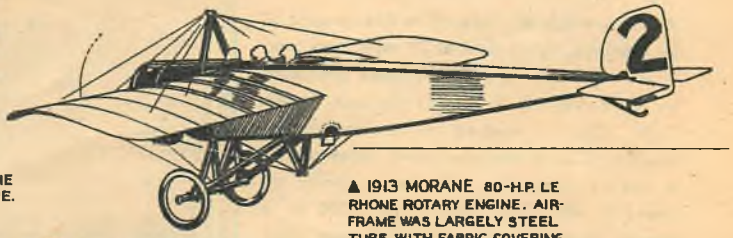
PART 3—THE DAWN OF FLIGHT

By DOUGLAS ROLFE



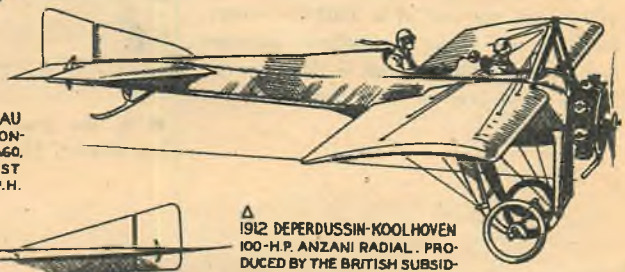
1913 SOPWITH TABLOID 80-H.P. ▲ GNOME ROTARY. TOP SPEED 92 M.P.H. LANDING SPEED LESS THAN 40 M.P.H.

▲ 1913 HENRI FARMAN 80-H.P. GNOME ROTARY. MILITARY AND COMMERCIAL TYPE.



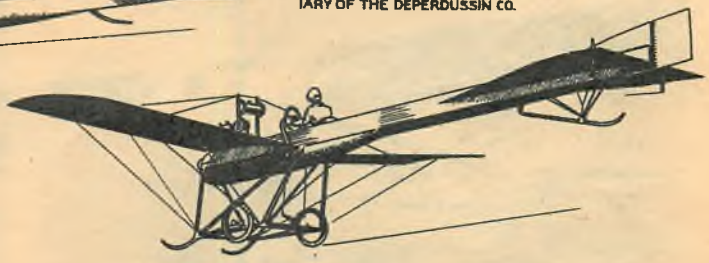
▲ 1913 MORANE 80-H.P. LE RHONE ROTARY ENGINE. AIRFRAME WAS LARGELY STEEL TUBE WITH FABRIC COVERING

1912 DEPERDUSSIN-BÉCHEREAU 140-H.P. GNOME ROTARY. GORDON-BENNETT RACE WINNER (CHICAGO, 1912) TOP SPEED 106 M.P.H. FIRST ▼ PLANE TO EXCEED 100 M.P.H.



△ 1912 DEPERDUSSIN-KOOLHOVEN 100-H.P. ANZANI RADIAL. PRODUCED BY THE BRITISH SUBSIDIARY OF THE DEPERDUSSIN CO.

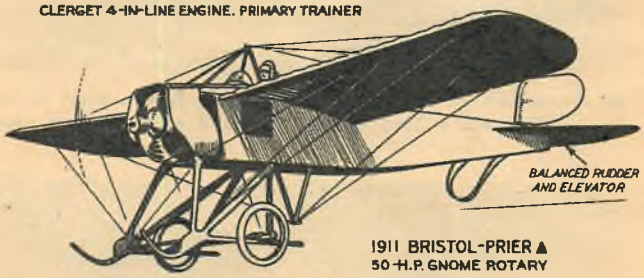
▲ 1912 AIR PROGRESS! LAST ANTOINETTE DESIGN PRODUCED, THIS REMARKABLE CABIN MONOPLANE HAD TAPERED FULL CANTILEVER WINGS, A STEAM-COOLED, DIRECT FUEL-INJECTION ENGINE AND COMPLETELY FAIRED LANDING GEAR WITH TANDEM WHEELS



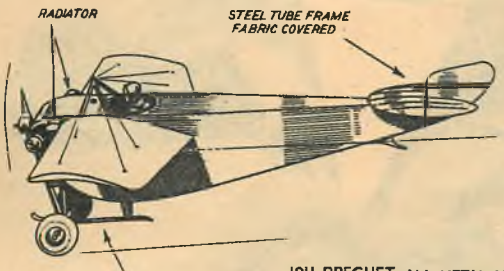
oleo and spring shock struts as well as the steerable tricycle landing gear. Bleriot made the world gasp by flying the English Channel, and so popularized his little monoplane that over 400 of these planes were sold in 1910 alone.

In America Baldwin, McCurdy and Curtiss conducted the experiments which resulted in the first Curtiss planes, one of which won the world's first international speed contest for airplanes. At the close of this period air speeds had jumped from about 30 mph to better than 120 mph, though the average remained in the 50-70 mph class. Non-stop flights of over 24 hours had been accomplished and such aerobatics as the spin, the loop and inverted flight had all been mastered. Engines were becoming increasingly more powerful and more reliable. The era which started out with practically only biplane types, saw monoplanes dominate, and bipes again and then, in the Kaiser War, the "aeroplane" truly came of age.

1911 DEPERDUSSIN-BÉCHEREAU 50-H.P. ▲ CLERGET 4-IN-LINE ENGINE. PRIMARY TRAINER

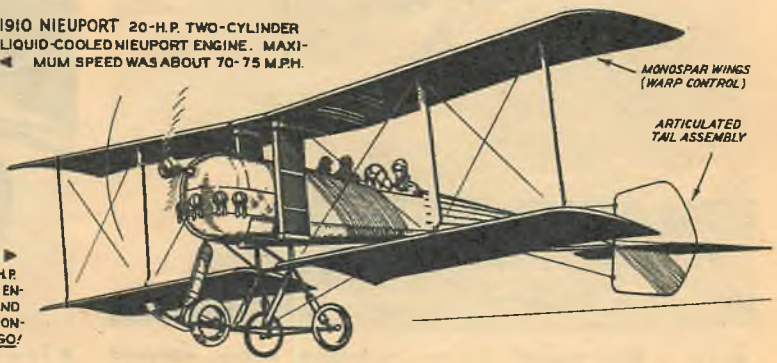


1911 BRISTOL-PRIER ▲ 50-H.P. GNOME ROTARY



1911 BREGUET ALL-METAL AIRFRAME, OLEO LANDING LEGS, 100-H.P. HORIZONTALLY-MOUNTED RADIAL ENGINE WITH GEARED DOWN PROP. AND SINGLE WHEEL TO OPERATE ALL CONTROLS — ALL THIS 40 YEARS AGO! ▶

1910 NIEUPORT 20-H.P. TWO-CYLINDER LIQUID-COOLED NIEUPORT ENGINE. MAXIMUM SPEED WAS ABOUT 70-75 M.P.H. ◀



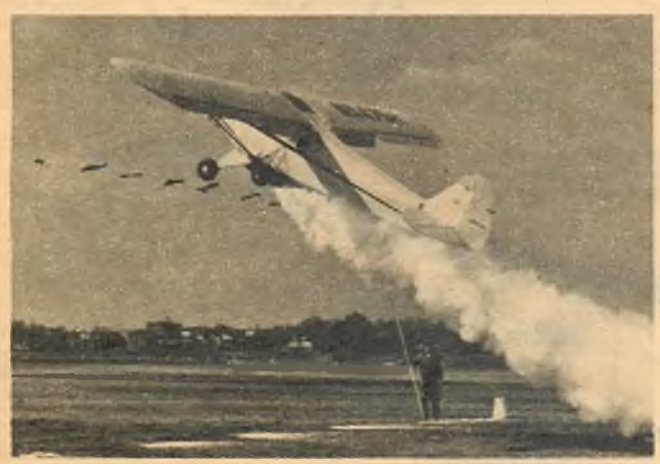
This Cub's *Super!*

A plane which will take off in five lengths of its fuselage, fly as slow as 30 mph, and land in less than 125 feet has just been produced by Piper Aircraft Corp. It's the new Super-Cub "105", a souped-up version of the familiar Cub modernized and powered by a 108 hp Lycoming. With one person on board it will climb better than 1,000 ft. a minute, and in still air will reach that altitude at the end of a 3000 ft. runway. Principal use is for agricultural purposes such as crop dusting, and in this capacity it can lift a load of more than 1,000 lbs.

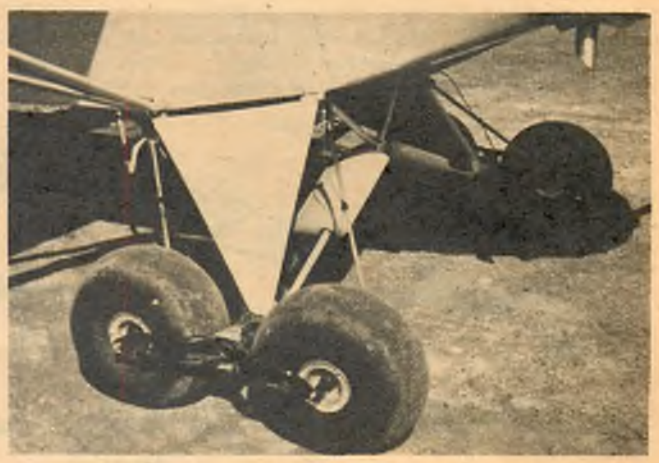
● Up she goes. The new Piper Super-Cub demonstrates its take-off ability at Flushing Airport, New York, by climbing steeply over a 20 ft. barrier after a 150 ft. run.

● The tandem four-wheel gear is optional. Permits plane to taxi over ground that's hard to walk on, and take off from snow.

● Out of the bull-rushes rises the Super-Cub showing that no condition is too rough for its remarkable flight characteristics.



● Not a Rato take-off, but the agricultural version, equipped with hopper, spewing lime. Dust-carrying tank holds 80 gals.



● Tandem gear designed by Art Whitaker of Oregon. Front wheels, without brake, carry 4 lbs. of air. Rear wheels, with brake, 8 lbs.

Solo Club

Air Trails Solo Club membership is open to all those who have soloed anytime in heavier-than-air aircraft. Use coupon below to apply

■ It was a clear windy day and headquarters had been making the rounds in a Cessna 140. In fact, it was the day that two of the staff dropped into Reading, Pennsylvania, to check on the exciting stories heard about flying clubs at that field. Leaving Reading, the Cessna had climbed steadily toward the ridges to the north. The wind was on the nose. Suddenly, miles from the first ridge, the heavily loaded little ship began to pick up altitude like a 105 hp Cub with one aboard and a light load of gas. Though nothing was touched, the ship picked up a thousand, then another thousand. After a while, it was all down. Took plenty of throttle to hold onto the original altitude.

"What gives?" asked the pilot of the co-pilot, an old sailplane man. Said the copilot, "That was a standing wave." And he told some fascinating things about this source of free lift which the sailplane pilots have lately been exploiting. And what has all this got to do with gas taxes in Louisiana?

In their series of Safety Suggestions published as a service for pilots, Beech Aircraft Corporation came up with a dilly called "Standing Waves." Now this campaign by Beech to acquaint pilots at large, particularly Beech owners, with the facts about lesser known phenomena as part of a plan to make us safer flyers, is a remarkable thing; if you can latch on to any of these "lectures," do. T. A. Wells authors this paper.

To make it brief, standing waves (see May 1949 Air Trails) generally occur on the lee side of a ridge where the slope is definitely steep and the wind usually is blowing across the ridge at, say, 30 mph. You can't see these things any more than you can see thermals, although a strato-cumulus cloud may be present over the ridge, and lens-shaped clouds may be present at the top of the wave at altitudes very much greater than those of the ridge. There may be several waves in succession; from the ridge to the first wave generally lies a stretch of two to five miles, a region of low barometric pressure which can put your altimeter and rate-of-climb in sizable error.

Alto-cumulus cloud roll may be encountered near the base of the wave, still much higher than the ridge. From the fore slope of the wave, to the fore slope of the second wave there generally lie from four to 15 miles of flying, depending on the wind velocity. As you may gather, not much is known about standing waves, despite the fact that they are of prime importance to all pilots. Wells states that, if you slam unknowingly into the down-draft side of the wave near the lens-shaped cloud at the peak, you can encounter thunderstorm velocities than can upend light aircraft and subject fast-moving craft to very high G-loadings.

What are we supposed to do about these standing waves? Mainly, hold plenty of excess altitude. In the West where you may run into well-defined ridges of ten and 12,000 feet altitude under such wind conditions, it is advisable to hold three and four thousand excess feet. If you haven't the equipment, pick another route. Settling in the down-draft area, with erroneous readings of the altimeter, can put the unwary pilot on a spot. Believing that he had sufficient altitude he (*Continued on page* 75)

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 75c, 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.....

Civil Air Patrol Newsletter

The Civil Air Patrol is the civilian auxiliary of the U. S. Air Force. Membership is open to any American 15 years of age or more of good moral character. Those under 18 serve as CAP Cadets, those over 18 are Senior Members. If you would like to join the CAP fill out the coupon below and send it to Air Trails, Box 489, Elizabeth, N. J. AT forwards it to your state Patrol Wing Headquarters; Wing HQ sends it to the CAP organization nearest your home. If you don't hear from your local unit within 60 days let us know. Get active, mail coupon now.

• Outstanding Oregon Cadets: Lt. Jack Bannister and 2nd Lt. Doris Coulter of Portland Sq. Doris is only girl officer in Wing.

Enrollment to Top 50,000

■ As midsummer approached with its Cadet encampments and international drill competition, all indications pointed toward the Civil Air Patrol meeting its quota of 50,000 Cadets actively enrolled in the CAP.

As early as last April the CAP recruiting drive had increased Cadet membership by 25 percent, and by the middle of May this figure had risen to nearly 50 percent.

First State Wing to go over the top was Wyoming, which not only reached its assigned quota of 500 Cadets, but had enrolled 519 in early April.

The indications were, according to National Headquarters, that most of the 52 Wings would go over the top in their quota assignments. The few who didn't, it was expected, would have their deficiencies made up by those States exceeding their quotas.

While National Headquarters officials were jubilant with the fine recruiting efforts of most Wings, they were also apprehensive that with so many Cadets there would not be sufficient Senior members. As Maj. Gen. Lucas V. Beau, Nat. Com., expressed it:

"The Wings, Squadrons and all units have done a marvelous recruiting job. But now that our Cadet enrollments are high we must have the Senior members to take care of the teaching of these young boys and girls in the fundamentals of aviation, and particularly to provide leadership for the hundreds of Squadrons and Flights now being activated as a result of increased membership."

C. A. P. NEWS c/o Air Trails
Box 489, Elizabeth, N. J.

I'm interested in more information on the CAP and would like to hear from my nearest unit.

Name .....

Address .....

City (and Zone) .....

State ..... Your Age .....

Air Trails, August '50

• First photo of CAP's newest Wing, Puerto Rico. Col. Orlando J. Antonsanto (lt.) commands; Maj. Gen. Lucas V. Beau, CG of CAP is in center.

CROSS COUNTRY WITH C.A.P.

Attention All Units: Is your local bank making a service charge on your CAP deposited funds? According to National Headquarters, this need not be.

While such funds are not appropriated funds, the CAP is an official auxiliary of the USAF. It is thus considered that funds deposited by CAP units are quasi-official funds and can be exempted from service charges without individual local banks violating the rules of their clearing houses.

North Dakota: It may be summer now, but a lot of people in and around N. D. are still remembering the 100 mph winds that drove sleet and snow across that state last March when CAP communications was for a period the state's only link with the outside world.

Communications and power plants had been destroyed in many areas, and even Fargo, the largest city, couldn't communicate; at least until CAP came into action.

Both United and Associated Press dispatches were carried by the CAP radio network after the teletypes went dead. The Fargo CAP station finally went off the air, because West Fargo desperately needed CAP's portable generator to pump water for the town's water tower, a precaution that paid dividends the same day when a residential fire was put out while the CAP generator ground out juice to push water into the tower.

Accident Rate: The returns are in for 1949 CAP accidents, and you can get ready for a real honest-to-goodness safety drive.

Last year CAP had 47 accidents of which 21 were minor, and 26 major. Thirty-one were due to pilot error, seven to improper tie-downs; five were partially pilot error; six were due to lack of proper maintenance and one the result of smoking in a plane.

Other details of the returns show four accidents due to ground loops, two from hitting wires on approach, five from running into snowbanks or other objects, six were nose-overs on landing, three were taxiing into other planes, and worst of all—two occurred to planes operated by unauthorized personnel.

National Headquarters sounded a grim warning—"Major damaged aircraft cannot be replaced. There are no more L-4's. These planes are vital to our Cadet and Senior programs."

ARS Aid: CAP ran up a new record in 1949 in assistance to the Air Rescue Service, flying more than 8,450 hours at the request of the USAFARS, of which 1,844 hours were contributed in search coverage to Operation Haylift in last winter's severe blizzards in eight Western states.

The voluntary performance of search missions took their toll, six CAP pilots losing their lives.

The cooperative work with ARS has been so successful that Wings not previously participating in actual search missions will now train in simulated maneuvers with ARS.

R.I. Maneuver: "Operation Unknown" brought the CAP and Boy Scouts of America together in a maneuver in northern Rhode Island that was a remarkable success.

It was a simulated rescue mission involving both CAP plane and walkie-talkie radio observation and communications.

Four-member teams of Scouts traversed a densely wooded area while CAP planes kept track of the maneuver. CAP walkie-talkie radios kept in touch with headquarters during the entire operation. Scout Executive John Page, the CAP Squadron Commander at Pawtucket, directed the operation.

Nevada has the initial VHF relay over the Sierra Nevada Mountains from Nevada to California. The big jump of 220 miles is over 8-10,000-ft. mountains. Result, Nevada now has excellent communications with the San Francisco Bay area. The operation was accomplished under Lt. Col. Arthur Sowle, communications officer of the Nevada Wing.

Wyoming: Wing plans to activate new units at Sheridan, Gillette, Buffalo, Pine Bluffs, Lander and Wheatland. In one of the smallest states population-wise, the Wing is third in the nation for number of missions flown in 1949, and first to go over the top in its quota of Cadets.

First Lt. Robert C. Butecher is the new Wing Commandant of Cadets. A new Flight has been activated at Thayne, and another is coming soon at Douglas. Ten more high schools next fall are expected to offer the CAP aviation education program.

Massachusetts: Up in Fall River they're turning the town upside-down with a new CAP Squadron. But let them tell you their story . . . "With well over a hundred active members, more still joining, a new municipal airport nearly completed, our own Sq. Hdqts. newly renovated and painted, and our own recruiting office on Main St. in town, I think we are doing fine work," opines CWO Chester O'Brien, PIO of the Squadron. He adds: "All our members, spic and span in new uniforms, hear 20-minute talks on aviation weekly and do drilling under supervision of our 13 staff officers who are always on the ball trying to promote anything that will benefit CAP."

Delaware: CAPers are proud of their new Wing publication "Delawing," a three-color mimeographed job termed by National Hdqt. officials as one of the best in the U. S. The new publication is due largely to the work of M/Sgt. Douglas F. Garten.

Oregon staged a Regional Wing CO Conference comprising Alaska, Hawaii, Washington, Montana, Idaho, Nevada, Arizona and also Oregon. In addition to CAP officials, members of the State Legislature, prominent business and professional men and her honor the Mayoress Dorothy McCollough Lee participated in the "get acquainted with CAP" activities.

Montana's CO, Col. Richard A. Kullberg, received from National Hdqts. a White Service Ribbon for faithful service in CAP . . . The Wing now has four L-type aircraft, although one is out for maintenance . . . The Chester Squadron was recently organized, with Lt. Bill Cheley as CO. . . . Maj. D. J. Whittingham, AF-CAP Liaison Officer, has been inducted into the Blackfeet Indian tribe and is known as "Three Suns" . . . As a result of outstanding Montana CAP cooperation, that state has one of the best "disaster preparedness" plans in the U. S.

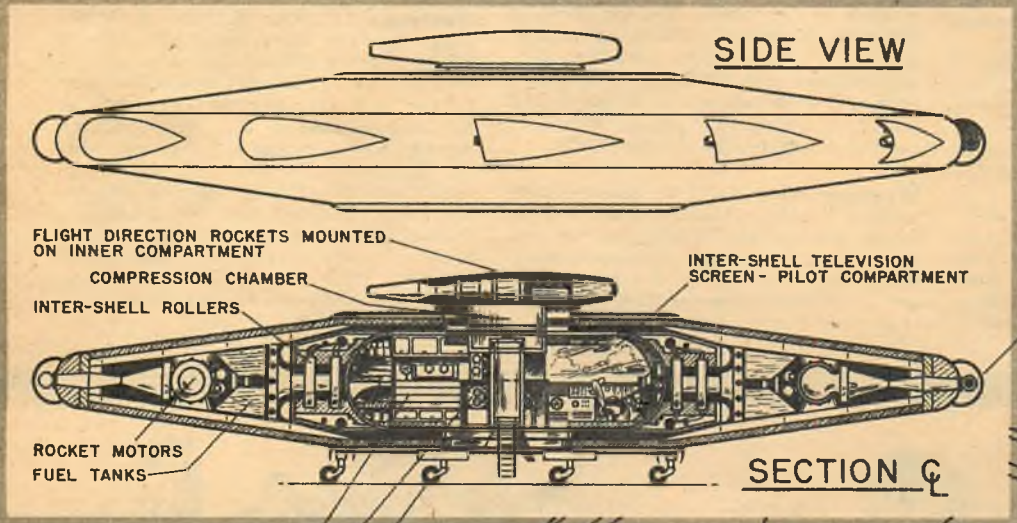
● Manual men: Maj. H. G. Rollins, Nat. Training Director (rt.) handles production; Maj. R. A. Trennert, Op's and Training, gets them in use.

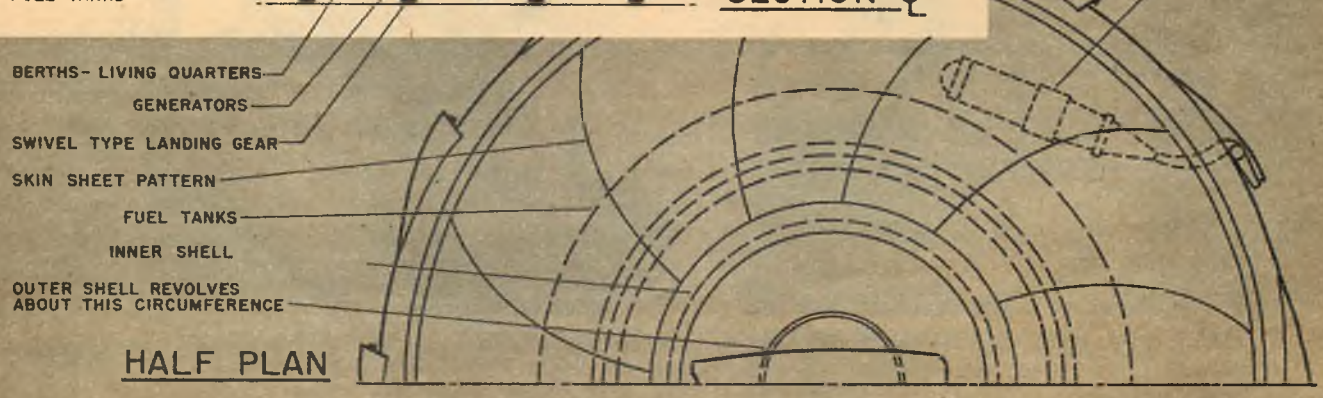
● Command post's radio set-up for "Operation Unknown," special rescue operation which combined Boy Scout and CAP personnel in R. I. maneuver.

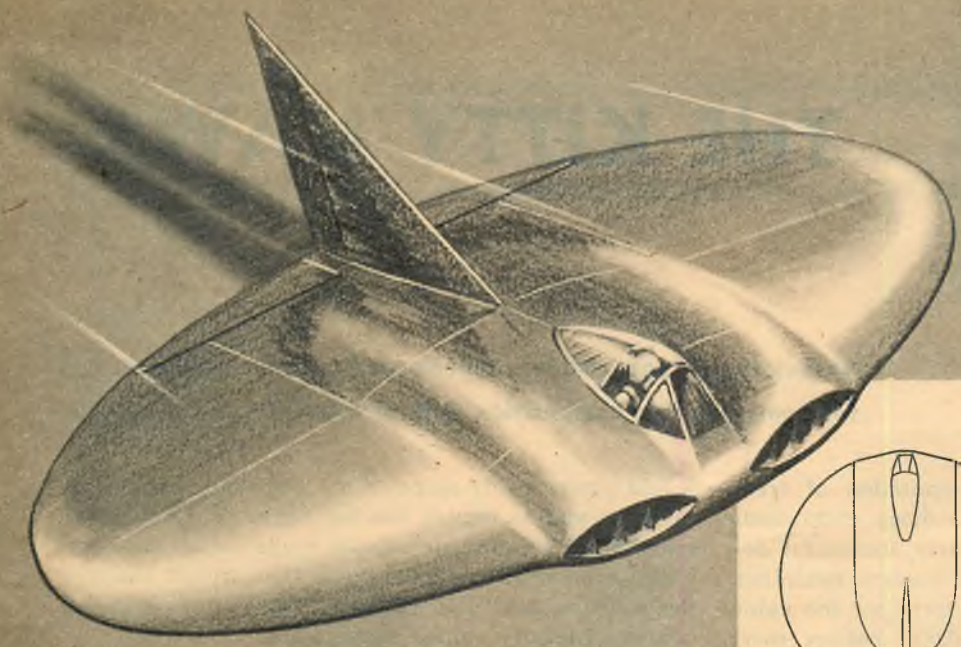
Airmen of Vision
DESIGN COMPETITION

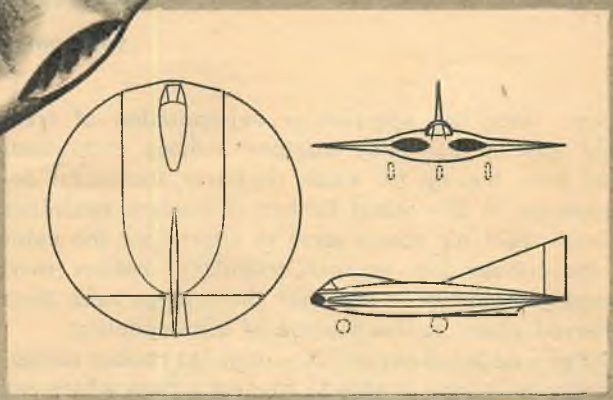
With Flying Saucer excitement still sky-high, we present our readers' ideas of these mysterious gadabouts.

● First prize: by John B. Fuller III, a rocket-propelled Flying Disk, suitable for space travel. Revolving outer shell is powered by 12 rocket units. Disk diameter is 90 ft., height 20 ft. 6 in. Cabin diameter 30 feet, height 9 feet. Outer shell rotates around inner one at varying speeds. Rocket nozzles swivel for change of flight direction.

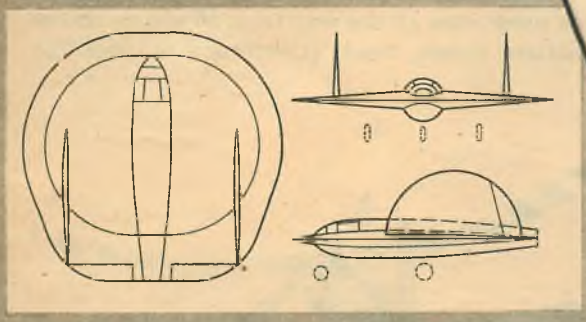




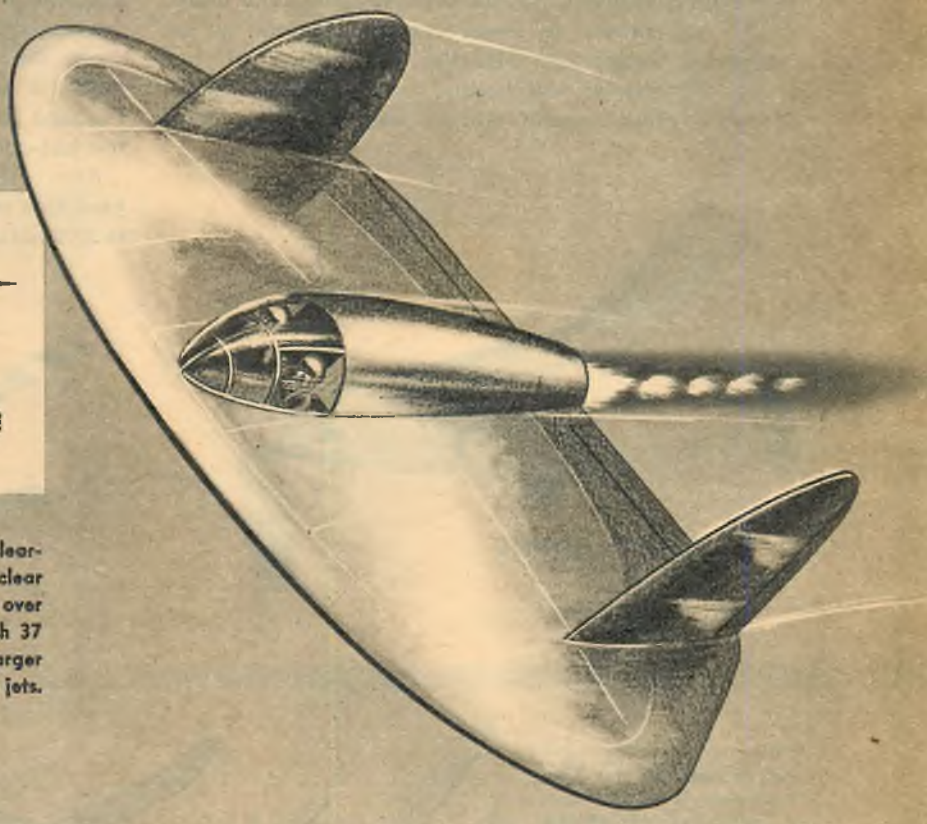




● Second prize: by James Burruss, Los Angeles, Calif. A twin-jet powered, circular wing aircraft, it's a neat-looking "saucer" which should do at least 1000 mph. Unfortunately, Jim did not include any specifications. Control is achieved by "elevons" located in the trailing edge of the wing, the shape of which would accommodate a large fuel capacity.



● Third prize: by John Patillo of Richmond, Va. A nuclear-energy powered "saucer" interceptor armed with nuclear disintegrators. Carries a crew of two, has a speed of over 2000 mph and a range of 15,000. Span is 34 ft., length 37 ft., height 13 feet. John claims that a version six times larger is O. K. for interplanetary travel. Small model can fly on jets.



Air Trails has opened its columns to those who are interested in presenting plans for "aircraft of the future." Rules governing the competition are as follows: 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. Give sketches of the complete airplane in three-quarter front and rear positions. Photos of a model of the proposed design may be included. Information on power plant(s), estimated performance, dimensions, and explanations of any unusual features are required. Data as to age, occupation or schooling of the entrant will be welcomed by the editors and judges. Designs may be of any type: commercial aircraft, military planes (fighters, bombers, troop transports), planes for the private flyer and single-engine sporting or racing craft. The entry each month judged the most practical or of the greatest significance will receive an award of $25. Payments of $5 will go to the runners-up. Entries will not be returned and for that reason those participating should retain copies of all material submitted. Mail entries to Airmen of Vision, c/o Air Trails, Box 489, Elizabeth, N. J. The editors regret that because of large number of entries they cannot enter into correspondence on Airmen of Vision.

THE KITTY HAWK:

At last, the younger and less experienced modeler gets an event for some exciting competition with simple rules, easy models

■ Ever since the spectacular rejuvenation of free-flight gas by the baby engines, rubber enthusiasts have been hoping for some similarly successful development in the oldest branch of contest modeling. Though most big meets seem to appreciate the value of the rubber job, staunch friends of rubber must campaign steadily to see that these ships keep their deserved place in the scheme of aeromodeling.

After a national survey of prominent rubber modelers, this magazine is able to suggest a plan which can be a shot in the arm for rubber modeling, especially on the local club level.

It is not proposed to alter classifications, combine events, or tamper with existing A.M.A. rules. This very survey showed that the contest-minded "R-man" would not consent to fewer events. Nor can he see tampering technically with the current crop of stick and cabin models. Many—but still a minority—favor dropping cross section and/or weight rules. Most would prefer to fly ships in the 150-200 square inch category and to banish the big boys. But when we asked what simple rules would make for an easy-to-build, economical rubber event that would interest the oldsters and also bring in the youngsters, the heavens literally rained suggestions.

Moreover, these suggestions quickly fell into a pattern. Some of the ideas were beautiful in their simplicity. With the objectives of that point in mind and only after careful consideration of the proposals on a count-the-heads basis, was Air Trails willing to suggest the types of models, the tentative rules governing competition for them. Before running through this analysis, the staff wishes to point out that the Kitty Hawk Contest is suggested for fun, for small groups, for clubs and interclub special event meets, and for any meet where time and interest may make it worthwhile to give these ships a whirl. Perhaps the ideas involved will work their way into the hot-shot contest picture.

Size. Recommended areas—for area was the only yardstick used—ran all the way from 50 square inches to 200 square inches, those (*Continued on page 76*)


CLOUD HOUND


SKY RACER

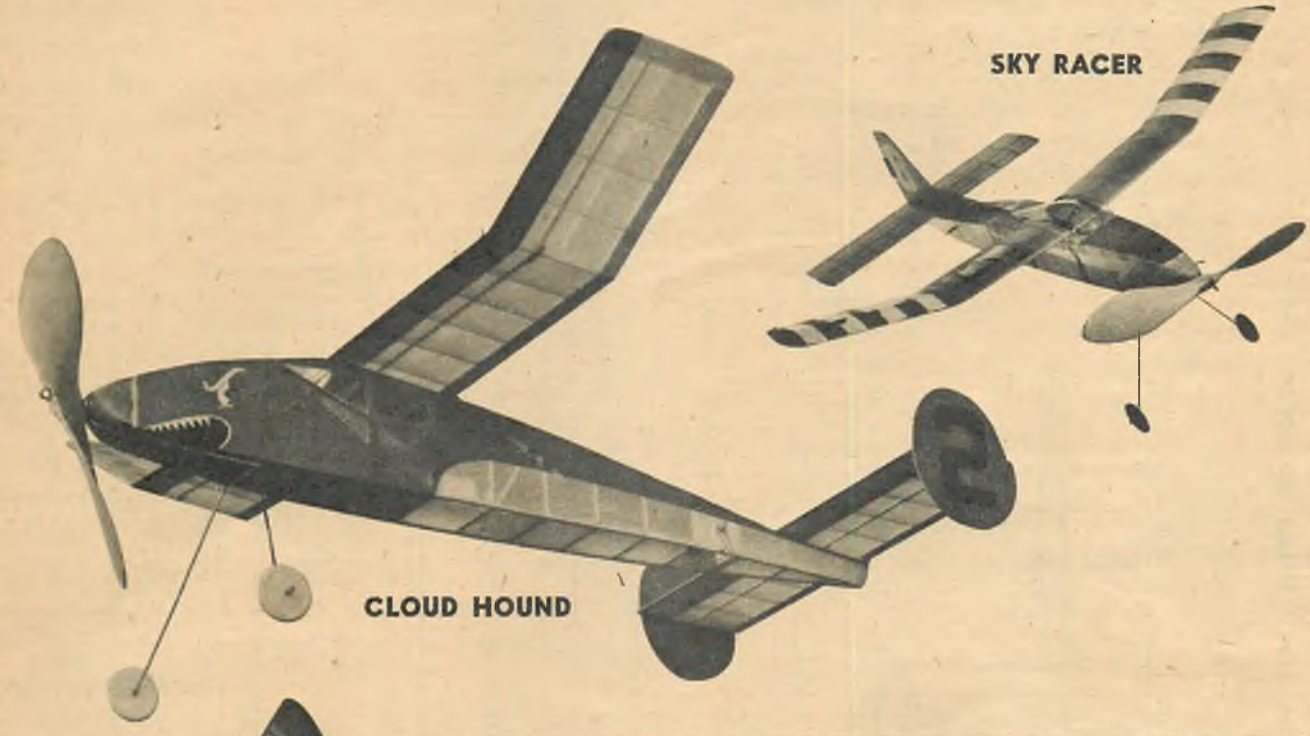
• *Here are some kit models that fit right into the Kitty Hawk event. In some instances you may have to chop off wing tips, or add a bit to the fuselage cross-section, but, generally, little changing is required. In subsequent issues, other kit models that qualify as KH entries will be listed, so watch for announcements.*

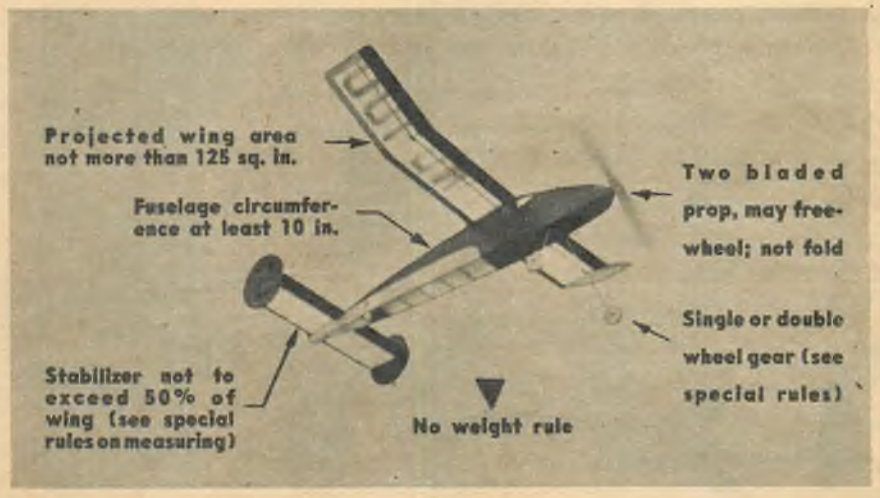

Jasco Senior or Jasco Junior


Scientific's Atlantic Ace


Monogram's Pirate

TO ENCOURAGE RUBBER MODEL FLYING BY THE NOVICE





SKY RACER

There's a little bit of the F-51 Mustang in this sleek competition model for the Kitty Hawk event; follow the general notes which appear on both plans.

1/16" SHEET GUSSETS
LEADING EDGE 3/16" SQ.
1/16" SHEET TIP
3/32" SQ.
1/32" SHEET GUSSETS
1/8" X 1/4"
3-3/4"
TRAILING EDGE 1/8" X 1/2"
DIHEDRAL ANGLE
3/4"

1/8" X 1/2"
1/8" X 1/4"
3/32" SQ.
1/16" SHEET
3/16" SQ.
1/32" GUSSETS
WING CONSTRUCTION DETAIL

TIN BEARINGS
WASHER
FREE-WHEELING DEVICE DETAIL
1/32" WIRE (ENGAGES LOOP)
1/16" WIRE PROPELLER SHAFT

1/8" SHEET
7" CANOPY (BERKELEY)
ALIGNMENT FORMER

WING RIB (21 REQ.)
ALL RIBS 1/16" SHEET
STABILIZER RIB (12 REQ.)

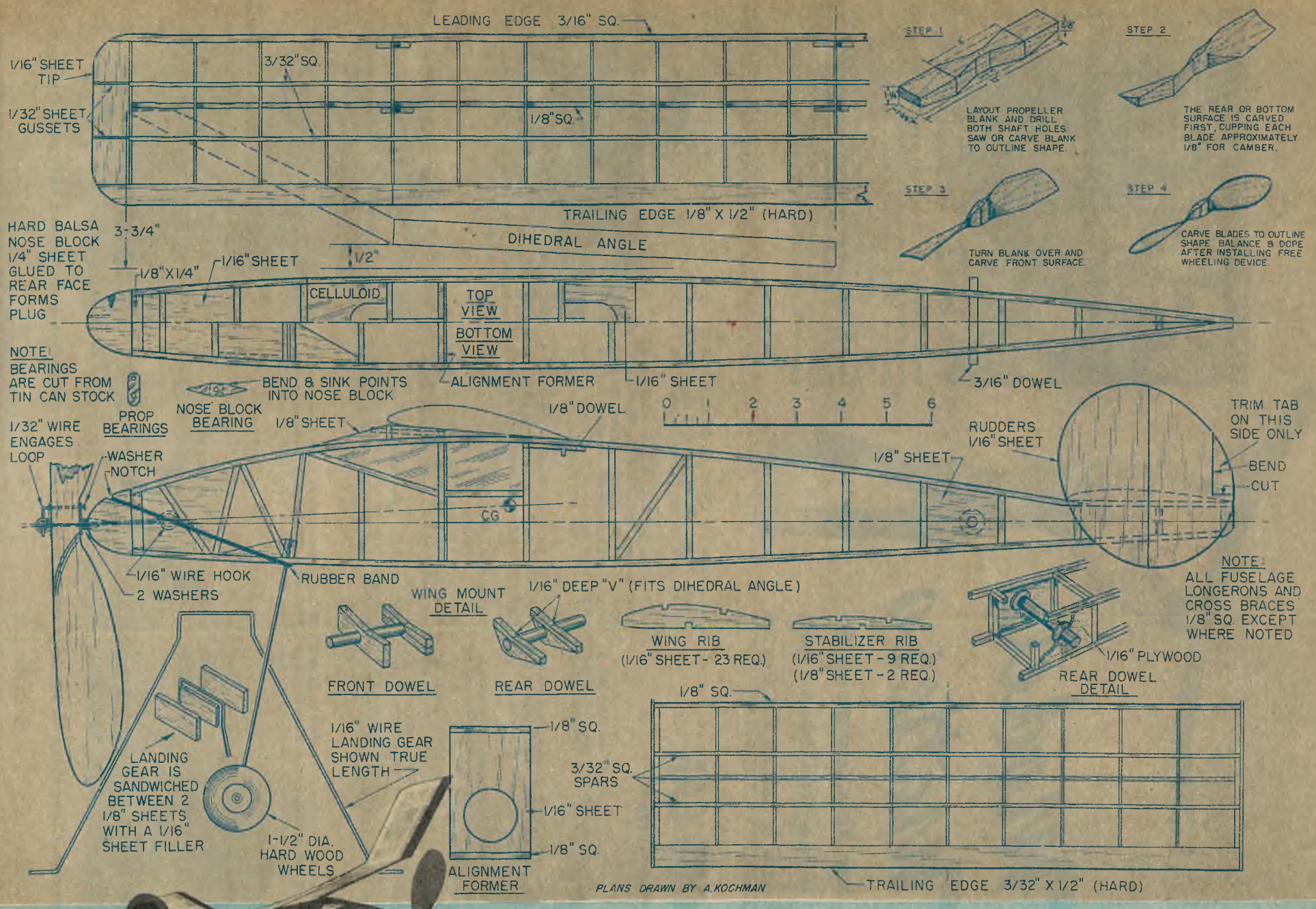
1/16" SHEET
BEND
CUT
RUDDER SUPPORT FITS IN BETWEEN STAB. RIBS
1/16" SHEET
CG
1/8" SHEET

NOTE:
2° DOWN & RIGHT THRUST BUILT IN
1/16" SHEET
1/8" X 1/4"
1/8" SHEET
ALIGNMENT FORMER
1/8" SQ.
0 1 2 3 4 5 6
PLANS DRAWN BY A. KOCHMAN
3/16" DOWEL
1/16" PLYWOOD
1/32" WIRE TAILSKID

2 PRONG TIN BEARING (SINK INTO NOSE BLOCK)
NOTCH FOR RUBBER BAND
1/4" SHEET
NOSE BLOCK DETAIL

1/16" WIRE
1-1/2" PLYWOOD WHEELS (JASCO)
6"
1 5/8"
REMOVE SHADED PORTION AFTER CARVING
1-1/4"
1/2"
PROPELLER BLOCK

LEADING EDGE 1/8" SQ.
RUDDER SUPPORT
1/16" SHEET
1/32" SHEET GUSSET
1/32" SQ. SPARS
1/16" SHEET
TRAILING EDGE 3/32" X 1/2"



CLOUD HOUND

This is about as simple as you can make a model with lots of built-in performance; before you start to build, read plans and directions carefully.

Model Matters

News, Views, Comments and Photos from Model Clubs and Enthusiasts in America and Overseas

● Planning meeting of '50 Nationals contest committee: seated lt. to rt., Capt. M. A. Nation, CO Dallas NAS; Roy Carter, pres., The Exchange Club of Dallas; standing, lt. to rt., Lt. Cmdr. G. M. Pierson, liaison; Dr. Troy F. Long, Exchange Club veep; E. J. Reeves, pres., Soaring Society of America; Johnny Clemens, contest manager; Cmdr. Barry Holton, publicity; Lt. W. A. Stockdale, liaison; Cmdr. B. A. Miles, exec. officer, Dallas NAS. National Model Championships are sponsored by Dallas Exchange Club with help of Navy.

DOPE CAN

BY "DOPESTER"

■ If there's one thing we like it's a fellow who goes ahead and does something, instead of just talking about what he's going to do.

We've uncovered a let's-have-more-facts-and-fewer-yaks club. Meet the gang that flies at the Millville, N. J., municipal airport under the name of Garden State Aeronauts. William L. Horton, Jr., the GSA secretary-treasurer speaks for the group:

"This club," reports Bill, "made an attempt to find the opinion of the majority of contestants with regard to the trophies-vs.-merchandise contest awards controversy. Double-postcard questionnaires were sent to all who had attended our contests. These cards contained items calling for age, chief interest, awards won in the past and choices for prize divisions."

The mailing pulled a 54% return and covered the New York to Washington area. Many who received the cards sent letters to the Aeronauts to express their views more completely. Clearly established was a general dissatisfaction with the merchandise that has been handed out in all too many cases in the past.

A compilation of the answers indicates that 21% of the contestants favor all-trophy awards, 8% want merchandise exclusively, 44% will settle for small "token" trophies with merchandise to all place winners; 27% of the respondees had different and impossible to reconcile trophy-merchandise breakdowns.

Many bitter flyers spoke of the unfortunate practice of some contests publicizing first- (*Continued on page* 84)

● Terrible crash at Las Vegas: Howard Waldo's fine Grumman Skyrocket caught by strong gust of wind. Below: Bob Carl, L. A., with A/2 sparless f.f.

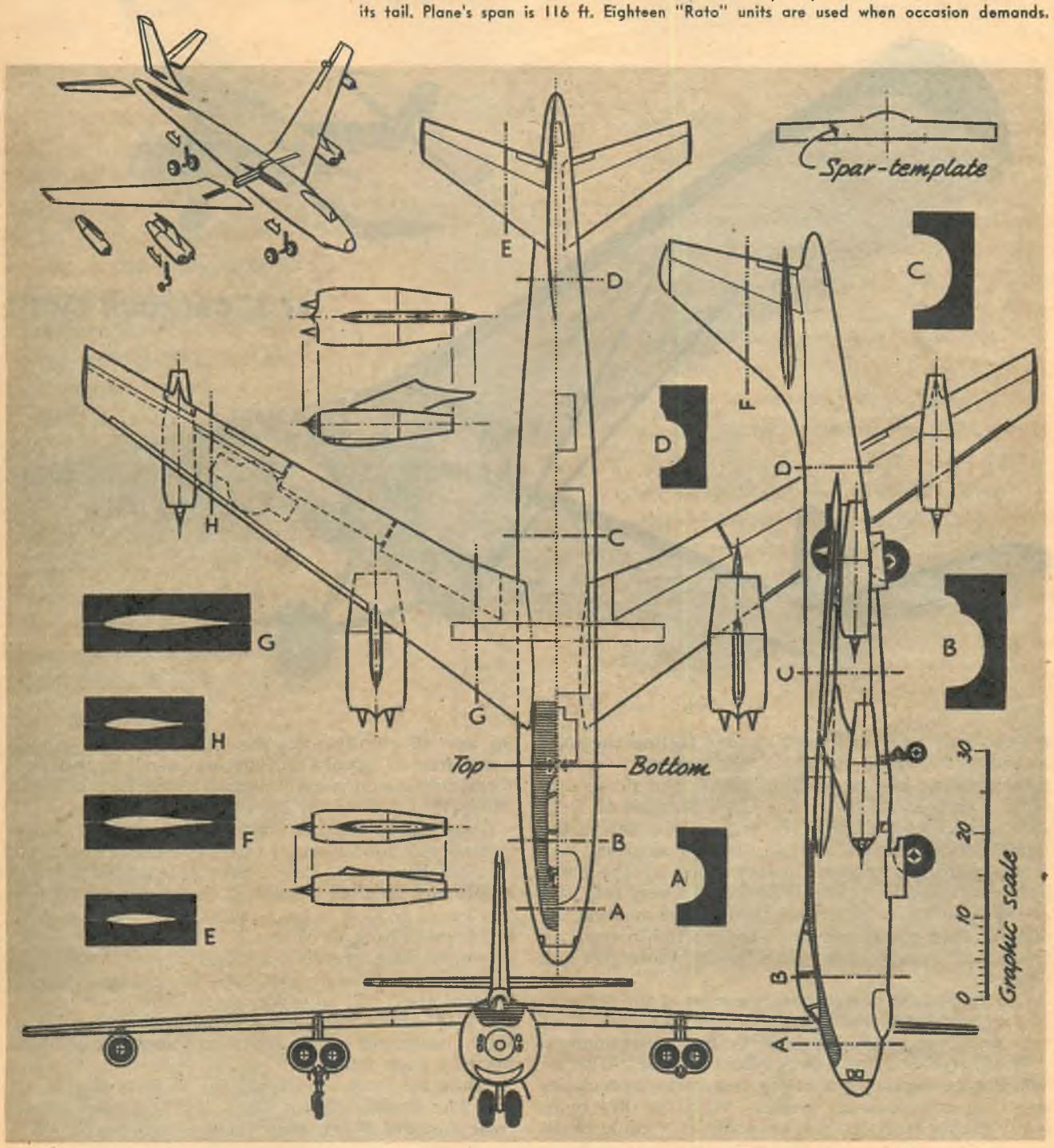
● Ed Kelley's Civvy Boy 31 powered by Spitfire takes off from L. A. park pond. Floats are original. Ed's a member of Inglewood Flight Masters.

● Gordon Snow from Ft. Logan (Colo.) VA hospital sends B-17G shot. Highly detailed, finely finished model took 3 years. Has full crew; 6½ ft.

● **Payment of $3 to $5 is made for glossy photos (at least 4 x 5 in.) sent exclusively to AT and used. Don't send negatives.**

Stratojet XB-47

Fleet as a jet fighter, the Boeing XB-47 is the Air Force's most modern bomber. Powered by six J-35 turbo-jet engines capable of developing 4000 lbs. of thrust each, it established a new transcontinental speed record in February 1949 when it flew 2290 miles from Moses Lakes AFB, Wash., to Andrews AFB, Md., in 3 hrs. and 46 mins., averaging 608.8 mph. To enable this fast bomber to land on a short runway, a parachute brake is installed in its tail. Plane's span is 116 ft. Eighteen "Rato" units are used when occasion demands.



Something very special for the free flight fans—a semi-scale version of the popular prewar home-built single-seater lightplane

The Flying Gazookus

By S. CALHOUN SMITH

■ Time was when a model builder feeling the urge to really fly, could round up the necessary spruce, tubing, fabric and motorcycle engine and proceed to build a ship of his own. The CAA changed all that, and nowadays a little more is required before the home builder can get aloft in his own creation.

The pages of aviation history filled by the home builders from about 1920 to '33 record a very real part of the growing pains of our then infant aviation industry. As a result, plenty of today's lightplanes can trace their lineage back to the Heaths, Pietenpols and Corbens.

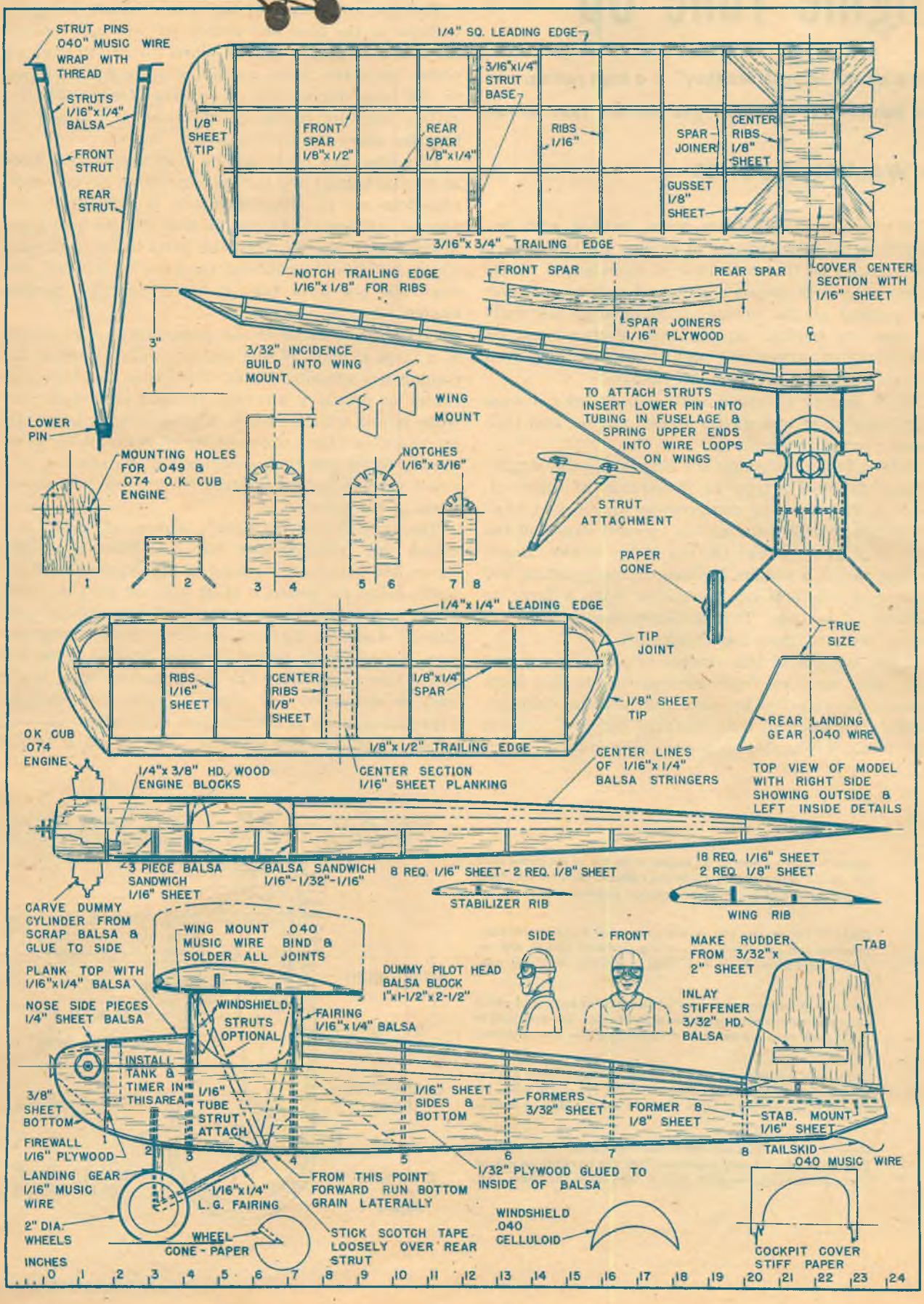
Our free-flight design borrows most of the features of a typical home-built single-seater and lends itself very well to sport type flying with the smaller engines.

Wing area is 212 sq. in., weight is 9 oz. With an .049 Cub performance is pretty tame, which precludes any long cross-country chases. With the .074 more lively flights resulted, but we doubt if it could chalk up any 10-minute averages. The ship has enough wing area to handle an .099 and good contest performance should result, although the design is not primarily intended for such flying.

Construction follows conventional methods and is started with the fuselage. Cut the fuselage sides from medium-hard 1/16″ sheet. Sand the outside surfaces before any building is started. The inside of the forward nose section is faced with 1/32″ plywood from the firewall back to former 5. This adds a minimum of weight with greatly increased strength needed to support the firewall, wing and landing gear struts. Cement the 1/32″ plywood to the inside surfaces of the 1/16″ sheet sides and let dry at least overnight. Pile a dozen old copies of AT on these assemblies to insure a good joint.

While the sides are drying the formers can be cut out. The firewall is cut from 1/16″ plywood. Next come formers 2-3-4, these (*Continued on page* 71)

● Gazookus would make a nifty "goat-like" control line craft. Substitute solid stab, add control system with line guides on inboard wing.



● Complete your Flying Gazookus by carving Peerless Pete the Fearless Pilot; add a neck scarf to flap in the breeze, for old times' sake, and then he'll be ready to roll.

Engine Tune Up

"Modelplane Grease Monkey" is a high rating, and this basic info will help you obtain that grade

By WALTON HUGHES

■ The average modeler has more trouble with engines than all other phases of flying. In 'most every case this can be traced to lack of knowledge. Model engines may look simple and have but few parts, yet they present all the problems involved in any full-size gasoline engine. In fact, the postwar engines with increased power and performance require even more careful tune-up than previously.

Before getting involved with details, let's discuss what takes place in a well-adjusted engine, and then consider possible ailments.

Model airplane engines are nearly all the single-cylinder two-cycle type as illustrated in Figure 1. Power is developed by compressing an air-fuel mixture in the cylinder during the upward stroke of the piston and igniting it at the top of the stroke. Rapid burning causes a sudden increase in temperature and pressure which acts on the piston with a force as great as *500 pounds*. This is transmitted to the connecting rod and then the crankshaft.

At the bottom of the stroke, intake and exhaust ports open, allowing fresh air and fuel to flow from the base through the by-pass and into the cylinder, pushing the burned fuel mixture out the exhaust port. While this explosion is occurring in the cylinder above the piston, the base of the engine is pumping fuel for the next power stroke.

The upward travel of the piston causes a partial vacuum in the base and draws air and fuel through the intake or rotary valve. When the piston is at top center the valve closes and the mixture is compressed in the base during the downward stroke. The resulting pressure blows the mixture up through the by-pass when the ports open.

This operating cycle sounds very simple, but when an engine is built and put into operation several complications set in. High pressure is difficult to seal against leakage at the piston, and intense heat plays havoc with close fits when the parts begin to expand. These individual problems must be understood and overcome one at a time in order to get a perfect engine tune-up.

Compression controls the personality of an engine to a large extent. If fuel and air were placed in the combustion chamber with the piston at top dead center at ordinary air pressure and exploded, very little power would result. Engine output is greatly increased by filling the cylinder with the piston completely down and then compressing the mixture to a small volume before igniting by the upward movement of the piston.

The amount that the fuel is "squeezed" together is called the "compression ratio." (This, of course, means the volume remaining in the cylinder over the piston when the piston is at its topmost position, compared to the space just at the time the exhaust port closes.) Leakage may reduce the "effective compression" considerably below the compression ratio and cause loss of power. The term compression might well be discarded and replaced with more definite expressions, such as compression ratio, effective compression, or compression seal. It may seem logical

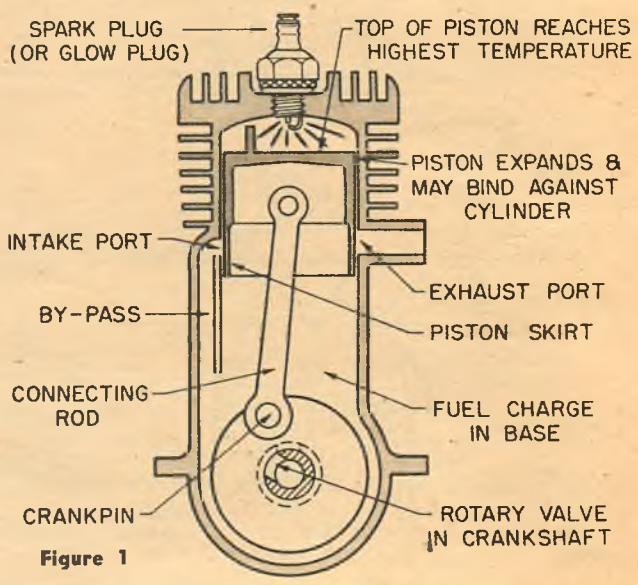


Figure 1

Figure 1—Hottest part of an engine is the top of the piston since it is cooled only by contact with the cylinder. High temperatures at top surface of piston cause greatest expansion at this point.

Photo 1—Large ring gap on worn rings will cause loss of compression and result in hard starting, reduced power and unsteady operation. Place new rings in cylinder to check gap.

Photo 2—High spots shown as white areas at bottom of piston can cause overheating due to increased friction. This may lead to detonation which shows up in an extremely low power output.

Photo 3—Cast-iron laps used to limber up tightly fitted engines for abnormally high speed operation. The cylindrical lap is for cylinders and the round block with a hole is for lapping pistons.

Photo 4—Piston rings sometimes foul with carbon and varnish so they do not move freely in groove. They can be removed without damage by using pieces of .003 in. shim brass slid under ring.

to make a close-fitting piston and cylinder to stop all leakage, but expansion of metal parts due to heat renders this impossible.

Burning inside the cylinder starts when the piston is near the top center and is completed before the piston moves down very far. The resulting heat is picked up by the piston, cylinder and cylinder head. Fins on the cylinder and head keep these parts at a reasonable temperature. However, much higher temperatures exist in the piston because it is cooled only by contact with the hot cylinder. (Figure 1 shows the temperature distribution.)

High temperatures at the top surface of the piston cause the greatest expansion at that point, and its skirt expands somewhat less. Piston clearance is reduced because the piston expands much more than the cylinder. Most small-bore engines take care of this change in clearance by allowing .0005″ clearance cold and depend on heavy oil to make a compression seal.

Cast-iron or steel pistons must be used in this arrangement because of their low rate of expansion. Cast iron or steel has proven satisfactory, especially in the comparatively lower speed engines, but for top-speed engines a lighter piston is necessary to avoid excess vibration, so aluminum is usually used. But aluminum pistons expand about two and one-half times as much as cast iron or steel and the oil film no longer seals. Cast-iron piston rings are used to make a seal with .002″ to .003″ piston clearance for expansion.

Engine designers take care of expansion when the engine is built, but must aim for average conditions. If a modeler expects to run his engine at high speed, more than average clearance is required, so some alterations such as those described later can be made.

Fuel ignition is another (*Continued on page* 63)

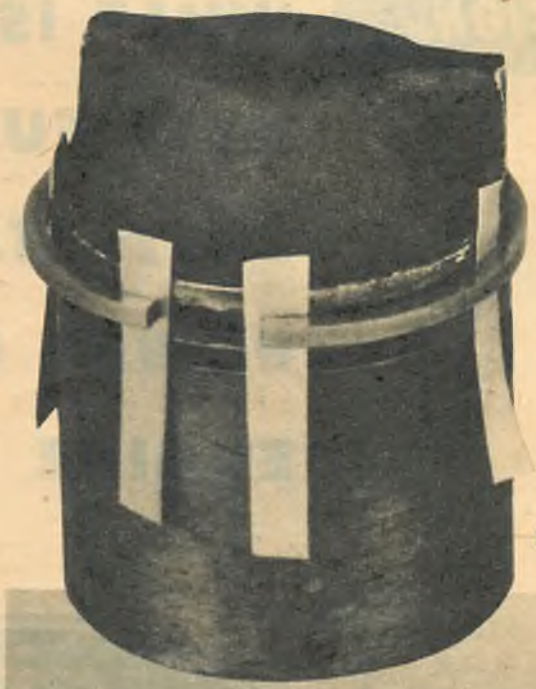


Photo 4

Photo 3

Photo 2

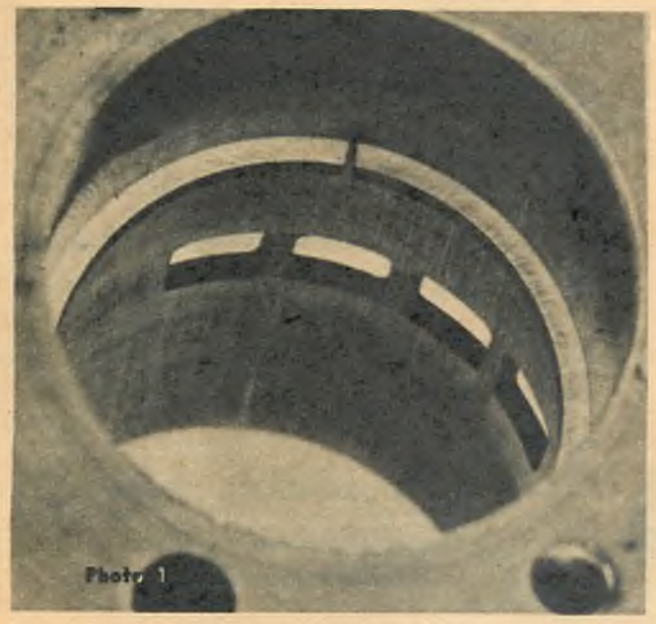


Photo 1

QUESTION: **WHAT IS THE SENSATIONAL NEW FUEL FAVORITE FOR EASY STARTING, MAXIMUM POWER OUTPUT, EXTENDED ENGINE LIFE?**

ANSWER: TESTORS "39"

HALF PINT: 39c
PINT: 75c
QUART: $1.40

RECOMMENDED BY McCOY FOR McCOY AND ALL OTHER MODEL ENGINES.

"Testor's '39' Model Engine Fuel has been tested by the makers of McCoy Engines for easy starting, all weather performance, power output, quality and quantity of lubrication. We have found Testor's '39' to be an excellent all-purpose fuel for both Glo and Ignition types of McCoy and all other standard Model Engines. We at Duro-Matic recommend Testor's '39' without reservation as a fuel that will assure the model builder high performance and extended engine life."

DURO-MATIC PRODUCTS CO.

The above statement appears on every can of Testor's "39"

TESTOR CHEMICAL COMPANY

QUESTION: **WHAT IS THE ONLY MODEL AIRPLANE FINISH THAT IS NOT IN THE LEAST AFFECTED BY ANY INGREDIENT IN ANY HOT FUEL?**

ANSWER: TESTORS

STA

That's right! Testor's STA is the *only* hot fuel proof finish on the market which is not in the least affected by any known hot fuel . . . including those containing high concentrations of such ingredients as nitro-methane, nitro-propane, castor oil, methanol, etc. In addition, this outstanding product is *really fast-drying* . . . covers well (actually better than dope) . . . can be applied over previous coats without dragging or lumping. It has excellent luster, and lends itself well to hand-rubbing . . . despite the fact that the film is extremely tough. STA is available in quarter-pint jars (50c) in the following standard colors: red, yellow, green, maroon, blue, black, white, and clear. STA Sanding Sealer (50c) and STA Thinner (35c) have also been formulated, and are for use with STA exclusively. Try STA . . . today! You will find it the finest quick-drying hot fuel proof finish you have ever used . . .

• ROCKFORD, ILLINOIS

It's 0-9's at twenty paces! You can take on the best stunter in your club with this maneuverable .09 ship

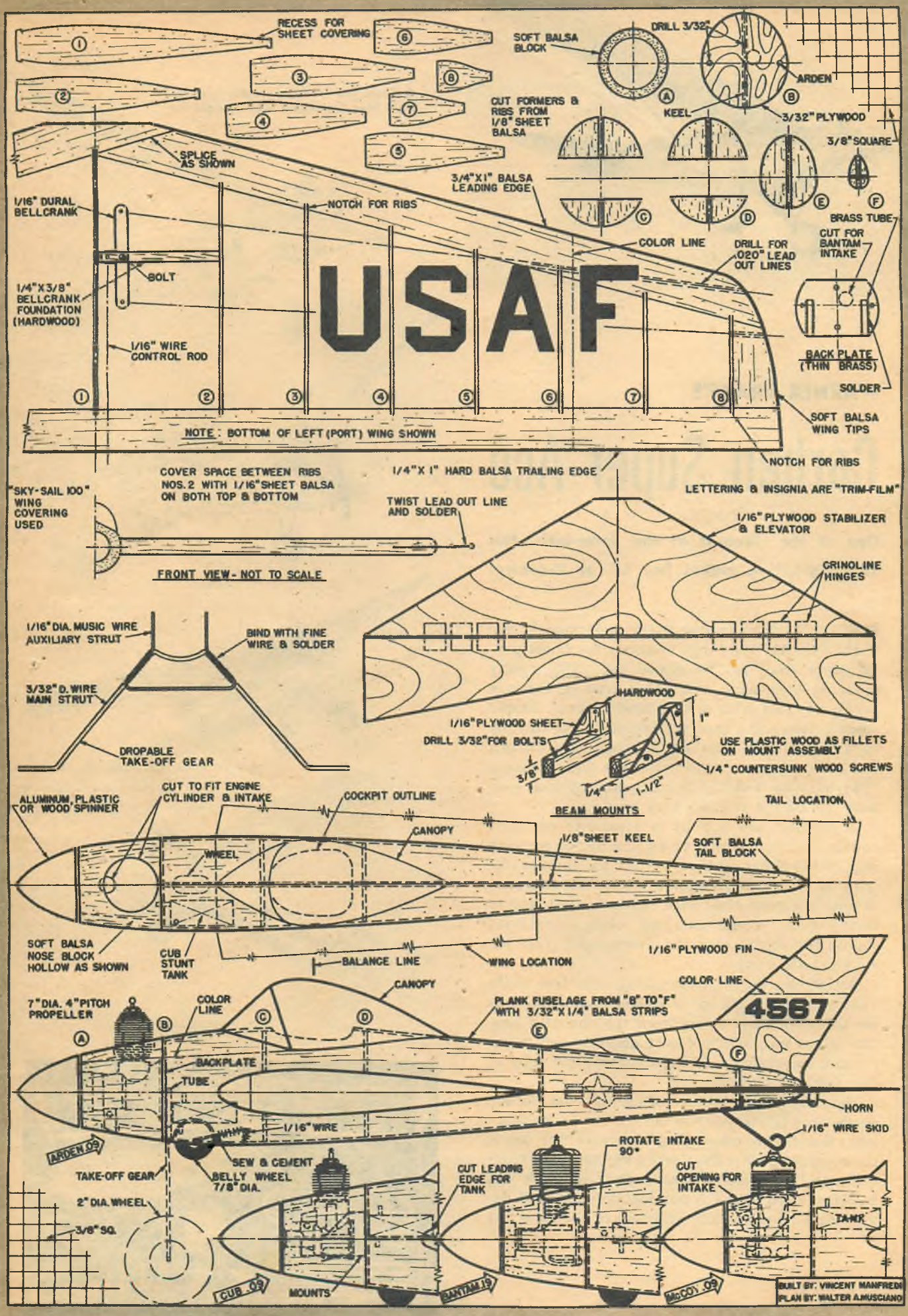
Loopy

■ If you are looking for a realistic, medium-size stunt ship that can really perform, this is it! Our model was designed and built in one evening (seven hours' working time). Three of my experienced model building friends and myself were discussing streamlined realism versus boxlike construction, and while sketching our ideas we hit upon Loopy. All agreed immediately that it should possess excellent stunting qualities plus good looks.

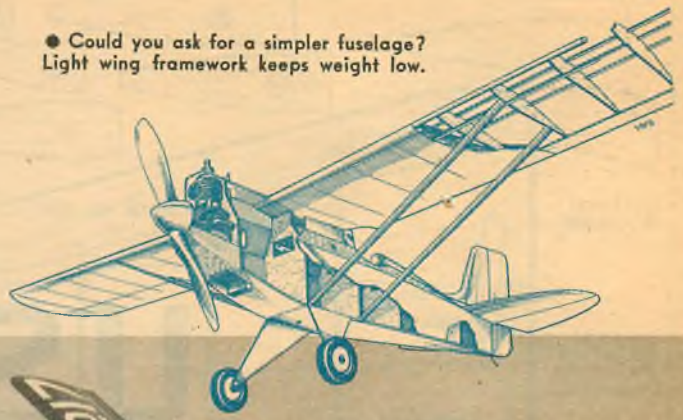
We also agreed that the fuselage should be held to a minimum while the wing area and thickness of *airfoil* should be as great as possible to insure prompt reaction to the control handle and avoid "slipping." Sufficient speed would be attained through streamlining and light but strong construction. The bubble canopy was added for appearance. The empennage utilized simple yet pleasing modern lines.

Before we knew it construction drawings were complete and balsa dust and the fine, strong odor of cement filled the workshop. When the air was clear once more, there stood the product of our efforts resplendent in its Air Force markings. After we had caught four hours' sleep, the plane was rushed to the flying field. Loopy proved to have wonderful flight characteristics and maneuverability. Best of all, the two "box" enthusiasts now swear by (*Continued on page* 69)

By VINCENT R. MANFREDI


RECESS FOR SHEET COVERING
SOFT BALSA BLOCK
DRILL 3/32"
ARDEN
KEEL
3/32" PLYWOOD
3/8" SQUARE
CUT FORMERS & RIBS FROM 1/8" SHEET BALSA
SPLICE AS SHOWN
3/4"X1" BALSA LEADING EDGE
1/16" DURAL BELLCRANK
NOTCH FOR RIBS
COLOR LINE
DRILL FOR .020" LEAD OUT LINES
CUT FOR BANTAM INTAKE
BRASS TUBE
BOLT
1/4"X3/8" BELLCRANK FOUNDATION (HARDWOOD)
1/16" WIRE CONTROL ROD
USAF
BACK PLATE (THIN BRASS)
SOLDER
SOFT BALSA WING TIPS
NOTE: BOTTOM OF LEFT (PORT) WING SHOWN
NOTCH FOR RIBS
1/4"X 1" HARD BALSA TRAILING EDGE
COVER SPACE BETWEEN RIBS NOS. 2 WITH 1/16" SHEET BALSA ON BOTH TOP & BOTTOM
"SKY-SAIL 100" WING COVERING USED
TWIST LEAD OUT LINE AND SOLDER
LETTERING & INSIGNIA ARE "TRIM-FILM"
1/16" PLYWOOD STABILIZER & ELEVATOR
FRONT VIEW - NOT TO SCALE
CRINOLINE HINGES
1/16" DIA. MUSIC WIRE AUXILIARY STRUT
BIND WITH FINE WIRE & SOLDER
3/32" D. WIRE MAIN STRUT
DROPABLE TAKE-OFF GEAR
HARDWOOD
1/16" PLYWOOD SHEET
DRILL 3/32" FOR BOLTS
USE PLASTIC WOOD AS FILLETS ON MOUNT ASSEMBLY
1/4" COUNTERSUNK WOOD SCREWS
ALUMINUM, PLASTIC OR WOOD SPINNER
CUT TO FIT ENGINE CYLINDER & INTAKE
COCKPIT OUTLINE
BEAM MOUNTS
TAIL LOCATION
CANOPY
1/8" SHEET KEEL
SOFT BALSA TAIL BLOCK
WHEEL
SOFT BALSA NOSE BLOCK HOLLOW AS SHOWN
CUB STUNT TANK
BALANCE LINE
WING LOCATION
1/16" PLYWOOD FIN
COLOR LINE
CANOPY
7" DIA. 4" PITCH PROPELLER
COLOR LINE
PLANK FUSELAGE FROM "B" TO "F" WITH 3/32"X 1/4" BALSA STRIPS
4587
BACKPLATE
TUBE
HORN
1/16" WIRE
1/16" WIRE SKID
ARDEN .09
TAKE-OFF GEAR
SEW & CEMENT BELLY WHEEL 7/8" DIA.
ROTATE INTAKE 90°
CUT LEADING EDGE FOR TANK
CUT OPENING FOR INTAKE
2" DIA. WHEEL
3/8" SQ.
TANK
CUB .09
MOUNTS
BANTAM .19
McCOY .09
BUILT BY: VINCENT MANFREDI
PLAN BY: WALTER A. MUSCIANO

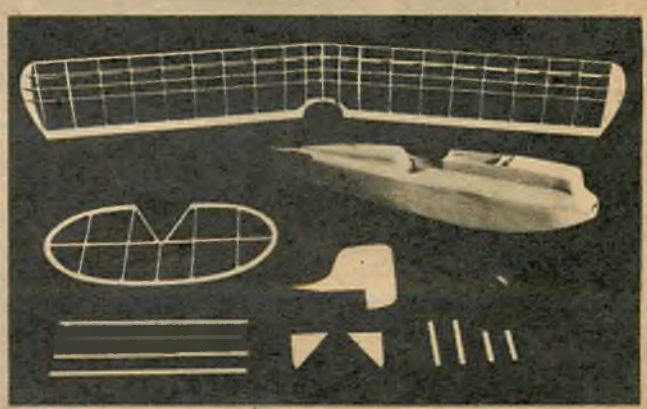
● Could you ask for a simpler fuselage? Light wing framework keeps weight low.



WARNER FRAKE'S

Corben Super-Ace

One of the cleanest of the home-bilts, this 1934 lightplane makes fine f.f. or U-control

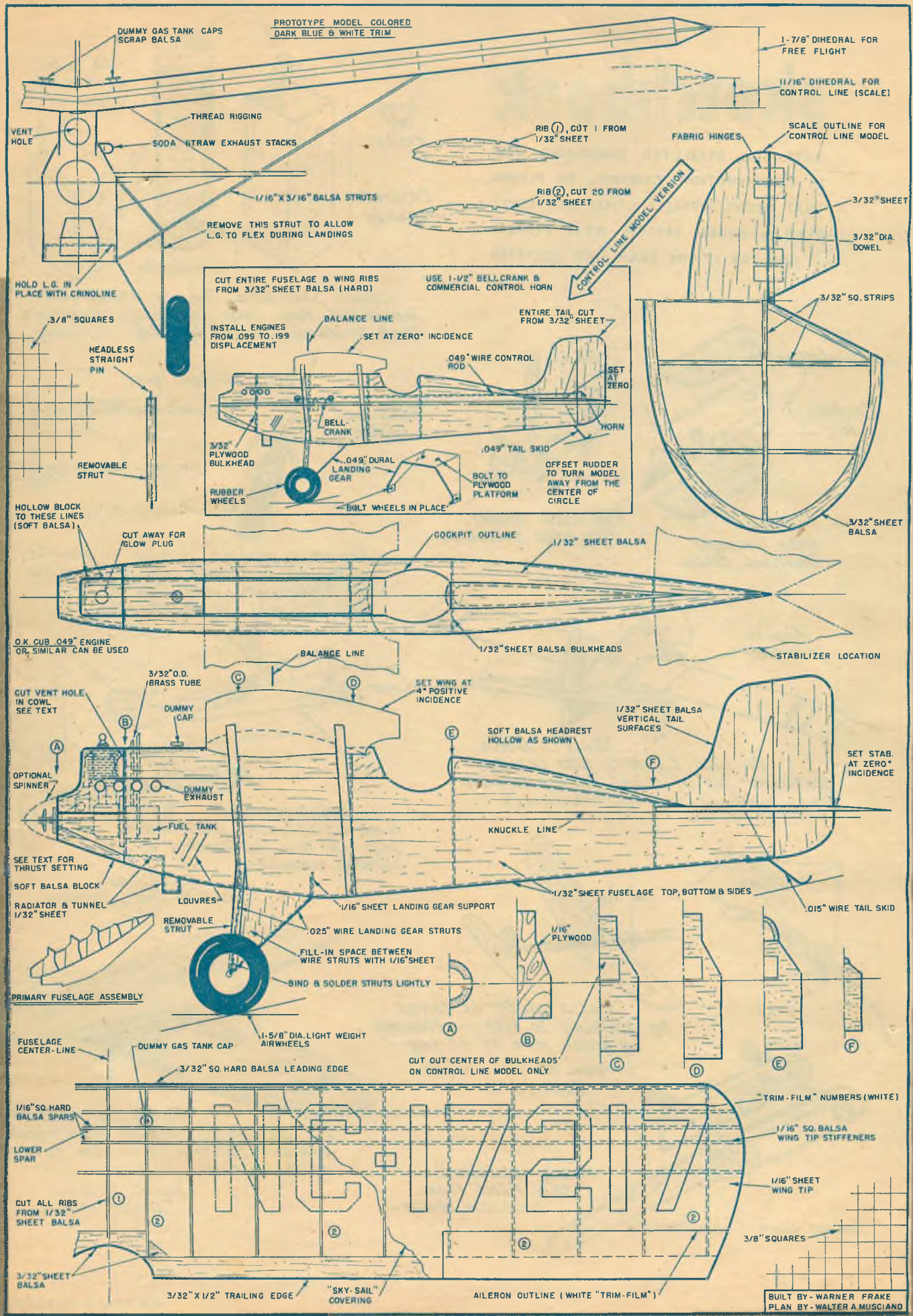


■ When it comes to free flight scale models, the Corben Super-Ace turns in about the finest performance that can be hoped for. The rigidly mounted high wing and pylon type of fuselage profile coupled with a long landing gear, simple construction and a neat appearance make this job hard for any model builder to resist. The Corben has been a favorite with scale free flighters since 1934, but now it should be more popular than ever with the half-A engines here to stay.

Our Super-Ace is built to a scale of one inch equals one foot, which gives it a projected wing area of 118 square inches, perfect for engines like the O.K. Cub .049. The Eiffel 400 airfoil was used to obtain a good glide with realistic climb and to insure good weight-carrying characteristics should the model turn out overweight. Our job weighed 4½ ounces.

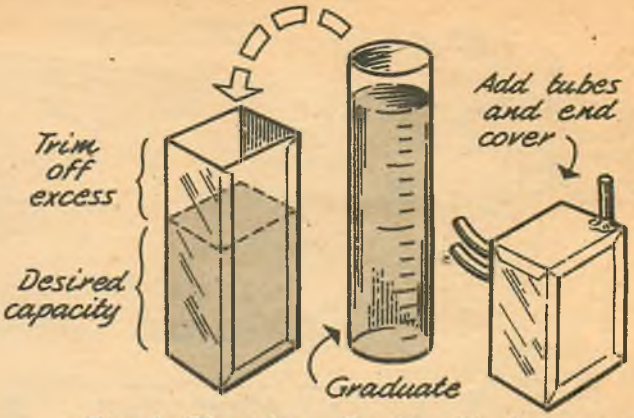
Before we begin constructing this free flight "natural," we must not overlook those who prefer to do all their flying from the end of a line. The plans and article insert describe the minor revisions required to build a control line copy of this famous lightplane.

The outstanding feature of the full-size Corben single-seat lightplane was not the steel tube fuselage, nor the wooden wing structure nor fabric covering but rather the Corben engine. This four-cylinder liquid-cooled power plant actually was a rebuilt Ford Model A automobile engine. It developed 52 hp at 1925 (*Continued on page* 74)

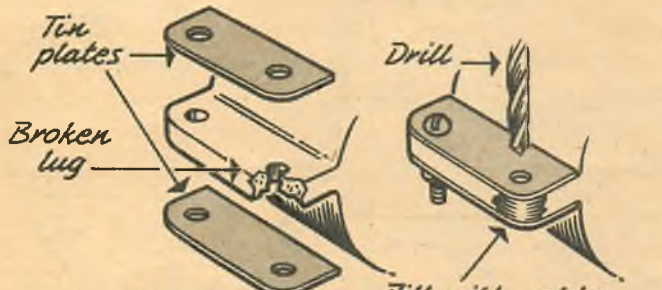

PROTOTYPE MODEL COLORED DARK BLUE & WHITE TRIM
DUMMY GAS TANK CAPS SCRAP BALSA
1-7/8" DIHEDRAL FOR FREE FLIGHT
11/16" DIHEDRAL FOR CONTROL LINE (SCALE)
THREAD RIGGING
VENT HOLE
SODA STRAW EXHAUST STACKS
1/16"X3/16" BALSA STRUTS
REMOVE THIS STRUT TO ALLOW L.G. TO FLEX DURING LANDINGS
HOLD L.G. IN PLACE WITH CRINOLINE
RIB (1), CUT 1 FROM 1/32" SHEET
RIB (2), CUT 20 FROM 1/32" SHEET
FABRIC HINGES
SCALE OUTLINE FOR CONTROL LINE MODEL
CONTROL LINE MODEL VERSION
3/32" SHEET
3/32" DIA. DOWEL
3/32" SQ. STRIPS
3/32" SHEET BALSA
.3/8" SQUARES
HEADLESS STRAIGHT PIN
REMOVABLE STRUT
CUT ENTIRE FUSELAGE & WING RIBS FROM 3/32" SHEET BALSA (HARD)
USE 1-1/2" BELL CRANK & COMMERCIAL CONTROL HORN
INSTALL ENGINES FROM .099 TO .199 DISPLACEMENT
BALANCE LINE
SET AT ZERO° INCIDENCE
ENTIRE TAIL CUT FROM 3/32" SHEET
.049" WIRE CONTROL ROD
SET AT ZERO
BELL-CRANK
HORN
3/32" PLYWOOD BULKHEAD
.049" TAIL SKID
.049" DURAL LANDING GEAR
BOLT TO PLYWOOD PLATFORM
OFFSET RUDDER TO TURN MODEL AWAY FROM THE CENTER OF CIRCLE
RUBBER WHEELS
BOLT WHEELS IN PLACE
HOLLOW BLOCK TO THESE LINES (SOFT BALSA)
CUT AWAY FOR GLOW PLUG
COCKPIT OUTLINE
1/32" SHEET BALSA
O.K. CUB .049" ENGINE OR SIMILAR CAN BE USED
1/32" SHEET BALSA BULKHEADS
STABILIZER LOCATION
BALANCE LINE
3/32" O.D. BRASS TUBE
SET WING AT 4° POSITIVE INCIDENCE
CUT VENT HOLE IN COWL SEE TEXT
DUMMY CAP
1/32" SHEET BALSA VERTICAL TAIL SURFACES
SOFT BALSA HEADREST HOLLOW AS SHOWN
SET STAB. AT ZERO° INCIDENCE
OPTIONAL SPINNER
DUMMY EXHAUST
FUEL TANK
KNUCKLE LINE
SEE TEXT FOR THRUST SETTING
SOFT BALSA BLOCK
RADIATOR & TUNNEL 1/32" SHEET
LOUVRES
1/32" SHEET FUSELAGE TOP, BOTTOM & SIDES
.015" WIRE TAIL SKID
1/16" SHEET LANDING GEAR SUPPORT
REMOVABLE STRUT
.025" WIRE LANDING GEAR STRUTS
1/16" PLYWOOD
FILL-IN SPACE BETWEEN WIRE STRUTS WITH 1/16" SHEET
BIND & SOLDER STRUTS LIGHTLY
PRIMARY FUSELAGE ASSEMBLY
1-5/8" DIA. LIGHT WEIGHT AIRWHEELS
CUT OUT CENTER OF BULKHEADS ON CONTROL LINE MODEL ONLY
FUSELAGE CENTER-LINE
DUMMY GAS TANK CAP
3/32" SQ. HARD BALSA LEADING EDGE
"TRIM-FILM" NUMBERS (WHITE)
1/16" SQ. HARD BALSA SPARS
1/16" SQ. BALSA WING TIP STIFFENERS
LOWER SPAR
1/16" SHEET WING TIP
CUT ALL RIBS FROM 1/32" SHEET BALSA
3/8" SQUARES
3/32" SHEET BALSA
3/32"X1/2" TRAILING EDGE
"SKY-SAIL" COVERING
AILERON OUTLINE (WHITE "TRIM-FILM")
BUILT BY - WARNER FRAKE
PLAN BY - WALTER A. MUSCIANO

sketchbook

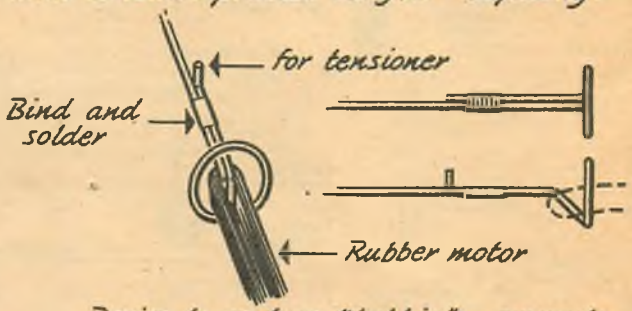
HAVE YOU DEVELOPED SOMETHING NEW IN CONSTRUCTION, CONTROL, OR FLYING THAT MIGHT INTEREST OTHER MODELERS? SEND A ROUGH SKETCH—WE'LL REDRAW IT AND PAY $2 FOR EACH ONE ACCEPTED



Chuck Sheridan, Seattle, Wash., pours measured fuel into partially completed tank to learn precise length – capacity.

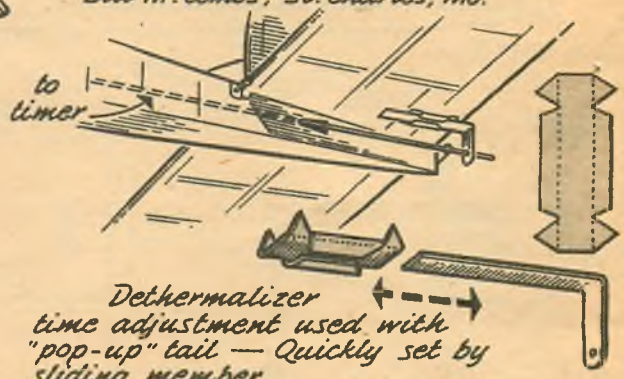


from Pete Granger, Duncan, Okla.



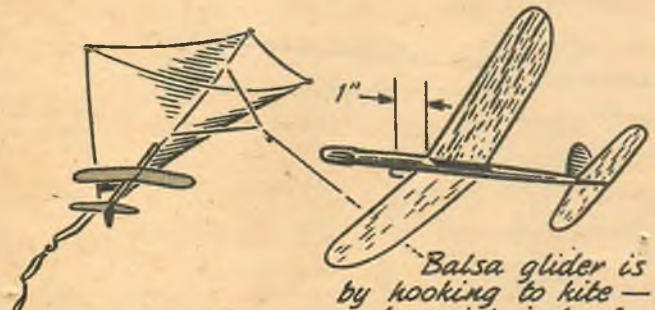
Device to replace "bobbin" — prevents "climbing" & strand cutting. Idea by Art Beckington, submitted by Bill McCombs, St. Charles, Mo.

Boris C. Urban, Bayside, L.I., N.Y., tilts inside stabilizer tip of stunt job up to keep lines tight during all maneuvers.



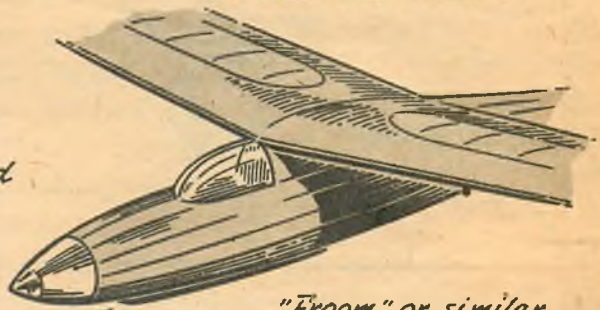
Dethermalizer time adjustment used with "pop-up" tail — Quickly set by sliding member.

B. Smythe, Toronto, Ont., Canada



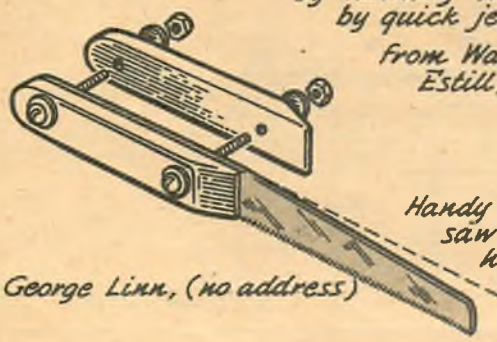
Balsa glider is towed by hooking to kite — released by quick jerk of string.

from Warren Krapse, Estill, S. C.



"Froom" or similar gas model spinner makes neat towline glider nose — also serves as ballast box.

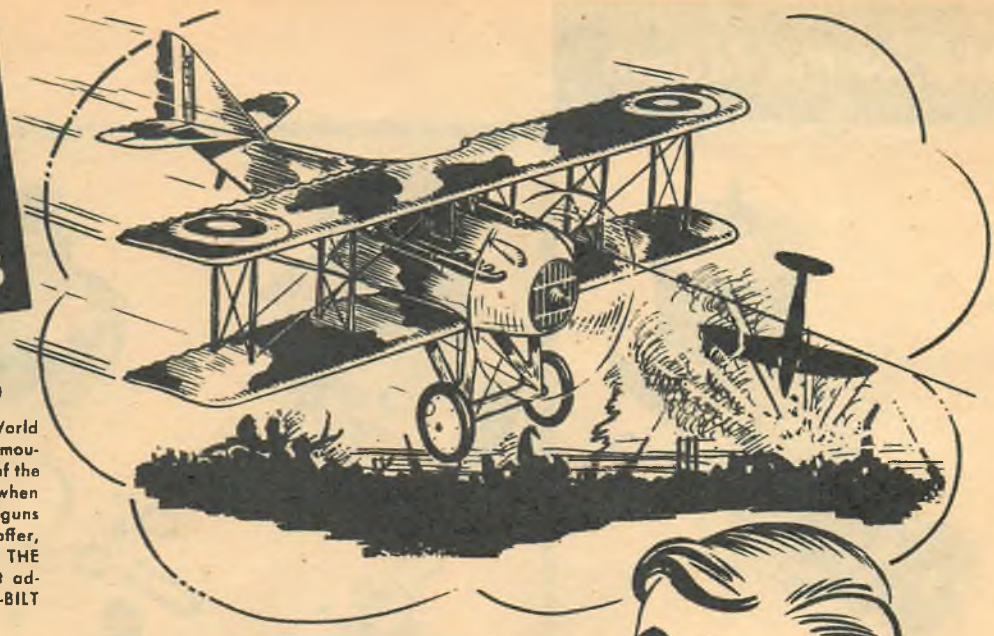
James W. Amis, Seattle, Wash.



Handy modelers' saw filed from hacksaw blade —

George Linn, (no address)

MODEL of the MONTH Selected By AIR TRAILS



SPEEDEE-BILT SPAD

Re-create the days of 1916 and World War I, with the open cockpit, camouflaged SPAD. Enjoy yourself, some of the thrills of the early American Aces when a burst of their Vickers machine guns sent the best the enemy could offer, down in flames. (The MODEL OF THE MONTH Spad is one of the newest additions to the famous SPEEDEE-BILT series. 75c.)

There's ROMANCE...THRILLS... ADVENTURE... in every MONOGRAM MODEL

SPEEDEE-BILT FLYING MODELS

LONG MIDGET

Whip this snappy racer around the pylon—past the stands in a flash—another air race victory at 200 MPH. Speedee-Bilt Kit 75c.

CESSNA SEAPLANE

Fishing is good in the Northern lakes. Get there quick in your Cessna and drop in from the sky. That's the life. Speedee-Bilt Kit 75c.

ERCOUPE

It's a swell Sunday and we're on our way to keep a date 200 miles away. *Just a short jaunt in our Ercoupe.* So easy to fly too. No rudder pedals. Speedee-Bilt Kit 75c.

MUSTANG F-51

Line up the sights as you dive out of the sun at 400 MPH and away goes a pair of rockets and an enemy locomotive disappears. Speedee-Bilt Kit 75c.

OTHER SPEEDEE-BILT MODELS. Boeing Kaydet — Piper Cub — Aeronca Sedan — Monocoupe. Each, 75c.

JET RACERS

MIDJET

You're in the pack, jockeying for position. You're off! with the engine roaring and the cheers of the screaming crowd. Midjet Kit 85c.

AQUA-JET

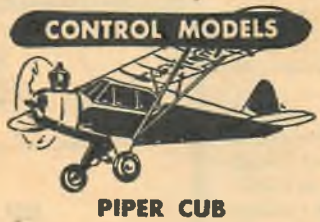
Over the top of the water and doing seventy. What a wonderful feeling. It's a real thrill to race an Aqua-Jet. Aqua-Jet Kit 60c.

Realism! Authentic Design! Easy to Build!

We can't all be heroic World War flyers. Neither can we all be ship's officers or dare-devil, helmeted, track-burning race car drivers. But we all can dream, can't we? — and have genuine fun and thrilling relexation building, flying and racing MONOGRAM MODELS. Get a Monogram Model today — any one for a starter. You'll be sure to want more for there is nothing else like Monogram Models — anywhere.

OTHER JET RACERS. Hot Shot—Original Jet Racer, 60c and Mono-Jet — Indianapolis Type, 85c.

CONTROL MODELS



PIPER CUB

Remember how good it felt when your Cub's wheels touched the runway after your first solo? Flying a Cub is still a grand feeling. Watch the envious eyes as you step out. Also, the sister ship—AERONCA. Exact scale model kits, each $4.95

HISTORICAL SHIPS

BATTLESHIP MISSOURI

It's Tokyo harbor and the "Big Mo" is there. Enemy officers come aboard, salute and sign the peace papers that bring the great war to an end. You're proud of this magnificent ship and the record she holds.

OTHER SHIP MODELS. Destroyer HOBBY and Carrier SHANGRI-LA. Ship model kits, each $1.00

CONTEST FLYERS

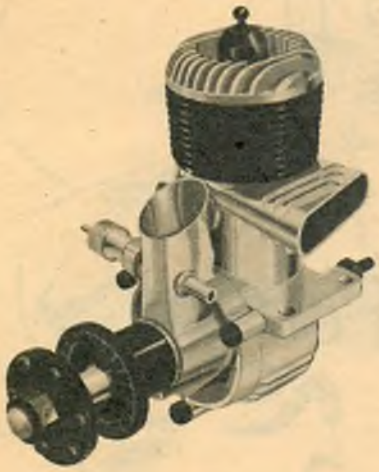
PROWLER

You're after a record and the Prowler gathers in the hardware as you head for the blue in a steep climbing turn. Relax brother. Enjoy the fun. Stick Model Kit. Also, the PIRATE, cabin model kit. Each kit, $1.25

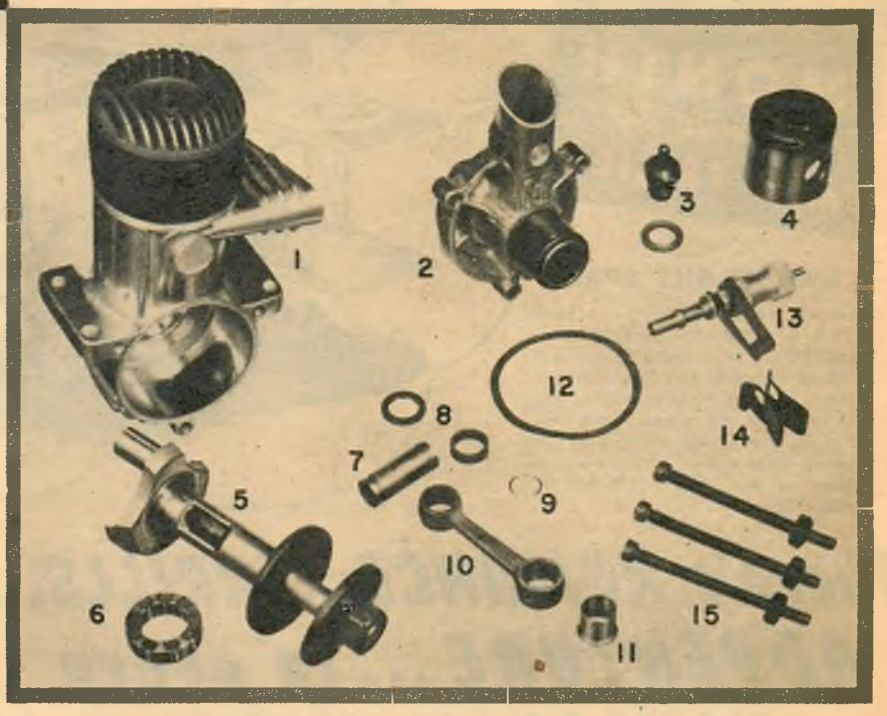
AT YOUR FAVORITE STORE. Good dealers everywhere stock all Monogram Models. If you cannot locate one, order from address below. Add 25c for packing and shipping from nearby dealer's stock.

MONOGRAM MODELS, INC. • 225 N. RACINE AVENUE, CHICAGO

Motor of the Month



Ohlsson 33



New O&R Red Head is interchangeable with the "23" and "29" for two-class flying

■ Two-class flying is coming to the front these days; newest indication emanates from Ohlsson & Rice who make their bid with a .33 cubic-inch-displacement engine that is interchangeable with their well-known .29.

Performance data shows good high-speed operation. Its medium compression ratio and large displacement mean free flight fans should pay particular attention to the high power output with very little vibration. A lightweight steel piston used with a large crankshaft counterbalance results in smooth running.

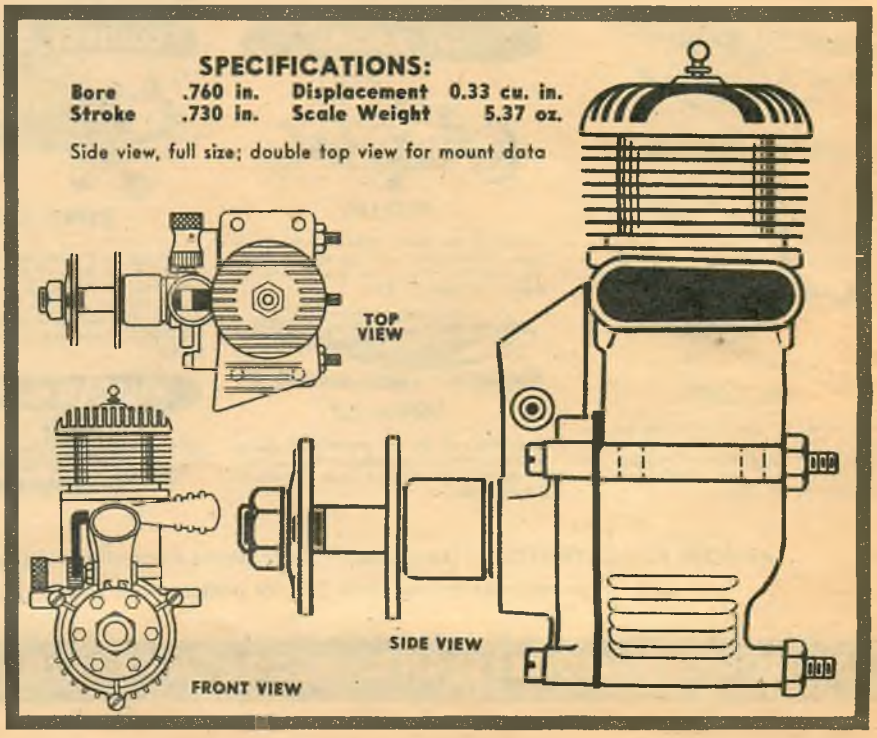
Stunt pilots should be well pleased with the power-weight ratio and a good fuel level test. The Red Head is also in the class for beginners and occasional flyers because it starts very easily and does not snap around so fast on the first explosion as to bruise fingers.

The engine test was started with a good break-in. During the first hour of operation there was some tendency to overheat, so it was given five hours on a 10/8 prop at 7,500 rpm. This put it in good condition for flying, but still it was too tight for high-speed tests. Five hours on a 9/6 prop made it loose enough to run at 12,000 rpm on a lean needle valve setting, so the tests were started.

The manufacturer's recommended fuel was used in obtaining results shown. Removing the venturi produced a gain in rpm at high speed but also made the engine more difficult to start. Hotter blends of fuel caused very little increase in rpm and made the engine run very hot. Excellent results can be obtained at speeds around 10,000 rpm. Higher speed can be had but this puts unnecessary wear on the engine.

Throughout the test it was found that easy starting resulted when the engine was primed with five or six drops of fuel in the intake and little or no prime in the exhaust.

Recent "Motor of the Month" articles list a new figure in the performance data as "Fuel Level Test." This figure is an indication of how sensitive the engine is to changes in fuel mixture. The test is made by lifting the fuel tank up and down while the engine is running and measuring how far the tank can be moved without a great loss in power due to (*Continued on page* 72)



Jim Walker GIVES YOU *More Flying Fun*

A-J FIREBALL

The plane that originated U-Control flying is first for beginners because it's easiest to build and fly...first for adanced flyers because it's highly maneuverable...first in value because it's the most complete kit of all... **$6.95**

No matter whether you are in your own backyard or the front circle at the "Nationals", you'll have more thrills per minute...more precision performance...and *more flying fun* with Jim Walker's *Flight-Engineered* developments for model flyers of all ages.

FUEL REGULATOR

Eliminates Conk-Outs

Assures constant fuel flow at all times by supplying fuel under pressure in any flight position until tank is dry! Fuel Regulator and Jim Walker "Easy-Fill" Pressure Tank, complete . . . **$2.50**

U-REELY CONTROL
Now with New Safety Lock

You are always ready for action with U-Reely Control because your flying wires are kept off the ground and ready for instant use at all times. You can make quick take-offs entirely unassisted...hand launch your plane...or take-off with shortened lines, "fly out" for stunting at a safe altitude, then reel in to land. **$7.50**

With single strand steel control wires.....

Wtih 80-ft. .018 dia. stainless steel cable... $8.50

AMERICA'S FAVORITE *Ready-To-Fly* PLANES

The Sensational

New CEILING WALKER

This novel Helicopter flies straight up out of your hands and hops along the ceiling. Outdoors it climbs straight up 'til unwound, then does aerial acrobatics on the way down.

25¢

"74" FIGHTER

Does 19 different stunts with ease. 12¼" cambered wing, smooth streamlined fuselage..... **10¢**

A-J INTERCEPTOR

Folds its wings for launching, automatically spreads them to soar. 16½" cambered wing. Complete with launching stick..... **39¢**

A-J HORNET

Will R.O.G. and fly 500 feet! Unbreakable plastic prop, 18" cambered wing, heavy duty rubber motor..... **50¢**

Jim Walker A-J AIRCRAFT CO.

DEALERS: ***Write for catalog and name of nearest jobber.***

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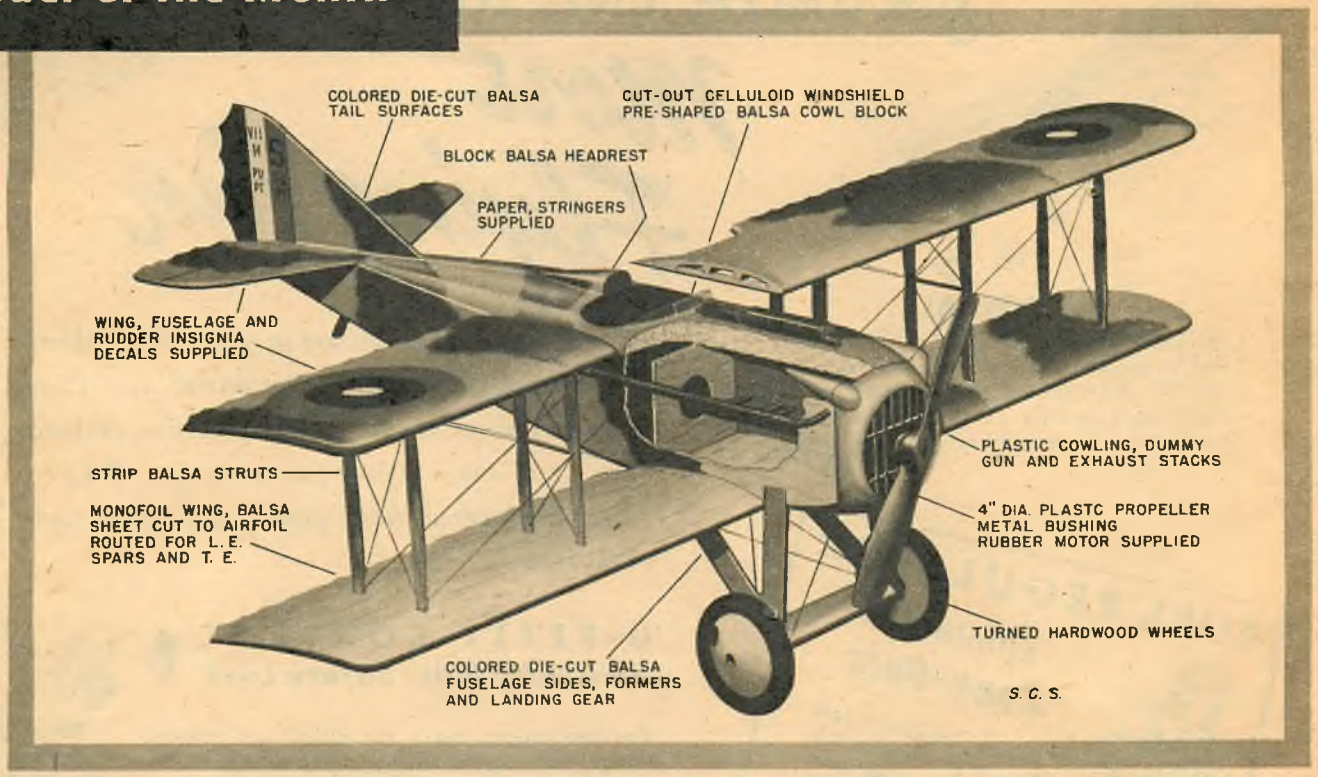
Model of the Month



SPAD

Monogram's newest trio of Speedee-Bilts includes this World War One'er; Monofoil wing is featured

■ "Perhaps the most famous of World War I aircraft," we read from the plan, "was the Spad 7 which first saw service in 1916. The 140 H.P. Hispano-Suiza engine gave it a top speed of about 130 M.P.H. Construction was mainly of wood and fabric. Standard armament was a single synchronized .30 cal. Vickers machine gun. Spads were used in action by French, English and United States Squadrons. Captain Eddie Rickenbacker, famous American ace, flew a Spad to 26 air victories."

It didn't take much "selling" on the part of our hobby dealer to convince us that Monogram's Spad qualified for the Model of the Month spot. After all it was a World War I oldie-but-goodie, a bipe (love those two-wingers!) and had a prop on front (those jets do begin to look alike, don't they?).

When the Chicago firm of Monogram Models, Inc., first introduced their line of Speedee-Bilt flying models at six-bits apiece, it included the Piper Cub, Aeronca and Monocoupe. The success with which these three met resulted in the Boeing Kaydet (PT-17), the Ercoupe and Dave Long's Midget Goodyear racer.

Newest S-B's are the Cessna Seaplane, the North American F-51 Mustang and the subject under discussion—the famous Spad. And fresh from our workbench is our own finished Spad. It is dressed up with those precise plastic parts which are Monogram hallmarks. The scale appearance in a model at this price is most impressive. Even if you discount the beneficial effects of exact-scale plastic nose radiator, machine gun, and exhaust manifolds, there are numerous other fine points that only a connoisseur may fully appreciate.

Let's examine the red, white and blue kit, quite representative of the nine Speedee-Bilts. Slide the stuff out of the carton, open the plan, and spread the material about. At this point, if you were exam-

(*Continued on page 60*)

first family of fuels

The distinguished Francisco line comes from the world's oldest, largest and best equipped racing fuel laboratories. Its achievements include more than 100 official world speed records and endorsements by 22 engine manufacturers.

Whatever your requirements—peak contest performance, smooth, trouble-free sport and stunt flying or dependable operation under widely varying atmospheric conditions—there's a Francisco fuel that's specifically designed to fit the need. The finest ingredients, rigid quality control, gallon-by-gallon testing and 24-hour-a-day filter control are your guarantee of maximum performance from every can.

For best results, choose from the incomparable fuel family with an honorable past and a brilliant future.

Write for your Free copy of our new booklet, "Contest Fuel at Its Best."

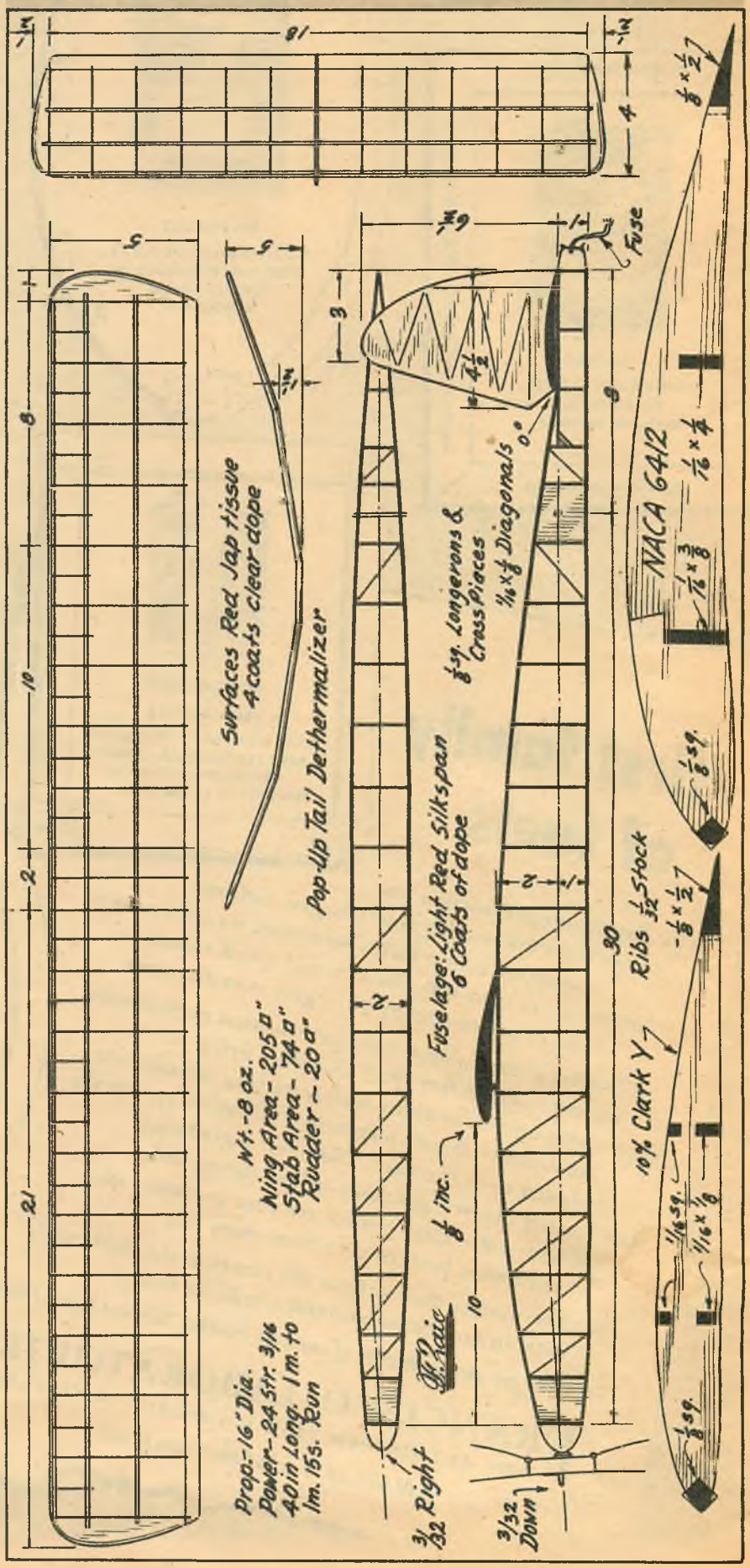
FRANCISCO LABORATORIES

3787 GRIFFITH VIEW DRIVE, LOS ANGELES 39, CALIFORNIA

Maker of "Fuel of the Champions"

RECORD REVIEW

• Anthony D'Alessandro of Philadelphia established an official AMA national record with this stick model at Plymouth meet. "Squarish" prop had washed-out tips.



FREE

THE MOST WANTED KITS IN AMERICA

FREE

GET YOURS TODAY

OR ANY TIME DURING THE FAMOUS O&R 15th ANNIVERSARY GIVE-AWAY CELEBRATION!

KIT
$3.95 VALUE
FREE

HERE'S HOW— O&R

Just go to your nearest model or hobby dealer and ask for an O&R "29" or "33" Engine with the *Gold Certificate*. Your dealer will sell the engine to you and *GIVE YOU, WITH HIS COMPLIMENTS, THE VECO "WARRIOR" KIT.* If you want the Veco "PAPOOSE" kit, an O&R "19" will entitle you to it. Purchase of an O&R "29" will give you the Veco "BRAVE". WHATEVER COMBINATION YOU WANT—THIS IS THE OFFER OF THE CENTURY. DON'T DELAY! ACT TODAY!

Veco props are designed right. They're made right. They are right. Properly selected for ship and engine, they can't be beat. Clip this ad and use it for reference in combination with O&R engines and for controline stunt.

O&R "19" Veco 8-6 prop
O&R "23" Veco 9-6 prop
O&R "29" Veco 9-6 prop
O&R "33" Veco 9-7 prop

KIT
$3.95 VALUE
FREE

KIT
$2.95 VALUE
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Veco PRODUCTS

HENRY ENGINEERING CO.
BURBANK, CALIFORNIA

Spad

(*Continued from page* 56)

ining the kit in a store, it'd be almost impossible to hold back your money. Contents seldom make such a colorful picture. The fuselage sides, tail surfaces, landing gear legs, and formers are printed in solid olive drab on the die-cut balsa sheets; the plastic nose and machine gun are light gray; the plastic prop is a bright yellow; decals of the French cockades and the hat-in-the-ring insignia are an eye-catching red, white and blue. See the two Monofoil-carved wings—it all adds up to a favorable impression.

Contents also include a sheet of gray tissue, a carved block for the forward top part of the fuselage, die-cut celluloid wind screen, eight assorted balsa strips for struts and stringers, a loop of rubber, sandpaper, wheels of proper diameter and thinness, headrest, and grommet for a propeller bearing. The plan features a full-size side-view showing camouflage and war regalia; and twelve informative construction and assembly sketches.

For a biplane, the Spad is unexpectedly easy to build. The fuselage is a matter of cementing formers between the die-cut sheet sides, fitting the top cowl block and adding a few stringers. The tail surfaces are sheet balsa; the fin, with diagonal grain, butts against the vertical grain rudder. The wings, like the wings in all the other Speedee-Bilts, are finished cut to airfoil (cross section) shape, outlined and routed out underneath leaving spar and edge material.

You may liken this type of wing to an easy built-up wing covered with sheet balsa on the top side except there is no building up to do. To finish a Monofoil wing you add several pieces of 1/16 inch square chordwise across the bottom surface; these eliminate any chance of the wing losing its airfoil shape and provide further means of attachment for the bottom tissue.

The center section struts being vertical helps no end in getting the top wing mounted, sometimes a touchy feat for the younger builders. It is safe to say that the combination of the Spad features and Monogram structural design has resulted in nearly automatic, accurate assembly. For example, after the one-piece top wing is cemented onto the center section struts and the bottom wing placed in the cut-out provided in the fuselage bottom, all you do is add the inboard and outboard interplane struts.

The machine gun, nose, exhaust manifolds of the Spad are matched in the Boeing Kaydet (Stearman) by a detailed air-cooled radial engine, in the Cessna seaplane by cowling and pontoon tips, in the Mustang by the spinner, nose, exhausts and canopy. All the Speedee-Bilts feature scale plastic parts.

Especially helpful is a small but thoughtfully prepared folder giving complete instructions on adjusting and flying the Speedee-Bilts. Important phases covered are balance, test glide, power flights, weight, dihedral, power and contests.

Designed as rubber-powered flying scale jobs, the solid model scalers are also edging into the Speedee-Bilt picture by finishing them off as mantel masterpieces, covering the wing bottom with thin sheet balsa instead of paper, adding wood filler and many coats of dope.

And leave it to the gas engine to get into the act! So far, everything including all-plastic shelf models has been put on the end of lines with the baby engines, and the Speedee-Bilts are no exception. Thanks to their carved wing construction, these little ships have plenty of beef.

If you don't mind too much what an .035 or an .049 does to the nose of a beautiful thing like the Spad, you can make a tethered whizzer of it, or its sister ships, by attaching a single line to the center of gravity position or to a wing tip. A small grommet inserted in the tip would act as an eye for the line.

PHOTO CREDIT LIST

Page 14—Piaggio; Howard Levy.
Pages 20-21—Courtesy George Bogardus.
Page 22—Little Gee Bee cockpit: Harold G. Martin; all others: courtesy George Bogardus.
Page 23—Courtesy George Bogardus.
Page 27—BL: Harold G. Martin.
Page 30—RC, BL, BR: Nonie Horton.
Page 31—Smith-Coda.
Page 32—T: Maj. H.L. Angle, Ore. CAP.
Page 33—L: R.I. CAP.
Pages 36-37—Smith-Coda and Bob Tucker.
Page 38—Smith-Coda.
Page 39—Bob Tucker.
Pages 42-43—Smith-Coda.
Pages 44-45—Walton Hughes.
Pages 48-49—Smith-Coda.

Job: Designer

(*Continued from page 26*)

straight aircraft design. Air Trails in future articles will examine some of the other jobs he may have elected to pursue. He's on his way to becoming a lead man now. Further on we'll see what that important function entails.

Let's say this is George's first day on the job. Schooling over? Scarcely. He gets a well-thumbed DRM, a primary on procedures; a design handbook, and a stress manual. He must become acquainted with all the tools of the department. If he is to work on an Air Force or Navy job, he must become familiar with AN standards. Then he delves into the company's standards. Last but not least, George sits for instruction outlining his responsibility (a word he will hear often), and the lines of authority from the chief engineer down to George and his first drafting job.

George starts by making drawing changes. He's not asked as yet to project his imagination onto a blank sheet of paper. It may be a clip, an angle or a stiffener. It's got to be simple, for the newcomer has a lot to learn. He changes the clip slightly, strengthens the angle, stiffens the stiffener. He makes 25, perhaps 30 changes. The chief engineer isn't interested in those parts as such. He probably doesn't even know George's name. But as the ultimate authority, he wants every man in design to prove himself capable. So George rapidly becomes familiar with the company's drafting system—and, more important, begins to get an idea of how to arrange his own detail on blank paper.

Where does George get that detail? A few weeks after first punching the time clock he is handed a layout drawing, a picture of many parts that go together to form some larger assembly. He reads on that sheet a few key dimensions. It may resemble a jigsaw puzzle at first. But George, being alert, turns to a more experienced man for advice. He breaks down the puzzle, and soon discovers he can interpret the layout and work back to the detail parts.

More drawings follow, and by experience coupled to quality work he demonstrates an ability to progress to assembly drawings. How long? Several weeks, perhaps; maybe several months. All depends upon his demonstrated ability and job openings.

He really becomes conscious that he's part of an important team when he tackles assembly drawings. Here he takes the many detail parts and puts them together, in his imagination and with his sharp pencil, by one or more manufacturing processes. He envisions the roles of bolts and rivets. He's taking a big step toward later layout work. He checks constantly for clearance for standard tools, and makes sure he's allowing the proper distance between rivet edges. He is building up a knowledge of tolerances, for unless individual parts fit properly there can be no airplane.

He's been working two years now, and he has progressed from "B" draftsman to "A" draftsman. Ahead lies opportunity as a "B" designer. Now, he sees, the men are beginning to be separated from the boys.

Is George ready for advancement? If he can do layout work requiring con-

siderable stress analysis—lay out bolt and rivet patterns, and have his product check out without revision—get along easily with his neighbors on all sides—the answer is probably "yes."

And so, George goes up to "B" designer. Now he is becoming a specialist. If he shows an ability to keep his job moving and demonstrates creativeness, he will continue upward. Because he is becoming a specialist, he no longer can jump from section to section. He cannot leap willy-nilly from wings to cylinders.

Remember how George broke layouts down to detail? Now he begins to turn out the layouts themselves. From basic dimensions supplied by preliminary design, he makes rough sketches for assembly drawings. George doesn't get all the dope he might like. The lead man (a supervision engineer) hands him a memo something like this:

"Start on door mechanism to operate bomb bay doors between stations 215.5 and 281.5. Mechanism operated hydraulically off ship's hydraulic system, 3000 psi. Obtain loads from aerodynamic section for operating and locking door. Must have emergency operation in case hydraulic system fails. Operate lock by first motion of cylinder . . ."

George gets the door loads from aerodynamics. He already knows the hydraulic system's operating pressure. Now he finds a spot in the plane where doors will not interfere with bomb drops. For 10 days he labors, getting the total picture. Then he begins coordinating with other installations in that area, such items as electric wiring and control cables. He confers with eight other groups: armaments, wings, controls, electrical, equipment, hydraulics, landing gear and power plant. He must know their plans as they might affect his precious doors. That airplane must be up and flying within 18 months. George has no time to waste.

Working rapidly but confidently, in due course he completes the layout drawings. These his lead man passes along to an "A" designer, another specialist who has progressed a year or two further than George in experience and ability. But George doesn't lose track of his work. He may go on to another interim job, but he frequently checks the production drawings rendered from his brain-child to make sure the design is correct, that his ideas are carried out.

George may become impatient, since he will be repeating this sort of thing for two years before he is considered ready for another boost in his career. But the eventful day arrives, and he finds himself an "A" designer, creating entire systems, rather than segments of systems. Perhaps he gets an entire hydraulic system. How many units are operated by this system, how much power is required, what does the customer want? He calculates power requirements, studies catalogues to find equipment immediately available.

Quickly he hooks up the entire network, on paper. Refinements will come along later. Once his calculations are complete, the picture goes on down to others for elaboration in detail. Now George really appreciates the importance of his work. The biggest and most modern airplanes must still have a good hydraulic system.

Again, he follows each set of drawings, for the responsibility of each man who labors on them is now his, too.

Design is a broad term, indeed. One doesn't escape design as he climbs to the top. The chief engineer is no bet-

ter than all the designers responsible to him. George may go on to become a lead man or a group supervisor. As a lead man, he will coordinate the work of the design group on a particular project. He quits pushing a pencil, picks up personnel problems. As many as 150 men may be engaged on one wing design, and the lead man must know exactly what each is doing—and how well.

As a lead man, George will begin to think of schedules and budgets. He establishes priorities according to design. Brackets must go ahead of the main piece. And he dare not exhaust his man-hours—another way of saying money—before the job is done. He is stepping along toward business management. Further up the ladder await jobs as section supervisor, staff assistant, assistant production engineer, design administrator.

Let's go back several steps.

George came out of school with a good study record. What, then, became his chances for success?

Says Gen. Donald Putt, director of research, USAF: "Above all else he must learn to get along with people."

Says "Boss" Kettering, General Motors inventing wizard: "The man (succeeds best) who can make the best decision at the time it has to be made. He it is who has the best education, and it matters not how he acquired that ability."

There's another important factor: enthusiasm. We read somewhere recently that the man who is fired with enthusiasm is seldom fired by the boss. Sound training and enthusiasm. It's a hard-to-beat combination.

And it can be yours.

Engine Tune-Up

(*Continued from page 45*)

phase of engine operation requiring careful attention. The electric spark plug serves to illustrate the problems involved. In a correctly adjusted engine, fuel doesn't explode instantaneously, but burns at a fast rate of speed, resulting in a "push" rather than a hammer blow on the piston. At slow engine speed the fuel can be ignited when the piston is all the way up (at top dead center) and full pressure will be exerted before the piston moves too much.

However, at high speed power would be lost because maximum pressure would not develop till the power stroke was half completed. To compensate this late pressure peak, the spark is advanced as much as 60 degrees ahead of top dead center. Burning starts to take place when the piston is moving up, but this loss is more than offset by increased power from the work stroke.

Good ignition also depends on getting the fire started with enough punch. Cold electrodes require an extremely hot spark, so most spark plugs are designed to operate at high temperatures. The trick is to have the electrodes as hot as possible without igniting the mixture before the spark occurs. Low compression engines use a "hot plug" (such as the Champion V-2) with long thin electrodes that have low cooling capacity. High compression engines develop so much heat that a hot plug would melt or pre-ignite the fuel, so "cold plugs" (such as the Champion VR-2) must be used.

Glow plug ignition at first appears far simpler because of fewer parts and equipment, but actually more careful adjustments are necessary.

Glow plug ignition depends on a hot element or wire coil to ignite the fuel mixture after it has been compressed. Experience shows that extreme high compression ratio and very hot glow plugs do not result in steady running, so a nitrated material is added to the fuel to make it explode at lower temperatures. Ignition timing, which corresponds to spark advance, is controlled by a balance between glow plug (hot or cold), fuel mixture, engine rpm, and weather conditions.

If your engine is operating correctly and you decide to use a smaller propeller for more speed, the balance is upset. Some other factor must be changed to compensate for the new propeller and to restore balance. A few simple tests can be applied to determine whether your engine is firing too soon or too late—these are discussed later.

Detonation is another bug that heckles the best engine designers, and model engines often suffer this ill. All the details concerning this are not yet fully understood, but in general it can be said detonation occurs when the fuel is heated or compressed too much, resulting in a violent explosion rather than rapid burning. Shock waves bounce back and forth in the cylinder, causing vibration throughout the engine and producing a hard knock.

Model engines make so much noise that the knock cannot be heard, but the other symptoms show up. The speed fluctuates rapidly, and you get the impression that the engine wants to go faster and keeps trying, but just can't seem to make it. Changing the needle valve setting has little effect. Several factors contribute to this condition and should be taken into consideration at the same time.

A given fuel, such as gasoline, has a critical compression ratio above which detonation takes place. Alcohol will burn at much higher compression before detonation. Addition of motor oil to fuel increases detonation. The following factors all act together to determine whether or not your engine will detonate: 1. Fuel critical compression ratio. 2. Engine compression ratio. 3. Engine temperature. The trick is to determine which one or combination of factors is causing the trouble.

Starting experiments with a new engine often makes things more difficult. A tight-fitting piston expands and causes extra friction and heat. Resulting high temperatures leads to detonation or pre-ignition from overheated plug, and this causes more and more heat, results in a vicious circle. Obviously the engine should be broken in at low speed so it will limber up and run cool, after which you gradually work up to maximum power output. But what happens when it has been run enough to be broken in and still won't perk? That's where the good mechanic steps in for a tune-up.

If your engine isn't running properly and you think something should be done, stop and make the following check before operating. Are you following the manufacturer's instructions about fuel, propellers,

and engine adjustments? Don't try to operate at speeds far above that intended by the manufacturer, or use souped-up fuel. If an engine should run at 10,000 rpm you can expect excess vibration, overheating, rapid wear and unsteady operation above that. If trouble still exists with correct operation, it must be diagnosed and corrected.

A very common and serious trouble is lack of clearance for expansion of piston. Some engines will loosen up in a half hour of break-in time, while others may stay tight for six months. A tight engine will start easily, due to good compression seal. Speed increases for a short time till the piston gets hot, then a gradual slow-down takes place. Turning the needle valve will not restore speed and the engine finally stops very hot. Choking down to very slow speed by putting your finger over the intake will usually cool the piston and the engine keeps running. As soon as the intake is opened up, the speed picks up in a burst and then slows down again.

I had this trouble with a Madewell "49" and never could get top speed out of it until the piston and cylinder were lapped to give more clearance. In this case a fine polishing compound (Carborundum Grade H40 Fine) was spread over the piston and then lapped inside the cylinder with a combination twisting and reciprocating motion. Then all lapping compound was washed and scrubbed from the parts before assembly. During the first few engine runs, speed kept increasing due to the remaining compound still cutting.

As you can see, only a very fine abrasive should be used or the engine will soon wear too loose. An even better lapping job can be done by using either of the two cast-iron laps shown in Photo 3. Either of these can be turned out for you by a machinist. The round bar is for lapping a cylinder and the block with a hole is for pistons. Both laps are split and provided with taper pins or screws for adjustment. A cylinder is lapped as follows: put a small quantity of lapping compound (600 grit or finer) on the lap and insert it in the cylinder. Tap the taper pin in till the lap rubs hard on the cylinder and then work in and out with twisting motion.

Tight spots can be felt by increased drag and worked out by rubbing in that area. A Drone Diesel was limbered up by this method till the piston could be pushed through the cylinder easily with one finger, but would not drop through due to its own weight. Excellent results were obtained

with the loose engine which still retained good compression seal.

Steel and cast-iron pistons can be lapped, but don't try this on an aluminum piston. Instead use a smooth mill file to remove high places which are indicated by shiny spots. A piston rubbing on the skirt is shown by the light streaks near the bottom in Photo 2. Remove high spots by one or two smooth rolling strokes at each point, and then reassemble engine and run. If engine is still tight, remaining high spots will be marked and they can be filed down again.

From three to ten attempts may be required. When done properly the piston fits even against the cylinder and rides on an oil film rather than rubbing metal to metal in a few spots. You will know instantly when this job is done because speed jumps up and engine temperature drops due to reduced friction. A bad case of rubbing between piston and cylinder will cause excess heat and may result in detonation.

Spark ignition gives very little trouble other than dirty points, worn-out spark plugs or bad wiring, and a good check-up now and then keeps us out of trouble. But glow plugs can be quite a problem. Ignition timing all takes place inside the cylinder and can be determined only by external symptoms. An engine firing too soon will run with a sputtering noise and be very hot. The needle valve can be screwed in and out several turns with little effect.

This condition is hard to distinguish from detonation due to high compression ratio, but changing glow plugs will tell the story. A thick element plug will correct advanced firing, but will not cure detonation due to high compression. A glow plug engine firing too late is very sensitive to needle valve adjustment and in extreme cases will sputter.

Don't be fooled by ignition starting characteristics because they are not always the same as running conditions. For example, an engine may kick and fire violently when starting, but run cold or fire too late. Starting depends on how hot the batteries heat the plug element and will vary with condition of battery, size of wire leads and type of plug. Experiment by varying fuel mixtures, propellers, and glow plugs one at a time to control ignition timing; check the results each time at full speed. Vary the amount of electric current reaching the plug to control starting.

Worn engines often suffer from poor com-

pression seal. A lapped piston in this condition can be salvaged by chrome plating and refitting or a new piston may be fitted, but a new engine is usually so cheap that these methods are not practical except for the experimenter. A ring engine on the other hand can be rejuvenated more easily. New rings can be purchased from a dealer or the manufacturer and are easy to install. Always check ring gap by first inserting the ring in the cylinder as shown in Photo 1.

Some expansion takes place but a ring gap of .002" is sufficient for most engines. After installation, wear on the outside surface of the ring will soon produce sufficient clearance. Excellent performance can be obtained by filling the gap on an old ring with silver solder, resplitting and fitting to the cylinder.

Piston rings sometimes become frozen in the ring groove so they are not free to expand against the cylinder. To correct this, carefully remove ring using shims as shown in Photo 4. Clean carbon and gum from ring groove and remove any burrs with a fine file. Replace ring with its bright surface down where it may seal on the ring groove face. When assembling a ring engine, place the ring gaps on opposite sides and cover rings with heavy oil so engine will start easily.

To tune an engine up properly the following are required: 1. Sufficient piston clearance to allow for expansion. 2. Good compression seal. 3. Correct fuel for compression ratio of engine. 4. Proper ignition timing.

Most of these factors are controlled more by the owner than by the engine manufacturer, so it is up to you.

Home-Bilts

(*Continued from page* 22)

plane never was something that could be whipped up willy-nilly. Or it never should have been. It has requirements to meet for licensing, and in order to protect your money and time only proved plans or kits should be selected. By home-built is meant a true sport plane of less than 10 pounds per square foot of wing loading, with less than 50

miles an hour landing speed—not a midget racer. It goes without saying that certain minimum skills are necessary; there simply isn't any method by which a completely unskilled and inexperienced person can hope to build a plane that will pass a license examination. And how about the license?

Application should be made to Washington for a registration certificate and number; this, with a weight and balance report and an inspection report by a licensed A & E mechanic are presented to the local inspector when the airworthiness certificate is applied for. The inspector then fixes a date for the inspection. This usually consists of paper work and a walk around the airplane. The inspector may ask—figure he will—for the drawings the plane was built from and evidence that it is strictly a home-built airplane.

If it was built by someone else it may have to be torn down and reassembled, and the paper work repeated. This discourages buying home-built planes and competition with manufactured products. This is a vital point if home-builts are to receive fullest cooperation from CAA. The new owner necessarily gets to know what makes his ship tick. Ignorance of weak parts or places to inspect won't help you get that license. In a plane like the Cub, produced by the thousands, such things have long since become standardized procedures, but any home-built craft should be watched throughout its life.

After the inspector further satisfies himself that the plane can be flown and controlled, he will issue a certificate with restrictions that limit the ship to the continental U. S., to be flown by only the owner or associates, and not over densely populated areas or open-air gatherings. After the first licensing, the craft may be recertificated each year by a Designated Maintenance Inspector.

There's a world of difference between the average 1930 home-built and the 1950 amateur craft, particularly when you consider each in relation to the times. Most of the famed kitted ships came before the era of the Cub. More than a matter of making a plane economically, it was a case of finding anything that would get you into the air, even if you had to make it! The Heath, et al, thrived in the predawn of real factory lightplane production. With used-plane prices at a low level, the modern home builder makes a plane for the pure satisfaction, or to get the kind of performance he wishes. Would the Heath thrive today? Maybe yes. Probably no.

The Heath was a toothsome morsel. Small, light, compact, and powered by the improved Henderson motorcycle engine, it was, however, tailored to Ed Heath who was a small man. Structurally sound in the air, the Heath used such small members that damage could result from bad landings or from rough handling on the ground. Most builders made the Heath overweight, causing further overloads. Tail areas were small and aileron action typically slow. Many of these items were changed on well-known individual Heaths. As designed, a Heath weighed but 270 to 290 pounds empty. Excellent modifications by Peterson caused it to weigh 375 pounds with the same motor, while the Rupert weighed 450 with the reliable Salmson, brakes, tail wheel, lights, and so on.

Compare this with the present-day Harry Thalman's Special, a wood geodetic design. With a 41-foot wing and a 65 hp Velie, it cruises at 120 miles an hour and lands under 40. Thalman puts it down all over Wyoming, Utah, and Colorado, on hay field and road, and reaches altitudes up to 10,000 feet. The truth of the matter is that even before the war the home-builts were growing up. The Peterson, the Rupert, Wimpy, and other excellent designs marked the trend. When the CAR was propounded during the Thirties, it became economically impossible to manufacture your own airplane.

More indicative of postwar home-builts is a sweet job by Jack MacRae, a Grumman engineer. Powered by a 65 hp Lycoming, it is a redesign of a Driggs Dart. Features include a full cantilever wing, shoulder strap harness, Cessna type gear. It spans 27 feet. Then there is the Harth Special, from The Dalles, Oregon, another parasol with a faired rounded fuselage and a Davis airfoil. On but a 36 hp Crosley, it cruises at 75 miles and lands at 41. Span is 27 feet. Landing the Harth is as easy as landing a J-5 Cruiser. In Plainview, Texas, E. A. Bode turned out a 20-foot low wing from Cub parts. Two-place, it has a top of 123 miles an hour, cruises at 107, weighs 420 pounds, all on a 75 hp Continental.

The postwar home-built movement is off to a good start, primarily because of the safe and sane attitude of the American Airmen's Association, which bands together the home-built enthusiasts.

In all probability, CAA will continue to cooperate with the movement that already has pioneered the Cessna type gear (Wittman); the Lanier plane; the experimental work of the Pou du Ceils; the strong, light geodetic structures by Yates; large aspect wings by Taylor, Long, Thalman; spoilers by the sailplane crowd which, unlike flaps, don't give you lift when you don't want it. Or prop design by Sensinich, Long, Lorenzen.

Thus was the airplane invented.

CAA's View

(Continued from page 23)

He may be critical of structural strength, the kind of material used, the controls, etc., and decide the craft is not adequately safe for flight.

If he decides that an experimental

certificate be issued, he can then place restrictions upon the plane's operation. He may restrict it to the neighborhood of the home airport, or within the state. He may permit its use within the United States, but restrict it to operation outside control zones. He may even permit the carrying of a passenger in the plane but never for hire.

Therefore, the CAA has this kind of policy on this matter: there are no specific regulations in force and the most the CAA can do is to use all its experience and resources in the interests of safety.

The procedure is for anyone who contemplates building an airplane at home to get in touch first with the CAA Aviation Safety Agent. And we mean "first." Before plans are on paper, this agent can help the builder. He can help him as he goes along with his design and construction, can save a lot of disappointment before the final day when he must say whether the plane may fly or not. He is concerned, of course, with the desire of the builder to fly, and it is his duty to encourage and foster flying. But he is more deeply concerned with the safety of all who fly, and that will be the basis of his judgment of any home-built airplane.

This Safety Agent has at his elbow another CAA man who serves the industry as an engineering representative. Today his principal duty is assisting the public in cases where major structural changes are made in existing airplanes. But he is available also to the amateur builder in case the Safety Agent finds aerodynamic questions which he cannot answer. Between these two, however, the Agent with years of practical experience in flying, and the qualified aeronautical engineer, the home builder certainly can get answers to his troubling questions.

As to the CAA's stand on the matter of the kit from which a purchaser can build his airplane, we have no objection to this method of cutting down the cost

of the airplane to the personal user. Our problem is to see that these planes, when they are completed, are airworthy and can be so certificated. If the manufacturers of such kits would first build a plane and get it certificated, we could then certify reproductions of such a prototype. This has not been done by the kit manufacturers. The builder, therefore, often curses the CAA when he has spent his time and money only to find that the airplane cannot be certified as fit to fly.

There are some steps under way to get this troublesome problem into a more sensible pattern. We are engaged in development of a special purpose agricultural plane, and we have proposed to the Civil Aeronautics Board a new category for planes built by amateurs. It may be that out of the present effort in building a "restricted" category airplane, we will be able to set down some rules for the back-yard builder. But meanwhile, we urge him to take his purposes and his problems to his best friend, the CAA Aviation Safety Agent.

It is possible that we will have more definite standards for special purpose planes within a couple of months. The CAB is considering a revision of the Civil Air Regulation giving to the Administrator the authority to establish standards for special purpose planes. such as dusters, advertising planes, etc. When and if that regulation becomes effective, we would be able to establish and publish standards for the amateur-built plane in more specific terms than we can now.

—Charles E. Planck
Chief Current Information Division, Civil Aeronautics Administration

Loopy

(*Continued from page 48*)

"Streamliners"! (Need any more proof?)

With 175 square inches of projected wing area, our model will take engines from .099 to .199 cubic inch displacement. In order to preserve its sleek lines we fitted the model with a dropoff gear—this is optional, however. The original model did not sport a belly wheel because we take off from concrete and during the flight the pilot can walk over to a grassy plot where the model lands without scrapes or dents. Realizing all model builders do not have comparable facilities, we suggest the belly wheel as protection. Now, on with construction:

Begin the wing first. The trailing edge should be very hard balsa in one piece from tip to tip. A ready-cut beveled trailing edge is recommended. Cut all the ribs from 1/8" medium balsa and cement into the notches in the trailing edge. The leading edge is medium soft balsa and should be installed next. Splice it as shown at the wing root. Notice that the wing tapers in planform only and that the leading and trailing edges maintain a constant cross section from root to tip.

Note the concave curvature of the ribs near the tips. These produced excellent results in performance. Use plenty of cement and add the tips. Install the bellcrank foundation. Using a leather punch (15 cents at dime store) or a hot nail, make holes in the ribs for the control line lead-out wires. Drill the leading edge and tip, as the plans indicate, for the lead-out lines. Add these lines to the bellcrank and install the bellcrank, first slipping the lead-outs through the ribs.

The center section is now covered over with 1/16" sheet on both top and bottom. Leave a portion uncovered for access to the bellcrank in order to install the control rod later. Sand the entire structure. Cover the whole wing with gas model Silkspan or Sky-Sail. Use thick dope for the adhesive. Apply three coats of clear dope after the covering has been shrunk with water. Sand the covering carefully with superfine sandpaper between each coat.

The fuselage is built directly onto the finished wing. Cut the vertical keel and formers from 1/8" sheet. The keel is in the vertical plane and in two pieces separating on the horizontal center line. When cutting the keel, cut away for the wing, belly wheel and stabilizer. Note that the keel extends from bulkhead B to former F only. The formers are cut in two and four pieces as shown and are cemented to the keel and/or wing as indicated.

Cement the keel to the wing. Attach the formers in place. Engine-mount construc-

tion will vary depending on the engine used —beam or radial. The plans illustrate four engines. Do not add the beam type engine mount until the bulkhead and metal backplate are installed. Use sheet brass or tincan metal for the backplate (do not use aluminum because it cannot be soldered).

Solder the copper or brass tube landing gear sockets to the backplate. Be certain they are parallel. Solder the engine mount nuts for radially mounted engines. Bolt the backplate to the plywood bulkhead and cement the bulkhead to the keel. Bend the belly wheel strut and sew to the keel with thread and needle; cement well. Now add the beam mounts if required. These are bolted and cemented to the bulkhead.

Cement the stabilizer in place and hinge the elevator to it after the control horn has been added. Install the control rod. Test the control system. Purchase the fuel tank, or fabricate it yourself. When installing the tank be sure that its center is in line with the engine needle valve body. Use Neoprene tube for vent extensions.

Add the belly wheel and plank the fuselage from station B to F by adding strips of 3/32" x ¼" medium balsa 180 degrees apart until the fuselage is completely covered. Add the two soft balsa nose blocks and tail blocks. Carve and sand the fuselage smooth after the engine and spinner have been installed. This is to fair the fuselage nose into the spinner lines.

The spinner can be spun or turned aluminum or plastic. Add the plywood fin and rudder. Clear-dope all exposed wood portions twice with intermittent sandings. Wood filler is optional and was not used on the prototype model.

Bend the take-off gear as the plans indicate: bind the two pieces together and solder well. The portion of the take-off gear that touches the fuselage can be wrapped with tape, if desired, in order to prevent the fuselage from being marred. Be sure the prongs fit the tubing sockets perfectly—neither too tight nor too loose. The tailskid is now added. We looped the end to facilitate possible "stooge" take-offs or take the attachment of streamers or banners. The plastic canopy is by Berkeley, the "pilot" by Scientific.

Although you can use your own color scheme, we found that Air Force markings fitted the design to perfection. The model is all pearl grey with green anti-glare nose top and bright red tail. Lettering is black and insignia are standard red, white and

blue. The fin and rudder have black numbers on a white band. Trim-Film was used for decorating and markings. Apply two coats of Comet fuel proofer.

Do not attempt to fly unless the model balances where the plans indicate. Add weight in the nose or tail to balance the model correctly. Lines from 20 to 55 feet long can be used; these should be at least .008" thick. The model is taken off in a normal manner with the take-off gear.

Try to set the propeller on the engine shaft so that it is in a horizontal position when the engine is beginning the compression stroke to eliminate breakage.

No rudder or thrust line offset was required on our model. However, the engine can be offset about two degrees toward the outside of the circle to insure taut lines.

Bill of Materials

Fuselage. 1 pc ⅛" x 2" x 36" medium hard balsa, formers and keel. 15 pcs 3/32" x ¼" x 18" medium soft balsa, planking. 1 pc 3/32" x 2¼" x 2" plywood, bulkhead. 1 pc 1⅜" x 2" thin brass or tin can, backplate. 2 pcs 1¼" x 2" x 2¼" soft balsa, nose block. 2 pcs ½" x 1½" x ½" soft balsa, tail block. 1 pc 7" cut to 5½" transparent plastic, canopy. 2 pcs 1/16" I.D. x 1" brass tubing, take-off gear sockets.

Wing. 1 pc ⅛" x 2" x 36" medium balsa, ribs. 1 pc 1/16" x 2" x 36" medium balsa, center section covering. 1 pc ¼" x 1" x 36" hard balsa, trailing edge. 1 pc ¾" x 1" x 36" medium balsa, leading edge. 2 pcs 1" x 2" x ¾" soft balsa, tips. 1 sheet Sky-Sail 100, covering. 1 1/16" x 2½" x ¾" dural sheet, bellcrank. 2 pcs .020" x 18" music wire, lead-out lines. 1 pc ¼" x 3⅛" x 3" hardwood, bellcrank foundation.

Empennage. 1 pc 1/16" x 3½" x 24" plywood, tail surfaces. 1 .032" x ¾" x ½" sheet dural, control horn. 8 pcs Band-Aid backing (crinoline), hinges.

Take-off Gear. 1 pc 3/32" dia. x 11" music wire, main strut. 1 pc 1/16" dia. 7" music wire, aux. strut.

Miscellaneous. Cement, wheels, 4 oz. clear dope, 4 oz. gray dope, 1 oz. red dope, Trim-Film, sandpaper 2/0 and 3/0, Comet fuel proofer, nuts, bolts, spinner, propeller, solder, screws (beam mount).

Gazookus

(Continued from page 42)

being sandwiches built up around the landing gear and cabane strut wires. Bend these parts to shape now from the specified wire size. Assemble the sandwiches, clamp and allow to dry thoroughly. Formers 5-6-7-8 are cut from 3/32" sheet to the rectangular shapes shown. Lightening holes may be cut if you desire. The semi-circular top formers are cut out and notched where needed for the stringers.

When the sides and sandwiches are dry, assembly can be started. The fuselage sides are parallel back to former 4, so the first four formers serve to line up the fuselage. Assemble the sides over the top view, blocking up as needed to insure square alignment. When the front formers are well set, work back towards the tail, adding formers 5-6-7 and 8.

When this basic structure is dry it can be removed from the work board. The 1/16" sheet bottom can be added now. The tailskid wire can be cemented in place. Add 1/16" sheet at the tail to reinforce the stabilizer mount. Doublers of 1/16" sheet are added inside the fuselage at the landing gear positions. If you wish to add additional strength at the firewall, landing gear and cabane strut formers, 3/16" triangular gusset strips may be cemented along the side and former joints.

The firewall is backed up with two strips of ¼" x ⅜" hardwood to serve as purchase for the engine mounting wood screws or bolts. Decide whether you wish to mount the engine horizontally or vertically and place the hardwood strips accordingly.

A 1¾" length of 1/16" O. D. aluminum tubing is cemented across the inside of the bottom of the fuselage at the junction of the V wing struts. This serves as the anchor point for the wire end of the wing struts.

With the interior work completed on the fuselage, the top formers and rear stringers are added. The cockpit outline can be cut from Bristol board or heavy bond paper and cemented in place. The top section between the firewall and former 3 can be completely planked tight after a permanent engine and tank installation is made, or it can be made removable for access to tank for cleaning and engine removal.

Either way, temporarily install the engine now and proceed to finish off the nose section. This is built up of ¼" and ⅜" sheet scraps with proper openings cut for engine cylinder and throttle.

Any type tank can be used and its installation should be made now. We used a small Darwin wedge tank mounted so that the wedge pointed downward. It was placed directly behind the firewall. A Spitfire timer valve was used in the fuel line with excellent results.

The steel wire wing mount is completed next. To avoid a poor soldering job, wrap joints with fine copper wire and use a hot iron. Check alignment carefully before final soldering. It would be a good idea to block up the wires with a simple jig of strip balsa and pins before soldering. This about completes the fuselage except for the 1/16" x ¼" balsa fairings on the struts. These can be omitted if simplicity is desired, but we think they add to the model's appearance.

Wing construction is next: cut out the required number of ribs from 1/16" sheet. Note that the two center section ribs are ⅛" sheet. Notch these and the two adjacent 1/16" ribs for the spar and plywood joiner thickness.

Build two wing halves. Lay down the spars and trailing edge over the plan, cementing the ribs in place. Omit the four center ribs until after the panels are joined. Add the ¼" sq. leading edge next. Join the two wing halves with the 1/16" plywood spar joiners held flat on the workboard.

Block up the tips to the required dihedral angle and align carefully so no warps result. Complete the center section by adding short lengths of leading and trailing edge, spars, and the four center ribs. Add ⅛" sheet gussets where shown and allow wing to dry thoroughly before removing from the board.

Cut out the ⅛" sheet tips, bevel the spar ends and cement the tips in place. Plank the top of the center section with 1/16" sheet. The bottom of the center section can be covered with celluloid or 1/16" planking and nylon. This will protect the bottom against the wire mount rubbing or puncturing it. Sand the leading edge round before covering is applied.

The outboard ends of the V wing struts attach to the wing with wire ends projecting through wire eyes mounted in the wing. These eyes can be bent from wire as shown

(Continued on page 73)

Ohlsson 33

(*Continued from page 54*)

its running too rich or its running too lean.

Needle valve adjustment will indicate fuel sensitivity on a particular engine, but it cannot be used to compare one engine with another, due to different designs in needle valves. A valve having a long tapered point and fine thread may seem very insensitive to fuel change because two or three turns will not affect the engine, while another will respond to half a turn. Using the tank or fuel level test eliminates all effects except on the engine itself.

Glow plug engines must be operated with a good fuel, propeller, and glow plug heat balance to get a satisfactory fuel level test. In general the engine must be firing the fuel charge well ahead of top dead center. This results when hot fuel, a hot plug and a small propeller are used. If this is carried to an extreme the engine will overheat and knock, resulting in loss of power and excessive engine wear.

To arrive at a good balance it is best to start with a "cold" type glow plug and large propeller. Reduce the propeller size till the engine hits approximately 10,000 rpm, and then make a fuel level test. Now continue tests by using "hotter" plugs or "hotter" fuel mixtures till an unsteady running condition develops. Turn back to a slightly cooler glow plug or fuel to eliminate the knock or fluctuating engine speed, and you have the best balance to give a high fuel level test. Each engine has a limit that can be reached, and that figure is indicated in the performance data.

Good fuel suction can be built into an engine by controlling these factors: small carburetor bore; venturi shaped carburetor; high base compression. High compression ratio is also a help for glow plug operation. Jim Walker's new pressure fuel system will give smooth operation on engines having a low fuel level characteristic.

Engine Data

Performance. Bare weight: 5.37 oz. Propeller—10/8 wide blade wood: 7500 rpm; 9/6 wide blade plastic: 10,000 rpm; 9/6 narrow blade wood: 12,000 rpm; 8/6 narrow blade wood: 14,200 rpm; 8/6 venturi removed: 15,000 rpm; 7/9 wood; 14,000 rpm. Fuel: average blend for medium compression; manufacturer recommends own brand for special lubrication. Fuel level test: with venturi, 6 in. at 12,000 rpm: without venturi, 3 in.

Design Data. Displacement: .33 cu. in. Class: "C". Stroke: .730 in. Bore: .760 in. Stroke bore ratio: .961. Compression ratio head: 7.8. Compression ratio base: 1.37. Port Area: intake—.0124 sq. in.; bypass—.0666 sq. in.; exhaust—.1030 sq. in. Ignition: Ohlsson Racing Glow Plug.

Construction Features. Bearings: crankshaft, rollers; crankpin, floating bushing; connecting rod, steel.

Q&R "33" Parts Illustrated

	Part	Material	Size. (in.)	Wt. (oz.)
1.	Crankcase	Die-cast alum.	1⅛ I.D.	2.03
	Cylinder	Steel	.759 Bore	
	Cylinder head	Aluminum	.....	
2.	Cover plate	Die-cast alum.	.....	.73
		Bronze bushing	31/32 long	
		Steel bearing race	.606 I.D.	
3.	Glow plug & Gasket	Steel	.....	.09
		Copper	.....	
4.	Piston	Hardened steel	.759 dia. .690 long	.26
5.	Crankshaft	Steel hardened & ground	.359 dia.	1.03
	Drive washer	Steel hardened	15/16 dia.	.21
	Prop washer	Steel hardened	29/32 dia.	.20
	Nut	Steel	¼-28 N.F.	.07
6.	Roller bearing	Steel rollers	.123 dia.	.12
		Brass retainer	.124 long	
7.	Wrist pin	Steel hardened & ground	.2485 dia.	.07
8.	Rod spacers	Steel	.134 thick	.03
9.	Snap ring	Steel	.....	.....
10.	Connecting rod	Forged steel	1.139 long	.14
11.	Crankpin Bushing	Brass	.304 O.D. .250 I.D.	.02
12.	Gasket	Fibre	.....	.....
13.	Needle valve ass'y	Brass body	.....	.13
		Steel needle	.....	
		Aluminum knob	.....	
14.	Venturi	Steel	.....	.03
15.	Crankcase screws	Steel	4-40	.21
			Scale Weight 5.37 oz.	

NEXT ISSUE!

BENDIX—

The Cross Country Classic

(Continued from page 71)

and cemented to strips of 3/16" sheet placed alongside the rib flush with the bottom surface.

The horizontal stabilizer is built in the same manner as the wing. Cut out ribs, lay down spar T. E. and L. E. and don't spare the cement. Center section is planked with 1/16" sheet across the bottom, then the 3/32" sheet fin is cemented in place and top planking is added, extending to the sides of the fin.

Lightly sand all parts to be paper covered and then proceed with the covering. One sheet of Silkspan or Sky-Sail will do the whole job if the fuselage sides are left uncovered. If you wish the additional strength, lightweight paper can be doped on over the balsa sheet.

Two coats of clear and two coats of colored dope should be enough for a neat job. Fewer coats if contest flying is planned. A coat of fuel proofer is a "must" on the fuselage outside. The nose section around the engine should get two or three on the interior where glow fuel is apt to collect.

Final details can be added now. The V wing struts are of 1/16" x ¼" hard balsa with short lengths of wire thread wrapped and cemented to the ends. Locate these carefully so that the struts do not warp the wing when installed. The struts can be removed when flying if desired.

Scale type wheels were used on the original and built up of ⅛" plywood sandwiched between two layers of ⅛" sheet balsa. A paper cone on the outside added the finishing touch. Regular rubber wheels can be used, but watch the weight and balance.

If you care to simulate the horizontal opposed engine used on many of the old home-builts, the engine should be mounted horizontally with a dummy cylinder on the opposite side. The dummy cylinder can be made up of disks of cardboard and balsa and painted like the real engine. Short lengths of dowel can be cemented on the sides to simulate exhaust stacks.

Outlines are included for the dummy pilot. This happy character can be carved from a block of soft balsa and painted with any degree of sunburn you may like.

The usual preflight precautions should be taken. Test-glide carefully and be well satisfied with turn and sink before turning on the power. Balance should be about one-third of the chord back from the leading edge. Partial plugging of the intake stack is good to retard the power for test hops.

Make short engine runs and correct any extreme turn or climb with incidence change in wing and tail and side- and down-thrust on the engine. Happy landings!

Bill of Materials

(Balsa unless otherwise specified)

2 pcs 1/16" x 3" x 36" fuselage and all ribs. 1 pc 3/32" x 2" x 36" fin, formers. 1 pc ⅛" x 2" x 36" wing, stab, ribs, tip. 2 pcs ⅛" x ¼" x 36" wing stab spar. 2 pcs ⅛" x ½" x 36" wing spar, stab T.E. 2 pcs ¼" x ¼" x 36" wing, stab L.E. 6 pcs 1/16" x ¼" x 36" stringers, struts. 1 pc 3/16" x ¾" x 36" wing T.E. 1 pc ¼" and ⅜" sheet scrap nose. 1 pc ½" x ⅜" hardwood scrap engine mount. 1 pc 1/32" plywood 5" x 12" fuselage sides. 1 pc 1/16" plywood 2" x 3" firewall. 1 pc 1/16" plywood 1½" x 6" spar joiners. 4 ft .040" steel wire, struts, L.G. 1 ft of .062" steel wire, landing gear. 1 sheet heavy Silkspan or Sky-Sail. 1 pair 2" dia. wheels.

Cement, clear and colored dope as required, fuel tank, Spitfire Timer Valve.

Corben Super-Ace

(Continued from page 50)

rpm and weighed 217 lbs. dry. This was one of the first successful applications of auto engines for aircraft use.

Begin construction by cutting the fuselage sides and bulkheads from hard 1/32" sheet balsa. Note that bulkhead B is cut from plywood. Join the fuselage at the rear and install the bulkheads in the locations shown. Install the nuts and bolts on the plywood bulkhead (nuts on the after side) and apply plenty of cement over the nuts to hold them to the bulkhead.

CONTROL LINE CORBEN

The small scale plan insert describes the minor changes required to build a control line version of this famous lightplane.

Construction steps are identical to the free flight models except that the tail and control system must be installed before the fuselage top is cemented in place. Notice that the entire empennage is heavy sheet balsa and the entire fuselage construction is "beefed up."

We suggest a sheet dural landing gear (as illustrated) which is bolted to a plywood platform which in turn is cemented to the fuselage. The rubber wheels are held in place by 1/16" steel bolts and nuts. Strut material should be cut from hardwood (pine or spruce).

The control line model should be fitted with a Clark "Y" or symmetrical airfoil. All wing ribs are to be cut from hard 1/16" or 3/32" sheet balsa for extra strength. Solid wing tips of soft balsa are recommended. Set the wing and tail at zero incidence for control line flying efficiency.

Use the scale stabilizer and elevator outlines on the control line model, which will take engines from .099 to .19 cubic inch displacement. And when it comes to painting you can let yourself go! Four or five coats of dope should produce a fine job. Wood filler could be used on the fuselage and empennage if desired.

The fuel tank should be larger than the free flight tank illustrated. In view of the fact that the control liner engine run is much longer than the free flight's 15 to 35 seconds, the engine hatch-cowl must be well ventilated or removed entirely when flying the control line job.

If the model is light powered and of light weight it can be flown on heavy thread or fish line. The heavier models should use .006" to .008" steel flight lines.

Bend the landing gear to shape and bind and solder the two pieces together. The completed gear is attached to bulkhead C and the sheet balsa landing gear support. Crinoline and plenty of cement must be used. The entire fuselage bottom is covered with 1/32" sheet balsa. Install fuel tank.

This can be purchased at your hobby shop or fabricated from very light shim brass. Our tank measured ¾" square and seemed an efficient size.

Add the fuselage top and cowl and turtle-deck sides. Select two soft balsa blocks for the nose. Cement these in place (pulling in the fuselage sides as the top view indicates), and when dry, carve and sand carefully to shape. The entire fuselage should be thoroughly sanded. Add the soft balsa headrest and wire tailskid. Clear-dope the entire fuselage once, sand lightly.

The empennage is the picture of simplicity. Cut the fin and rudder from 1/32" hard sheet balsa. The stabilizer and elevator are made from a simple framework of 3/32" square and 3/32" sheet balsa. This is constructed by pinning the wood directly over the plan on the work table and cementing all joints well. Cover both sides of the framework with Japanese tissue or Sky-Sail. We used Sky-Sail with excellent results. Pin to the workbench and water and clear dope one side at a time to prevent warping. Two coats of clear dope proved satisfactory. Cement the empennage components to the fuselage parallel with the center line.

Medium hard balsa should be selected for the wing ribs. We made our wing in one panel and cut the upper spars and leading and trailing edges to produce the required dihedral. If you desire, two panels can be constructed and jointed at the center line.

Pin the rock-hard 1/16" square balsa lower spar to the work table directly over the plan. Cement all the ribs to it. The rock-hard upper spars can now be cemented to ribs in the notches provided for them. Add the leading edge. When dry, remove from the table and cement the trailing edge to the ribs at an angle to follow the airfoil contours.

Cement the sheet balsa wing tips in place and add the 1/16" square stiffeners. Sandpaper the entire wing framework lightly and recement all joints. Care should be exercised when covering the bottom of the wing, to make certain that the covering adheres to every rib in order that the true under-camber is maintained. Here again we used Sky-Sail.

Water the wing, then clear-dope three times when dry. The wing on the prototype model was cemented to the fuselage and this method proved successful; however, rubber bands can be used to hold the wing in place. Note the proper incidence.

Fill in the space between the wire landing gear struts with 1/16" sheet balsa.

Cement the balsa wing struts in place other than the removable vertical strut. This strut must be removed when flying the model in order to permit the landing gear to flex on landing and not transmit the load to the wing struts, possibly breaking them. Although the landing gear is quite flexible, lightweight airwheels were used effectively.

Bill of Materials

Fuselage. 3 pcs 1/32" x 3" x 18" medium hard balsa, sides, top, bottom and bulkheads. 1 pc .025" music wire, 18" long, landing gear. 1 pc 2" x 2" x 2" very soft balsa, nose block. 1 pc 1/16" x 3" x 2" plywood, engine bulkhead. 1 pc 1/16" x 2" x 2½" soft balsa, L. G. fill-ins. 1 pc ¾" x ¾" x 7" very soft balsa, headrest.

Wing. 1 pc 1/32" x 18" x 3" medium balsa, ribs. 8 pcs 1/16" x 1/16" x 15" hard balsa, spars. 2 pcs 3/32" x 3/32" x 15" hard balsa, leading edge. 2 pcs 3/32" x ½" x 15" medium balsa, trailing edge. 1 pc 1/16" x 1" x 4½" soft balsa, wing tip. 2 pcs 1/16" x 3/16" x 24" soft balsa, struts.

Empennage. 1 pc 1/32" x 2" x 8" soft balsa, fin and rudder. 1 pc 3/32" x 3/32" x 28" medium balsa, stabilizer structure. 1 pc 3/32" x 2" x 9" medium balsa, stabilizer outline.

Miscellaneous. Sky-Sail tissue, cement, celluloid sheet, wheels, nuts, bolts, Trim-Film, thread, 4 oz. clear dope, Comet Fuel Proofer, 3/0 sandpaper, shim brass, soda straw.

The upper nose block can now be removed (careful!) from the fuselage. Install the engine with slight down and right thrust. This is accomplished by inserting one brass washer behind the top right engine lug and two brass washers behind the top left engine lug. Hollow the upper nose block so it will clear the engine by at least 1/16". This block is now the engine hatch and can be held in place with dress snaps, or hinged.

Although the prototype Corben Super-Ace model was flown with the hatch in place, it is suggested that ventilating holes be cut in the front and rear of the hatch, or that the hatch be removed when flying in order to avoid the danger of fire.

The general Corben color scheme was all yellow with cowl and upper portion of the fuselage forward of the cockpit black; however, in view of the fact that this is a personal type craft any color scheme that you have in mind can be used. Our model was colored all dark blue with white lettering and trim. Fuel-proof the entire plane once, including cowl interior.

Before flying be sure the model balances at the point indicated. The prototype required slight ballast in the tail. Test-glide in tall grass until a good glide has been obtained; this should be very flat and slightly to the left. The model should climb to the right. When launching, it is advisable to have the wind blowing on the front right quarter of the model in order to achieve maximum performance.

Solo Club

(*Continued from page 31*)

may reach a point where he can't turn back. Turbulence is an added factor. A film of water on the windshield can cause an error in the angle estimated by your vision to peaks ahead of as much as five degrees. If it sounds complicated, let's just remember what we already know. Be careful of mountains in the wind.

Harry Reece, Chief of Police, Veterans Administration, Kecoughtan, Va., is still another who has been attending meetings and only just now got into the swim—or should we say air?—by joining up. Harry has 300 solo hours and more than 50 dual, and is about ready for his try at the commercial tests. Wishes us all success. Thanks Harry, and the same to you.

"Made my first solo this morning on an Aeronca," announces Dick Hazelwood, Medford, Mass. "Follow the column each month but couldn't become a member until now. Now I know why all the others are so anxious to get into the air." You lost no time, Dick!

Kitty Hawk

(Continued from page 36)

being the extremes. On the lower end, 100 square inches was the minimum to receive solid support, and, at the upper end, 150 square inches received a fair number of votes—with 125 square inches being advocated by the majority.

Analysis of all proposals produced the following rules for the Kitty Hawk event. The comment of clubs and experienced contest directors, especially those who have run novice events, will be welcomed in regards to these.

Kitty Hawk Event

1. The model shall have no more than 125 square inches of projected wing area computed by multiplying the straight-line tip-to-tip wing span by the maximum chord. No allowance shall be given for tapered or elliptical wings. (In other words, a wing with square tips and no taper achieves the maximum possible area under this rule.)

2. There shall be no weight requirement. Models may be as heavy or light as entrant wishes.

3. Minimum fuselage cross section shall not be less than the length of a 10-inch string placed around the fuselage at its widest point.

4. The model must have a fixed landing gear of one or two wheels. If a one-wheeler, model must have built-in means (skids or double rudders) of maintaining its take-off position unassisted.

5. Propeller may be carved from a block or sanded from a blank. It may have a fixed prop shaft or it may free wheel. No gears or mechanical tensioning mechanism permitted. The prop may have one or two blades, but cannot "fold."

6. The area of the stabilizer must not be more than 50% of the wing area computed in the same manner as the wing area.

7. Method of launching: the model may be hand-launched or rise-off-the-ground. Five additional seconds are given to an R.O.G. flight provided the model takes off by itself completely unassisted.

8. Number of flights: five official ATTEMPTS AT FLIGHT will be given each contestant, with each attempt counted regardless of duration. Unofficial flights are not recognized. If a model fails to take off it still constitutes an OFFICIAL ATTEMPT.

9. Scoring of flights: highest time for each entrant constitutes his OFFICIAL FLIGHT. Flyer with longest OFFICIAL FLIGHT wins.

10. Winders of any type may be used. Rubber motors may be braided and of any length.

The simplified measurement of area is an aid to the beginner, for emphasis is on wings having the maximum area for their span and chord, which means a rectangular surface with a squarish tip.

Some readers will point out that the

"piece-of-string" measurement of cross section does not give identical areas, depending on width and depths, or shapes. Various cross sections of practical dimensions were checked and all had seven square inches or better of actual cross section, variations being held within 1¼ square inches. For all practical purposes this is satisfactory enough and makes for rapid processing.

The propeller rule aims to simplify the beginner's job. Lack of tensioning will prevent a beginner being an expert, so to speak. Emphasis there is purely on successful flying, and simple adjustments are a notorious chore to the novice. Most experts said in the survey that the folder should be out for the new recruits.

In conclusion, two designs are offered for study. Both use 12 strands of 3/16 T-56, with only one inch of slack, yet each puts up good performance.

Designed expressly for the Kitty Hawk rules competition, both these models are ideal for either sport flying or for the "KH" event in club or small contests. Both are easy to build and fly. Both are drawn up according to the simplified set of rules given which dispense with wing loading and tensioning devices and should prove ideal for beginners.

The following directions are for the twin-tailed Cloud Hound, but both models are basically similar in construction. Special notes on the Sky Racer are included.

Fuselage. Both sides of the fuselage are assembled at the same time directly on the plan. Place the straight pins on either side of the ⅛" square longerons, and put wax paper beneath the work to prevent the cement adhering to the working surface. Cross pieces are trimmed the right length with a single-edge razor blade—or balsa knife—and are cemented in as usual.

Allow plenty of time for the cement to harden, then separate the sides by sliding your razor blade between. To join the two sides, note that they are parallel from in front of the wing position to a point well behind the wing; cut the necessary cross pieces to an identical length.

Also note the alignment bulkhead former which is made from 1/16" sheet balsa, reinforced along the top and bottom with ⅛" square; these pieces of ⅛" square later serve

as two of your cross pieces. Assemble this alignment former to the sides, then add a top and a bottom cross piece at the station immediately behind the wing. When these dry, add the intervening cross pieces. Rest the fuselage flat on the bench and check it (looking from the front) for alignment.

Bring the sides together at the rear and add the cross pieces that fall behind the wing position; then draw the nose together with a weak rubber band and add the top and bottom ⅛" x ¼" cross pieces at the very nose. Finally insert the remaining cross pieces.

Note how the nose sections are then filled in with 1/16" sheet balsa, how the landing gear "sandwich" (see detail) is constructed, and the 1/16" sheet balsa filled in at the rear rubber dowel (sides only). Be sure your landing gear slants slightly forward when the unit is dropped into place, and add necessary ⅛" sheet gussets on the bottom of the fuselage at that point and from the sandwich forward as seen on the side view. Details of the wing rubber hold-down dowels are shown (see special notes on the Sky Racer).

Tail Surfaces. The stabilizer is assembled flat on the bench: first fasten down the two edges and the bottom spar. The trailing edge is standard ½" wide stock which is 3/32" thick. Cut 9 ribs from 1/16" sheet balsa and two from ⅛" sheet. Pin the ribs together for sanding, trimming and notching, then cement them in place one at a time. Do not force any fits as warps are apt to result. Finally add the top spars of 3/32" square.

The twin fins are cut to size from 1/16" sheet; butt-joint two pieces of sheet together (pin on bench while drying) to get the necessary width. To prevent warping, these sheet rudders are coated with plasticized dope—in this case, five drops of castor oil to one ounce of clear dope; later use this mixture for applying covering tissue to the rudders only.

Wings. The wing is made flat on the bench in one piece, then cut into four pieces (at the dihedral breaks) to build in the polyhedral. Begin by cutting 23 ribs from 1/16" sheet balsa. Pin these ribs together, trim and notch as required. Pin the bottom spar of ⅛" square to the bench, also the 3/16" square leading edge (round it when the wing is done) and the standard ½" wide trailing edge stock. Make sure trailing edge material is very hard or warps will result. Do not force-fit the ribs. Cement them in position; however, for the time being, leave out the three ribs that fall at the various dihedral breaks.

Add the 1/16" sheet wing tips as per detail. When these joints are dry, sever the spar and edges at the three dihedral breaks and then slant the ends of these members to meet at the proper angles. This can be done by supporting the panels at the tips for a check. It is best to leave the entire center of the wing—that is, all the wing with the exception of the one outer panel on each side—flat on the bench while dihedral is incorporated into the outer panels.

When those joints have dried, lift each side of the wing the required elevation above the bench (place blocks or handy objects underneath for support) and attain the proper dihedral angle at the very center of the wing. Note that reinforcements are glued to the leading edge and the main or bottom spar wherever these breaks occur. It will be necessary to widen the notch on the ribs at those points.

Finally, when the dihedral is finished, cement in the three missing ribs and follow up with the two top wing spars which are 3/32" square.

Motor. The propeller is cut from a me-

dium hard block measuring 1¼"x1¾"x12", or you may obtain finished propeller blanks from your dealer as manufactured by Jasco, Testor, and others. The blades should be carved slightly convex or curved on top and concave underneath (see detail). The tips are not rounded until the propeller is completely carved and rough sanded. It is advisable to drill the shaft hole before carving; also to make it slightly oversize so that the prop will free-wheel easily.

For construction of the shaft and the nose block, consult the detail drawing. Note that the grain of the wood in the nose plug runs fore and aft and that the ¼" thick plug fits closely within the nose opening. When you balance the propeller, locate the free wheel catch on the side of the lightest blade, and if that does not bring the prop into balance add a straight pin inside the tip of the light blade as necessary. The finished prop is given two coats of sanding sealer with a sanding after each, then several coats of clear dope for a nice shine. Power consists of ten strands, or five loops (in one piece) of T-56 3/16" wide rubber. The rubber should be about 200 inches long, which will give about 1 inch of slack.

Covering. If possible use either Silkspan or Skysail wet-or-dry paper which is tougher, longer lasting than ordinary tissue. Incidentally, wet covering is quicker, easier and far neater than dry covering. Try it! If you do, coat the trailing edge with dope and let dry so that the moisture won't warp the wood. It is always a good deal to coat all wood surfaces to which paper will be applied, with clear dope and allow to dry. This helps the paper stick on. Use one piece of paper each for the sides of the fuselage, top and bottom of the fuselage, top and bottom of the stab.

It is best to cover the top and bottom of the wing with four pieces of paper, one for each flat portion. Start at one end of the panel, then attach the other end, and continue on immediately to the trailing edge and finally the leading edge. Ignore the ribs in between. Similarly, on the fuselage begin at the nose, attach the extreme rear, and then the outer edges. Ditto for the stab. If you dry covered, water spray the material and when it has dried taut apply the clear dope. Use three coats of dope thinned half and half with thinner and, on the final coat, add three drops of castor oil to one ounce of dope to prevent further paper pull and warps.

If warps occur, soften the adjacent tissue with thinner or steam and hold the wing twisted to its proper position until dry.

Flying. Hand glide the model, preferably over tall grass. Point the nose down slightly and launch with a smooth movement of the hand—don't throw it into a stall! The ship should glide straight and slightly fast; if the nose rises abruptly and the ship stalls, then it is tail heavy—unless you threw it too hard. If it dives enough to tumble over on its nose or to bounce extremely hard, then it is nose heavy. The glide should not be a swoop which ends in a perfect landing. That's nice to see but means the ship is tail heavy. To correct for tail heaviness, place thin sheet balsa (1/32" to 1/16") under the trailing edge. (If you leave this in later, be sure to cement in place.)

If the ship dived badly, place your thin wood under the leading edge of the wing to give it more angle (incidence). Your ship should trim for glide if built as shown; if it proves stubborn, add a little weight (like solder) to nose as cure for tail heaviness, or in fuselage rear for nose heaviness.

Now wind in about 50 turns on your motor and hand launch the model into the wind, if any. If it tends to stall, add down

thrust (makes the prop pull downhill) by placing slivers of wood behind the top of the nose block. If it dives, you didn't trim the glide properly. As the model responds to these changes, add ten turns each flight. Eventually it will get high enough for you to see the glide and to recheck it.

To make the plane circle, bend the rudder tab slightly to the right. Now the ship will glide in right-hand circles and, under power, will climb in great large circles in the same direction. When your glide circle is satisfactory, you can tighten up the power circle by adding right thrust. This is done by placing slivers of wood behind the left side of the block so that the prop is pulling to the right.

The objective in trimming a rubber model is to make it glide properly first, then offset the thrust line down and to the right to make it fly the way you want under power.

You will observe that, as you tighten the turn, the model will threaten to dive slightly or to glide faster. When this happens "slow" up the glide by adding incidence to the wing or, if you have shims under the trailing edge, or nose weight, remove same.

Notes on the Sky Racer. The principal difference is the mounting of the wing; there is no cabin or windshield. Instead, the wing rests flat on the fuselage top and is held on by tying a strip of rubber around wing and fuselage. A 7" Berkeley celluloid canopy is cemented to the wing and slides with the wing as a unit. Cut out the sides of the canopy to fit over the wing. The ship should trim for best glide when the rear point of the canopy touches front of dorsal fin.

Bill of Materials—Cloud Hound

8 pcs. ⅛" square hard balsa, longerons, stab leading edge, wing spar. 4 pcs. 3/32" square hard balsa, stab spars, wing top spars. 1 pc. 1/16" x 3" soft sheet balsa, rudders, ribs, fill. 1 pc. 3/16" square, soft balsa, wing leading edge. 2 pcs. standard ½" wide trailing edge stock, hard balsa. 1 pc. 1⅝" square x 1" nose block, hard balsa. 1 5" length ⅛" dowel, wing hold-ons, rear rubber holder. 1 pc. 1/16" music wire, 24" long. 18 feet 3/16" wide T-56 rubber. 1 1¼" x 1¾" x 12" prop block, fairly soft to medium balsa, or nearest blank or machine-cut prop. 1 sheet rubber model Silkspan or Skysail. 2 tubes cement (one is close squeak). 4 ounces clear dope. 2 ounces thinner. 1 small sanding sealer. 1 small bottle castor oil. 1 scrap celluloid for windows.

Scraps of tin or sheet brass for various bearings, scrap of ¼" sheet balsa for back of nose block, several small washers for prop shaft, decals and Trim Film as necessary. 6 inches scrap ⅛" x ¼" for nose cross pieces—or cut from scrap ⅛" sheet. 1 pair thin hardwood or plywood wheels (as Jasco) for rubber models.

Bill of Materials—Sky Racer

8 pcs. ⅛" square hard balsa, longerons, leading edge stabilizer. 1 pc. ⅛" x ¼" hard balsa, main wing spar. 3 pcs. 3/32" square hard balsa, stabilizer spars, top wing spar. 2 pcs. 1/16" x 2" soft sheet balsa, ribs, fill, fin, rudder. 1 pc. 3/16" square soft balsa, wing leading edge. 2 pcs. ½" wide standard trailing edge stock, hard. 1 pc. 1⅝" square by 1" hard balsa, nose block. 1 1¼" x 1¾" x 12" prop block, or nearest blank, or machine cut propeller.

Other items per the Cloud Hound.

Convertaplane

(*Continued from page 24*)

short duration and occupy a relatively small percentage of the total flight time. This short-time use of the rotary wings, in certain types where the rotor is not used as such in the airplane portion of flight, opens the way for direct jet-propulsion of the rotor.

Since it is not proposed that the craft take off or land as an airplane, in normal operations, wing area may be kept to a minimum, only enough to insure that it will be safely above the stalling speed at the time the shift from direct (rotary wing) lift to fixed wing support is accomplished.

It is not difficult to imagine the possibilities of such an aircraft for the private owner, for instance. He taxies out onto his lawn (a 100 ft. square will be ample), turns up the rotor, and rises vertically until clear of obstructions, and then, using helicopter technique,

Herrick Convertaplane

starts to move forward, building up toward maximum helicopter speed—a speed well above the stalling speed of the fixed wings. The wings then carry the load; the craft continues to gain velocity up to its normal cruising range as an airplane, which it maintains for the major portion of the flight.

Just what happens to the rotor during this portion of the flight depends on the type of convertible aircraft the owner has purchased. If it is a Herrick Convertaplane, he will have reached this airplane flight phase through an intermediate phase, autorotation of the rotor. As the maximum forward velocity desired as a helicopter is reached, the normal airplane propeller will be speeded up to maintain

forward speed while the rotor tip-jets are shut off and the two-bladed rotor permitted first to auto-rotate, then to be slowed down and stopped in transverse position, to act as additional fixed wing. If it is a craft of the type proposed by LePage, de Monge, or Flettner and shown in the illustration, the rotor axes will be swung from vertical to horizontal, the rotors transferring their lift to the fixed wings, and becoming large-diameter slow-speed propellers, to drive the craft in horizontal flight.

When the destination is reached, the process is reversed, the rotors taking over their lift function as the horizontal speed is reduced into their range. The landing is accomplished as a helicopter.

What happens in the case of power failure? If this occurs during helicopter flight, we must use helicopter procedure—shift the blade angle to the auto-rotative setting, and make an autogiro dead-stick landing. If the failure should occur while flying as an airplane, two courses are open: first, to glide in and land as an airplane, bearing in mind, of course, that the wing area is small, and the safe gliding speed high; second, convert to auto-rotative setting and make an autogiro dead-stick landing.

It might be mentioned here that in a craft like the Herrick, where the rotor is jet-driven and is used only for helicopter flight, and a separate engine is used for propulsion, failure of one does not mean failure of the other unless it is caused by fuel supply exhaustion.

Aside from the personal aircraft field, an immediate market for the convertible aircraft is seen in the military services; perhaps not right away in the field of combat aircraft, but most certainly in air-sea rescue and liaison.

The helicopters lack the range and speed necessary to get them where they may be needed.

In the much publicized case of the Air Force men stranded on the Greenland icecap, while other means of rescue were failing, helicopters were ordered to the scene on a large aircraft carrier, an operation requiring several days. Methods of towing them by airplane are now being tried. Airplanes, on the other hand, do not fill the bill, since many rescues must be made from places where the landing of any fixed-wing aircraft is impossible, much less one of size and range necessary to get to the site quickly.

The advantages of convertible aircraft are too important to let their development lag.

AIR TRAILS Plan #850:

Kitty Hawk **Corben**
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Monocoupe: Fine little free flight scale flyer of Velie Monocoupe for Infant engine (#450).
Mooney Mite: Pert U-control flying scale of 27" span for half-A engines (#1249).
Nightmare: Unconventional swept-forward 28" span rubber endurance model (#1049).
Orange Crate: Wallick & Thomas' Class D speed job for Dooling engine (#450).
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Sailplanes

(*Continued from page 12*)

and gliders, many kits of which were purchased and built before the war, operates a successful soaring school at El Mirage with a Schweizer TG-2 and TG-3 as well as a two-place BG-8. Since January 1, seven of his students have earned their commercial glider pilot ratings and a number of private tickets have been issued.

Champion Editor. Fred Obarr, editor of Soaring Society of America's "Soaring," was duly nominated Mississippi State Champion when he flew his Pratt-Read sailplane 78 miles from Starkville, Miss., to Tuscaloosa, Ala. Obarr is studying aeronautical engineering at the Mississippi State College.

French Record. Monsieur Paul Lepanse, well known to American soaring enthusiasts from his participation in the National Contest at Wichita Falls, Tex., in 1947, and to our readers from the article "Vol à Voile" (June issue Air Trails), has recently established a new French record flight to a predetermined goal of 450 km (280 miles). Lepanse flew a new French sailplane, the Brequet 900-2; his average speed was 56 mph, very high for such flight.

The Russians Are Coming. It is said that Russia is sending a team of soaring pilots to participate in the International Soaring Meet at Oerebro, Sweden, this July. This will be the first time that Uncle Joe's boys have competed in an international event. Rumors are rife as to what equipment they will use. Everyone hopes it will be Russian-designed sailplanes. Our guess is that Red sailplanes will not be let out from behind the Iron Curtain, and that the Russian soaring pilots will fly in captured German machines such as Weihes or Olympias.

Cross-Channel Commuters. On April 12, a British soaring pilot and instructor, Lorne Welch of the Surrey Gliding Club, looked up at the sky and saw cumulus clouds (thermal sign posts) stretching in the general direction toward France. Long having nursed an ambition to make a soaring flight across the English Channel, he got into the cockpit of his Olympia sailplane. Six and a half hours later, after various experiences which included icing-up in the clouds and getting uncomfortably low over water, he landed at the Melsbroek airdrome, near Brussels, Belgium, having covered 230 miles from the take-off point at Redhill. On the very same day, Flight Lefienant L. A. Miller of the R.A.F. Gliding Club at Detling took off in a Gull 1 sailplane also headed across the channel. He reached the Belgian coast.

Pacific Coast Champions. The San Diego Calif., annual Pacific Coast Mid-Winter Soaring Championship, which took place March 11 and 12, attracted seventeen sailplanes and 19 soaring pilots and was witnessed by a crowd of 17,000 people. Pilots and sailplanes logged 106 hours of flying and made 126 winch and 14 airplane take-offs. For his cross country flight of 14 miles, John Loufek was declared champion of the meet and awarded the Montgomery Trophy. Herman Stiglemeier won the spot landing contest when he stopped three inches from the "spot." The bomb dropping event went to 15-year-old Irving Gere. Bill Ivans flying a Schweizer 1-23 sailplane, walked away with aerobatic laurels.

–Alexis Dawydoff

MCAF Answers (See P. 27)

(Pictures from top to bottom)

1. Front end: detadilosnoC 2-Y4BP; center: 11eB 95-F temocariA; rear section: htroN naciremA 15-F.
2. Front end: gnieoB 1-B6FX; center: acnoreA mednaT; rear section: tfarchceeB O1-TAX.
3. Front end: ssitruC O4-F; center: tfarchceeB S71; rear section: tfarchceeB 54-C.
4. Front end eriftipS kraM X1; center: salguoD 2-DA; rear section: reinroD oD. 533.

Dope Can

(Continued from page 40)

class merchandise awards, then handing out obsolete, inexpensive items that some hobby shop was unable to sell. Quite a few anti-trophy boys said the same thing, "You can't fly a trophy!" Some, by calling for more expensive awards, want to make it really tough on sponsors—shining examples cited included television sets.

The Aeronauts did not editorialize on the survey's results. They evidently drew their own conclusions and passed on the data with the hope that it would be of some use to those contest directors and sponsors who are undecided as to what awards most satisfy the contest goers.

Considering the initiative they showed in conducting this poll, we think the GSA club is well entitled to the slogan it uses on its official letterhead: "South Jersey's Best."

We'd like to pick up the ball from the point where the Aeronauts carried it and get all the clubs in the country to send in their votes on this important matter of awards. Tell you what we're goin' to do. . . .

At the next meeting of your club ask the chairman to call for a separate vote by the juniors (under 16), seniors (16 to 21) and the open-class members (over 21) on the following: (A) how many prefer trophy and cup awards exclusively, (B) how many prefer suitable merchandise awards exclusively, (C) how many prefer trophies for top places and merchandise for other winners?

Then ask your secretary to notify Air Trails, Prize Poll, Box 49, Elizabeth, N. J., of the number of junior members who voted, number of senior members who participated and the number of open-class flyers who expressed their opinions. Then list the results as follows:

Members Who Voted
No. of juniors———
No. of seniors———
No. of open class———

For plan A: —— (no.) juniors; —— seniors; —— open. For plan B: —— juniors; —— seniors; —— open. For plan C: —— juniors; —— seniors; —— open.

You might well include any general opinions the club has on suitable types of merchandise awards, or other pertinent comments on awards in general. We'll run

a box score on the voting. Let's see how close it parallels the Eastern sentiment. Ask your club secretary to get the results in the mail by August 5.

Some New Record Categories. As most Dope Can readers know well, the official national model aircraft records are kept by the Academy of Model Aeronautics. At last count the AMA was maintaining more than 140 records! So we sort of hesitate to ask the Academy's Washington office to take on some more record keeping work. Then we'll do it, by golly. Air Trails is entering the homologation field. That's a two-bit word which means "certify records."

Now the records we are going to certify are just three, but ones that need some constant supervision. They are all for control line models:

World's record for consecutive inside loops.

World's record for consecutive outside loops.

World's record for duration.

Anybody or any team can qualify for these, you don't have to be a member of any local club or national organization. There are no fees attached except maybe a quarter it might cost you for a notary's seal. Instead of a trophy or certificate, you get your picture in Air Trails with an account of the record-making flight. The duration record will be divided into two sections: solo flight and team flight (two or more contestants). We'll also recognize a women's category and publicize the best flights by the gals.

Rules will be fairly simple. You can write for a record application form which will cover all the categories and give the few simple regulations that govern the flying. The flyer need not have built the model he or she operates. And to make sure that everything is properly checked, Alex Dawydoff, our technical editor, will process all applications.

So let's go, fellows. Old marks will be recognized providing you can dig up reliable witnesses and give all the necessary data. We might say that we were nudged into this by Stan Lapin of the Master Modelcraft concern. Stan said, "Why doesn't somebody straighten out all these claims for loops and duration?" We replied, "Somebody certainly should." Stan: "Well-1-1-1-1???"

Okay, Mr. Lapin, you satisfied?

Bigger Carrier Deck. In our announcement of the Navy's new U-control Carrier Event in the June issue we stated the deck would be "5 feet long." That was a great big mistake—we wrote "5 feet wide and 75 feet long" but somehow the figures got crossed up along the route from typewriter to press. So there's the correction: the circular take-off area will be 5 feet in width, 75 feet in length, and curved to fit a flight circle which will accommodate the 70-foot control lines.

Buzzard Bombshell Kits. We've had some requests for info on where one might obtain Buzzard Bombshells. That's a very famous prewar free flight that appeared in Air Trails, you know. Maircraft kitted the job. We inquired around and found several sources: Polk's, 314 5th Ave., N.Y.C.; Ruth's, 1466 Genesee St., Buffalo, N.Y.; and Auler's, 159 N. Broadway, Milwaukee, Wis. Mr. Auler is not a hobby dealer, he's a distributor, but he says several of the dealers in Milwaukee have Bombshell kits and if he receives any inquiries he'll pass them on to the retailers.

More Movies For Your Club. From time to time we include a few tips on movies avail-

able that would make good entertainment for a club night. Here's one that'll keep you on the edge of your seats: "The Farnsborough Air Show." It's a 10-minute English film of planes on the ground and in the air at the British Aircraft Constructor's Show. The aerial photography of jet fighters and bombers is something you'll never forget. The film can be rented for $1.50 from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. Also available each at the same rental fee are "Faster Than Sound," "Jet Getaway," and "Brabazon, King of the Air." This is all on full scale aircraft, you understand.

Fans Across the Sea. Here are some pen-pal seekers, all imbued with the spirit of aeromodeling: Leo Gray, 1510 Ouellette Ave., Windsor, Ont., Canada. . . . Entire club wants to meet with American group: Mapperley Model Aero Club, Care of J. Marsden, 11 Haywood Rd., Mapperley, Nottingham, England. . . . Speed and stunt U-controleer M. Cadby, 17, 304 Thimblemill Rd., Smethkick 41, Staffs., England. . . . Free flighter and sailplaner John B. Kent, 23, 8 Logan St., Geelong West, Victoria, Australia. . . . Six-foot, 18-year-old David R. Wiseman, 33 Ashford Rd., Mutley, Plymouth, Devon, England. . . . Leo Bosman, Amsterdam Aeromodel Club, St. Willibrordusstraat 105, Amsterdam, Holland. . . . A. E. Wright, White Lion, Ketley, Nr. Wellington, Salop, England. . . . radio controleer Henning Hansen, 21, Orstedsvej 62, Aalborg, Denmark. . . . Roy Hutchinson, 20, 8 Paton St., off Narborough Rd., Leicester, England. . . . Brian Western, 18, 522 Bromley Rd., Bromley, Kent, England. . . . F. L. Whisker, 18 Armstead Walk, Dagenham, Essex, England. . . . Free flighter and U-controller Anthony Oliver. "Crumplehorn," Polperro, Nr. Looe, Cornwall, England. . . . Karlo Eisele, Schmittstr 16, Frankfurt/M, Germany. . . . Bengt-Erik Bengstran, Rensgatan 12, Stockholm, Sweden.

Thailand Calling. Special today only—Ohlsson 60's for $17.85, Buster kits for $5.71. That's how the prices read in Bangkok. We have it straight from C. Kamonsiri (Care of Thai Rice Co., Ltd., 691 Sathorn Rd., Bangkok, Thailand), who's been trying to form a model club even though there are few modelers in the vicinity. The main obstacle to the expansion of the hobby is the high import prices on engines and kits. A motor purchase takes about a month's wage of the ordinary worker.

Captain Paul Clevenger of Trans-Asiatic Airlines (Siam) Ltd. has been helping Mr. Kamonsiri form a club and suggested the Bangkok group contact the AMA for suggestions and help. Any American modelers from the "old country" might want to contact Mr. K. and swap experiences.

Break for the Novice? R. Bruce Lester of Toronto, Ontario, one of Canada's best-known model designers and contestants is proposing a "Protege" contest. It sounds so interesting we'll let Bruce give you the pitch.

He points out that for some time Junior (*or novice*, as the case is usually) participation has not been as intensive as many of us would like to see it. The trouble, thinks Mr. Lester, is not that we've been ignoring the junior flyer; instead we haven't quite understood the problem of how best to bring these youngsters along.

It's a case of having to show the novice how to build, adjust and fly, and that's where the protege idea comes into the picture. It is an event in which the experienced model builder takes a beginner under his wing, coaches him with the construction of

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his model, helps him fly it and shares in the honors and the awards. Bruce sees the expert-novice team having its picture taken together big-brother fashion. He figures the beginner should be around 16 with no age limit on the coach.

Suggests Mr. Lester, "The contest should be flown with relatively low-cost models—after all, Junior's 'income' is limited. Take the case of the hand-launched glider, where the average out-of-pocket cost can be kept as low as 25 cents, and certainly not over a half dollar. A fairly good model will average a minute in duration even if it is not too well built. This has been a forgotten class for quite some time, yet I doubt if there is any other category that offers more instruction in adjustment. Also—important—a hand-launched glider can be built in one evening and flown the next day.

"Take tow-line gliders as another example. Here we have a low-cost plane. Seventy-five cents to a dollar results in one that can be flown out of sight, and a week's spare time building will see it flying. The manufacturers have given us a wide variety to choose from and a size range up to 6 feet in case Junior likes to build 'em big.

"Rubber-powered fuselage and stick models for the protege event: to keep from getting into the high-powered Wakefield range, let's start this class at 100 sq. inches and stop it at 160. This works out to a span of 32 to 36 inches and gives definite assurance Junior can still go out of sight with no trouble at all. I can still remember my 132 sq. in. Moffetts back in '32 and '34—no trouble in losing one on a good day. Here, again, the manufacturers have good prefabbed kits with formed sides ready to go.

"It should be remembered that some youngsters think only in terms of the modern jets. But we have another low-cost item, the Jetex 50—and possibly we could include the '100.' There are few sloppy flights turned in with models using these power plants; one can go out of sight easily. I know, because my last two flights were 2:56 and 3:21 at Eaton's contest. This beats a lot of Wakefield time I know of and the Jetex models are pint-size compared to the big Wake's.

"One category of gas free flight fits right in with this team scheme: half-A. These ultra-small-bore motors are easy to start and will stand crack-ups with but minor damage."

It looks to us as if the Toronto expert has come up with a mighty fine suggestion. We'd like to hear from those who have tried similar events; if your club undertakes a "big brother" contest, let's have the results with pictures of the winning teams.

Different Competition System. Thinking along the lines of a better break for the newer recruit, Andrew Canino, an old-timer in Jersey modeling and a member of the Garden State Aeronauts of Vineland, N. J., has a lot to say. He starts out on the "professionalism" theme: "My opinion may not mean anything as I am neither a model designer nor a manufacturer, but I would like to say that all this squawking about Professionalism is the bunk. I never did agree that model dealers should fly in their own class. There are more hot flyers that are not in the model industry than (all) the dealers themselves. Regardless of how a man must make his living, he had to spend much time at his work bench in order to become an expert flyer. I'd rather beat an expert than a novice, and speaking of novices I have a squawk of my own.

"The AMA rules divisions of class I, II, III (junior, senior and open) do not meet with the approval of many modelers. The present system assumes that skill is found in proportion to age—and in my opinion that is not true. A newcomer to the sport should compete with newcomers, not against those who are more experienced, but who happen to be in the same age group. The principle of classifying any competition is to try to group together those who are the most alike in skill or experience so that all may have an equal chance of winning. A 30-year-old newcomer should not be forced to fly against consistent winners, be they 16-year-old backyard flyers or mature manufacturers. Let frequent winners fly against each other, newcomers against newcomers, and those in between with others of comparable skill.

"I believe a system can be worked out in which all contestants would be classified according to their individual contest records

of the previous year. It may never come to pass, but I would like to see some kind of a favorable handicap be given to the beginners."

Al, you sure spoke a mouthful that time. What do you say, gang, any suggestions on how such a system could be set up and maintained without the expenditure of a million dollars?

Last Word on Professionalism. We leave it to Bill Benton of Washington, D. C., to sum up the majority report on amateurs vs. professionals in modeling competitions. "Seems to me there is a lot of talk about setting up a separate class for professionals," writes Bill. " 'Expert' is a better word. Any way you put it, I will fly against anybody. All I ask is that he stick to the rules that prevail.

"If I can't beat him fairly, I won't complain—I'll try to improve. If you are afraid of top-notch competition, stay home in bed. I'll be out there to take all I can get (usually 6th place!).

"Because a fellow is good, don't run him down. Copy his stuff—improve on it—and beat him next time!"

Booster for the Low C.L.A. Loran Salisbury of Huntington Park, Calif., can't help speaking up for the low c.l.a. theory. And he has the dope to substantiate his contentions. In March 1947 he built a 570 sq. inch low c.l.a. ship powered by a Bunch Tiger .45. While the ship has not been a world beater in competition, it has compiled a contest record which indicates the consistent flight characteristics inherent in the design. As we can see in a photo of the ship he sent (unfortunately not clear enough for reproduction) the model has lots of low keel area, a low pylon, high thrust line and high c.g. The ship is definitely not underpowered since the Tiger swings an 11-inch Thrustee prop at 11,500 rpm and a 12-inch Air-O at 11,000 rpm.

L.S. reports that the ship climbs at about a 60-degree angle with plenty of zip. The turn under power is very slight; the model makes only one complete turn during the entire motor run. It has been flown both to the left and to the right, either way giving satisfactory results. It is not critical in any manner and requires a considerable amount of side thrust to achieve any turn.

The ship has made three flights of more than 30 minutes; one was for 1:04:0. And it has never come close to winding in under power. Remarkable, hey?

Salisbury's contest record with the design is as follows: Sept. '47, sixth in C at Santa Barbara; Nov. '47, fifth in B with a two-flight total of more than 12 minutes at a Los Angeles Aeromodellers' semi-annual meet; '48 All-Western Open, fourth in C; '48 San Diego Annual, sixth in C; Nov. '48 in another L.A.A.A. inter-wing contest, third in C; June '49 in the L.A.A.A. annual competition, second in C. Also, the plane has taken several firsts and seconds in club and lesser meets.

Apparently the plane mellows with age. As Loran asks, how many of the high pylon pencil bombers built in 1947 are still going strong? Very few, if any. With his good friend, Don James, Mr. Salisbury has been pushing the low c.l.a. idea, but he admits that nothing seems to change the attitude of the high pylon boys. He takes his stand with the statement, "If it's predictable, consistent flight you want, the low c.l.a. ship cannot be beaten."

Daffy Definitions (suggested to us by Maine's Flying Maniacs). *Spark Plug*—it has nothing to do with romance although it's known in England as a sparking plug; noted for not working unless you happen to

ADVERTISERS' INDEX

AIR TRAILS, August, 1950

have your finger on it. *Glow plug*—necessary addition to most engines; glows only on test before installation. *Gas tank*—generally found empty after you've been swinging a prop for 30 minutes. *Propeller*—has great affinity for fingers; instead of by make, diameter or pitch, it is commonly designated as "that "#('%$*!!@¢ prop." *Fuel*—hot stuff you feed to an engine to make it run cool. *Needle valve*—fiendish device that never assumes the same setting twice. *Fuel line*—something one forgets to place between tank and engine; also distinguished by its propensity for plugging. *Cement*—tasty dish, rich in food energy; consumed after being gnawed off fingers. *Dope*—any modeler who disagrees with you. *Balsa*—light wood seldom found in right size or hardness; its dust on living-room rugs has led to divorce in many states. *Contest timer*—something hard to find.

Chief's Champ. The recent South African Nationals found the Veco Chief kit making a clean sweep in stunt. The prefab'ed control line model won a 1st for Cliff Culverwell who used a McCoy 36; second went to J.M. Malherbe with his K&B Torp 29 powered Chief; third to G. Machett with his McCoy powered Chief. Heap big feat!

J. M. Fullarton of Victoria, Australia, sends along the results of the Australian Nationals. The competition this year included control line flying scale and team racing. Reports Mr. Fullarton, "So far our boys are a bit weak on speed, but stunt is very popular, while some of our Wakefield men are up to world standard. In free flight gas we have boosted the power loading to 8 oz./cc."

BOOK NOOK

Visibility Unlimited by Dick Grace; Longmans, Green & Co., $2.75. Those who saw such aviation masterpiece-movies as "Wings", "Hell's Angels", "Lilac Time" and others will no doubt remember the realistic airplane crashes which sent shivers down the spine. These spectacular crack-ups were done by the then-famous aviator Dick Grace, veteran of World War I (and later of World War II). In this book Grace tells of the fascinating life of a crash artist, describing how he developed the technique of ramming a plane into the ground, a building or other obstacle without killing himself.

Civil Air Regulations & Reference Guide for Pilots; Aero Publishers Inc., $1.50. This book combines in one volume all up-to-date air regulations that pilots must know and observe, as well as those required by the Civil Aeronautics Administration for pilot certification. The Reference Guide contains check questions and information pertaining to examinations, and the last section reproduces in color the fundamentals of elementary flight maneuvers.

Civil Air Regulations & Reference Guide for A & E Mechanics; Aero Publishers Inc., $1.75. CAA rules and regulations for the A & E mechanic. Includes Aircraft Airworthiness and Air Traffic Rules. Reference Guide contains check questions for CAA exam as well as sample copies of inspection forms with which the mechanic must be acquainted.

The Aeronautical Papers of Albert Zahm; the University of Notre Dame Press, 2 volumes, $7.50 each. This author is considered one of the outstanding living authorities on the development of powered aircraft. The two volumes contain articles on every phase of aviation written by him between 1885 and 1945.

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