1933

UNIVERSAL MODEL AIRPLANE NEWS

JUNE

15¢ in Canada 20¢

"THE ONLY MAGAZINE DEVOTED EXCLUSIVELY TO EXPERIMENTAL AVIATION"

Maneuver Contest

"BAILING OUT"

Picture No. 5

This New Sport is Going Strong!

Model Builders by the thousands are taking up this New Idea and making these Miniature Ship Models. Here's your chance to make some money this summer. You can make them for a few cents each, and sell them to friends, tourists and other people. Read on—it's all told below:

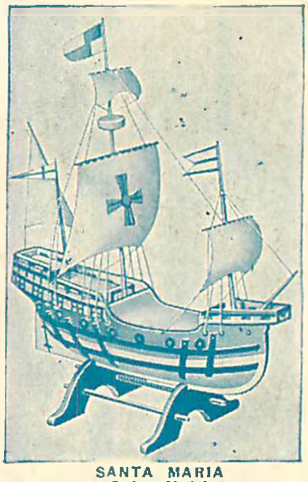
SPANISH GALLEON
6 in. Model

MAYFLOWER
6 in. Model

Now You Can Make

MINIATURE MODELS of HISTORIC SHIPS

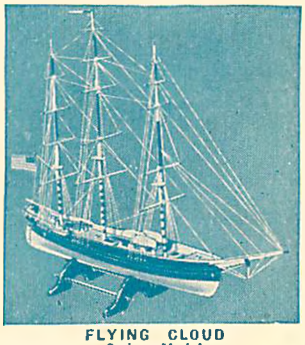
HALF MOON
6 in. Model



SANTA MARIA
6 in. Model

Just look over these pictures at the right. They are real photographs of the Miniature Ship Models you can build. Of course, the gorgeous coloring doesn't show here, but each Model is a wonderfully realistic reproduction of the original Ship, and you can finish them in actual colors. Did you ever see anything finer for decorations, in your room or your den, on the radio, over the fireplace, or anywhere else? Make some samples and sell them; you can earn money this summer.

Each Ship Model comes in a complete Kit containing everything required to make and decorate one Ship. You carve the hull from a balsa block; use round wood for masts, bamboo for spars and yardarms, thread for rigging, and paper for sails; railing, deck fittings and other details are printed on sheet balsa. Cut out the parts, then cement them together with cement furnished in the Kit, and color and decorate your Model with materials also furnished. You get a full-size Plan to work from and detailed Instructions for everything; you cannot go wrong—it's all explained for you! This is your chance for a new Model Sport. Look over these Ships, select the ones you like the best and get going—there's real sport ahead for you.



FLYING CLOUD
6 in. Model

CONSTITUTION
6 in. Model

Your choice of any 2 Ships for 60c

Postpaid

4 for $1.20 Postpaid All 6 for $1.75 Postpaid
(West of Denver, 5c Extra for Postage.)
Stamps Not Accepted

15-inch Size

MONOCOUPE

Flying Model

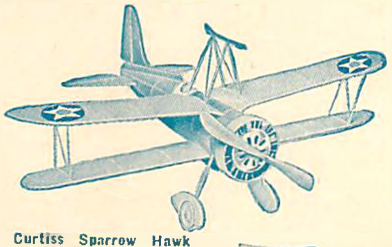
A wonderful Model of this popular Ship that will give you marvelous flights. Full-fuselage body, cambered wings, carved balsa body, metal motor plate and other fine features.

Remember this is a 15-inch Model! The Kit is complete and full-size Plan giving all Instructions is included.

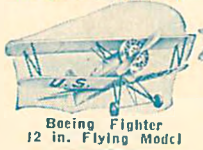
COMPLETE KIT **30c** POSTPAID

(West of Denver, 5c Extra for Postage)
Stamps Not Accepted

How to Save 5c on this Kit:
Order the Monocoupe with one of our 12 in. Models shown opposite, and get both for 50c postpaid.



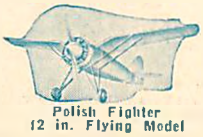
Curtiss Sparrow Hawk
12 in. Flying Model



Boeing Fighter
12 in. Flying Model

Puss Moth
12 in. Flying Model

Fokker Triplane
12 in. Flying Model



Polish Fighter
12 in. Flying Model

Your Choice of 7 *Guaranteed* 12-inch Flying Models for

25c Each Postpaid

(No Order Accepted for Less than 2 Kits)
(West of Denver, 5c Extra for Postage)
Stamps Not Accepted

Sopwith Camel
12 in. Flying Model

Fokker D-VIII
12 in. Flying Model

These are full-fuselage Models with cambered wings, special design ribs, shock-proof landing gear, carved balsa propellers, aluminum motor plates, and other features usually found only on expensive Models. Each is complete in Construction Kit, with full-size Plan showing all details and including simple Instructions for every operation, also cement, rubber, wire parts, wheels and all other fittings and materials required. The most complete and perfect Kit put out at this popular price.

Look them over and get yours now. We cannot accept orders for less than two (2) Kits, so pick out the two you want and we will send them postpaid to your door.

Send 3c for New Bulletin of Models

IDEAL AEROPLANE & SUPPLY CO., Inc.,
20—21 West 19th Street, New York, N. Y.
Pacific Coast Branch:—16 No. 3rd St., San Jose, Cal.
Canadian Branch:—Canadian Model Aircraft, 3007 St. Antoine St., Montreal.
(Canadian Prices are 40% Higher to Cover Customs Duty)
DEALERS:—Write for Big-Money Discounts on Ideal Models

100 STRIPS of Bamboo

1/16" x 1/32" x 12"

ONLY 5c

Only one batch of 100 bamboo strips to a customer! Remember, to get the special 5c price, you must send order of $1 or more worth of supplies.

Yes, you can get 100 pieces of genuine, split bamboo strips (1/16" x 1/32" x 12") for only 5c, provided you order $1 or more worth of Balsa Products Company supplies from this advertisement! (Kits **NOT** included.) Just think . . . 100 feet of bamboo strips for 5c! This is a remarkable value . . . and we hope to make many new friends and get re-orders from our thousands of old friends. But you must act immediately to take advantage of this SPECIAL 5c price as this offer closes Midnight, August 31, 1933.

Watch for our big page advertisements in UNIVERSAL MODEL AIRPLANE NEWS for "get acquainted" Special Offers. We believe that you will get more for your money by waiting till you see our Monthly Special Offer. As you know, this is a company formed by mature business men who are model airplane "hobbyists"—and BUSINESS-LIKE SERVICE has been our motto from the start. A constantly GROWING flood of orders PROVES that model airplane builders prefer to deal with a company that SPECIALIZES on giving quick service, full value, low prices—and guarantees satisfaction, or exchange, or money back! NOW . . . send us an order for supplies amounting to $1 or more—add 5c to that order and get 100 bamboo strips with your order!

CATALOG FREE

Send 3c stamp to cover mailing cost. You'll be surprised to see this beautiful Catalog which PICTURES our many wonderful supply items. Send stamp with your order **NOW!**

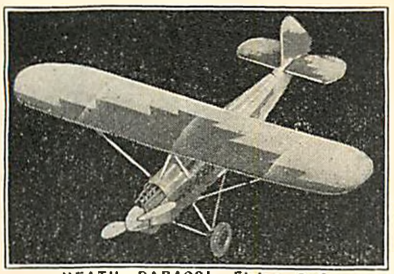
Offer Good only till Midnight, August 31, 1933—So Order Now

HERE! B.P.A.'s New De luxe 25c FLYING SCALE MODELS!

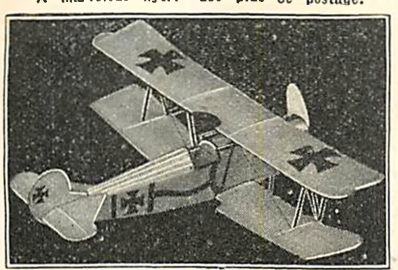
25c EACH Plus 5c Postage

BEST 25c kits on market! FULL-SIZE, 3-view plans, COMPLETE KITS with banana oil, cement, formed wire parts, balsa, Jap tissue, turned balsa wheels, etc. Packed in sturdy cardboard boxes.

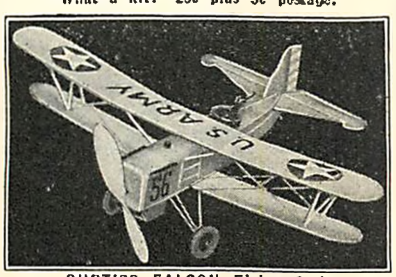
25c each plus 5c postage on order for only one kit. We pay postage on order for 2 or more kits!



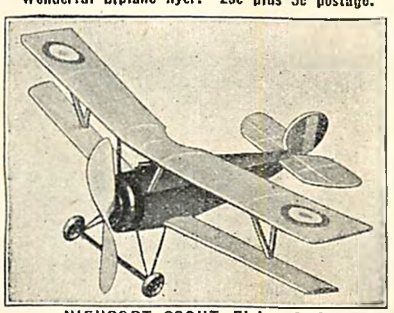
HEATH PARASOL Flying Scale
A marvelous flyer. 25c plus 5c postage.



FOKKER D-7 Flying Scale
What a kit! 25c plus 5c postage.



CURTISS FALCON Flying Scale
Wonderful biplane flyer. 25c plus 5c postage.



NIEUPORT SCOUT Flying Scale
War-time fighter. 25c plus 5c postage.

GEE BEE SPORTSTER D
Speed Plane! 25c plus 5c postage.

SUPPLIES!

NEW! Balsa Cowlings

Wonderful invention! Very light! 1/8" thick wall—comes in open face type only. Outside diameter, 1 5/8". Gives a model that "racy" appearance. Price only 10 each!

BALSA STRIPS 24" Lengths

		each		
1/16"	sq.	1c	12 for	5c
1/16"	x 1/8"	1c	10 for	5c
3/32"	sq.	1c	9 for	5c
1/16"	x 1/4"	1c	8 for	5c
1/8"	sq.	1c	8 for	5c
3/32"	x 3/16",	1½c	8 for	8c
1/8"	x 3/16",	1½c	8 for	8c
1/8"	x 1/4"	2c	5 for	7c
1/8"	x 3/8"	2c	5 for	7c
1/4"	x 1/2"	3c	5 for	10c
3/8"	sq.	4c	5 for	16c
3/8"	x 1/2"	5c	5 for	20c
1/2"	sq.	6c	5 for	25c
1"	x 1"	13c	4 for	45c

Other sizes to order.

BALSA STRIPS 36" Lengths

		each		
1/8"	sq.	1c	6 for	5c
1/8"	x 1/4"	2c	6 for	10c
3/16"	sq.	2c	5 for	9c
1/4"	sq.	3c	5 for	12c
1/8"	x 3/8"	2c	5 for	9c

SHEET BALSA

		24"	36"
1/32	x 2"	3c	
1/16	x 2"	4c	5c
1/16	x 3"	6c	
1/16	x 4"	9c	
3/32	x 2"	4½c	6½c
1/8	x 2"	4½c	6½c
3/16	x 2"	6c	9c
1/4	x 2"		11c

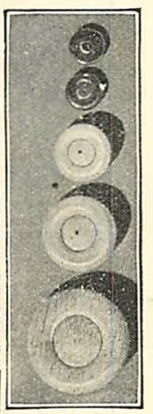
NEW! Semi-Carved Balsa "Props"

Lite weight, center-marked, finished in a jiffy! Just out! Quality balsa!

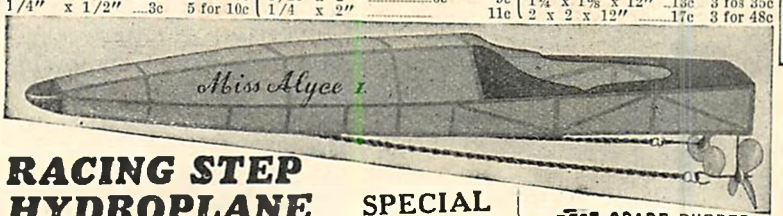
5" dia. 5c 6" dia. 6c
7" dia. 7c 8" dia. 8c

PROPELLER BLOCKS

		each		
3/8	x ½ x 6"	1c	6 for	4c
½	x ¾ x 6"	1c	6 for	5c
9/16	x 7/8 x 7"	2c	6 for	10c
¾	x 1⅛ x 8"	3c	3 for	8c
7/8	x 1¼ x 8"	4c	3 for	10c
¾	x 1½ x 8"	5c	3 for	13c
¾	x 1¼ x 10"	6c	3 for	15c
1	x 1½ x 8"	7c	3 for	18c
1	x 1¼ x 10"	8c	3 for	21c
1	x 1½ x 10"	9c	3 for	24c
1	x 1½ x 12"	10c	3 for	27c
1¼	x 1⅝ x 12"	13c	3 fos	35c
2	x 2 x 12"	17c	3 for	48c



NEW! Balsa Wheels



RACING STEP HYDROPLANE SPECIAL 75c

Quick . . get this twin-screw racing "step" hydroplane kit at the SPECIAL DIRECT-BY-MAIL Price of only 75c! (Regular price, $1). It's prepaid. 20 inches long . . . easy as pie to assemble . . and she simply t-e-a-r-s thru the water! Build it and race it! Big sport! Order on coupon now.

NEW! Balsa Wheels

Three sizes only—¾" dia. at 4c pair; 1" dia. at 5c pair and 1⅜" dia. at 7c pair. Axle holes accurately drilled. 3 wheels at bottom (see photo) are balsa wheels, 4c per pr. The two upper wheels are miniature wheels for replica models, made of hard wood, colored red. Axle holes drilled. One size—½" diameter and sells at 2c a pair.

PLANK BALSA

1x3x36"	33c	2x6x36"	80c
2x3x36"	55c	2x6x40"	95c

BAMBOO

	each	
1/16 x ¼ x 12"	1c	6c per dz.
1/16 x ¼ x 15"	1c	8c per dz.
1/16 sq.x12"	1 for 1c.	36 for 8c

JAPANESE TISSUE

White, 19 x 26"—4c per sheet 36c per doz.
Red, yellow, green, blue, black, orange and khaki colored Jap tissue, 20½" x 21". 5c per sheet 48c per doz.

THRUST BEARINGS

Small size—2c ea. per doz. 18c

BEST GRADE RUBBER

No. 20 sq. (.05")—3 ft. for 1c
1/32 x 1/16" —3 ft. for 1c
1/32 x 1/8" —3 ft. for 1c

DRI-QWIK CEMENT

Large size tube 10c
Pint 85c

BANANA LIQUID

1 oz. bottle 7c
2 oz. bottle 10s
Pint 60c

ACETONE

2 oz. bottle 10c
Pint 75c

CELLULOID DUMMY MOTORS—9 cyl.

1½" dia. 18c
2" dia. 22c

CELLULOID WHEELS

¾" dia., per pair 6c
1" dia., per pair 7c

Above two sizes in black, white, blue, red. 1-3/16" dia.—(Black only) per pair 8c
1¾" dia., per pair 10c
1⅞" dia., per pair 16c

Above two sizes in blue, white, black, green yellow.

3" dia. Jumbo wheels (Black only), per pair 30c

ALUMINUM TUBING

1/16" dia., per ft. 8c
3/32" dia., per ft. 8c
1/8" dia., per ft. 10c
3/16" dia., per ft. 11c
5/16" dia., per ft. 13c

NEW! Semi-Carved Propellers

How to Order — Send No Money!

Order kits or supplies the convenient C.O.D. way—send no money, mark coupon or your letter "C.O.D." and pay postman on delivery.

REMITTANCE RULES: (1) No order under 50c accepted. On supply orders up to $1.50 add 15c packing, postage. Add 10% on orders over $1.50. West of Mississippi, add 10c extra to cover charges. Order C.O.D., or remit cash by postal or express money order. (2) We pay postage, insurance on orders of $4 or more, except on balsa planks. (3) Canadians add 25c on orders up to $1.50, 15% on orders over $1.50. No Canadian coin or stamps accepted. Use International Money Order! Print order clearly. Satisfaction guaranteed, or exchange made, or money refunded.

Use This Coupon For Kit Orders Only!

Order supplies on postal or on sheet of paper

BALSA PRODUCTS CO. of AMERICA
1319 So. 5th Ave., Div.-36. Maywood, Ill.

[ ] Send C.O.D. kits checked below. I will pay postman for kits, plus C.O.D. fee, postage. No. C.O.D. orders accepted for less than 2 Kits.
[ ] I enclose $..... for kits checked below. Also 5c for postage. If I order 2 or more B.P.A. kits, you will send them prepaid.

Heath [ ] Fokker [ ] Curtiss Falcon [ ] Gee Bee "D" [ ] Nieuport Scout [ ] Racing Hydroplane [ ] Catalog, 3c [ ]

NAME .....
Street .....
City ..... State .....

HURRY! RUSH THIS COUPON

DEALERS!

Write on letterhead today for Special Discounts. BIG PROFIT handling B.P.A. supplies. REAL SERVICE! Deal with BUSINESS MEN!

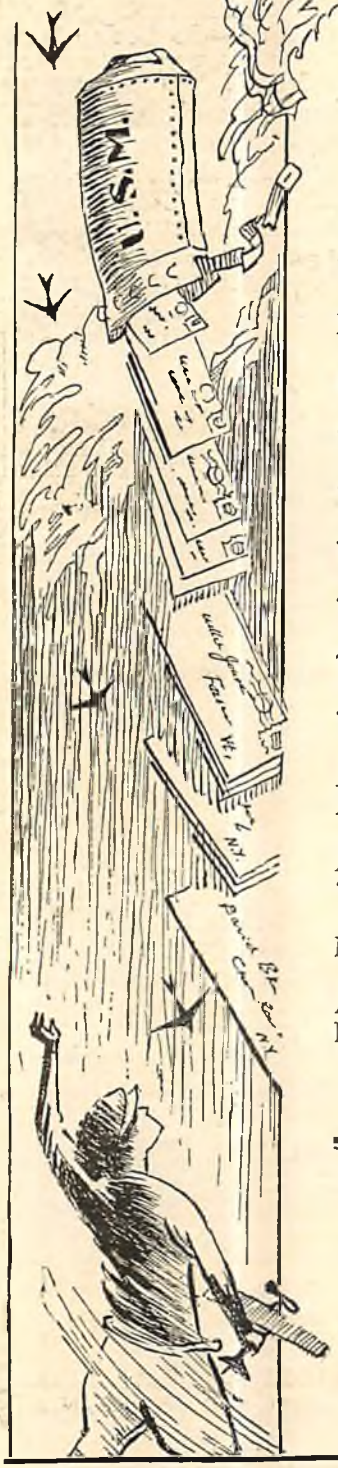
NEW! Balsa Cowlings

BALSA PRODUCTS CO. OF AMERICA

UNIVERSAL

Model AIRPLANE NEWS

Vol. VIII *No. 6*



Edited by Charles Hampson Grant

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JUNE—1933

Important Notice

THE NEXT ISSUE OF UNIVERSAL MODEL AIRPLANE NEWS will be called the AUGUST ISSUE which will appear approximately one month later than the June issue. There will be no issue bearing the July date line. All subscriptions commencing with an issue prior to the August Issue WILL BE EXTENDED FOR ONE ISSUE OVER THE NORMAL EXPIRATION DATE.

In Our Next Issue

Prof. Alexander Klemin tells us of the surprising advance the United States has made in large flying boat construction and how they are expected to conquer the Atlantic, in *Flying Boats vs. The Atlantic*, Part 2.

Lt. (j.g.) H. B. Miller gives interesting high lights of his ballooning experiences in *Sailing the Skies On A Bubble of Gas.*

How to Build the Submarine Scout, by John Tyskewicz gives you complete information to construct a flying scale model of the plane which operates from U. S. submarines.

There are many other presentations which will fascinate you, as: a War Ace story by F. Conde Ott, detail plans of large ships, plans for a record breaking single propeller pusher and a baby hydro, as well as other short stories, helpful hints and a course in Experimental Airplane Design.

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Contributors are especially advised to be sure to retain copies of their contributions, otherwise they are taking unnecessary risk. Every possible effort will be made in our organization to return unavailable manuscripts, photographs and drawings (if accompanied by postage), but we will not be responsible for any loss of such matter contributed.

SCIENTIFIC

Scientific Model Airplane Co.
277 Halsey St., Newark, N. J.

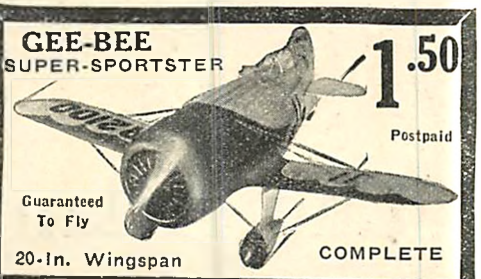
Gentlemen:

Please find attached check for $2.25 to cover order for 1 Kellett Autogiro and 1 Monocoupe-110.
The writer won a speed contest with the Gee-Bee Super-Sportster that was built from your kit, held last Sunday, April 23.
Hoping to receive the above kits soon, I remain,

Very truly yours,
Chas. H. Snyder,
124½ Collett St.,
Lima, Ohio.

FLYING MODELS are WINNERS and Set a New Pace!

We have received hundreds of letters similar to this one.



GEE-BEE SUPER-SPORTSTER 1.50 Postpaid
Guaranteed To Fly
20-In. Wingspan COMPLETE

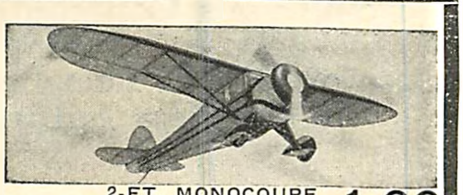
ALL SCIENTIFIC FLYING KITS CONTAIN:

Ready-made balsa cowlings; ready-made wire fittings; all ribs, bulkheads, etc., clearly printed on balsa; semi-finished propeller, and pants; 1 oz. banana oil and cement (and colored dope where needed); tissue; rubber; all balsa strips cut to size; insignia and numbers where needed; full-size drawings and explicit instructions

22 in. Wing Span

CAPT. HAWKS' SKY CHIEF

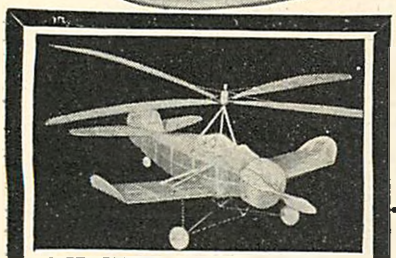
A Great Flyer!



2-FT. MONOCOUPE Complete Kit 1.00 P.P.

2-FT. GEE-BEE SPORTSTER Complete Kit 1.00 P.P.

26½-IN. STINSON AIRLINER Complete Kit 1.50 P.P.



2 FT. FLYING KELLETT AUTOGIRO
GUARANTEED TO FLY. SEND FOR YOURS NOW. 1.25 P.P.

NORTHROP "GAMMA" $1.00 Post Paid

Easy to build—Flies Great! Here's one of the sweetest flying models you ever flew. Snappy, speedy lines, big 22" tapered wing length 13½", weight 1 oz. Kit is complete! including finished cowling, wheels, and semi-finished prop. Full-size plan and instructions. Send for yours now.

All Scientific Kits Guaranteed To Fly

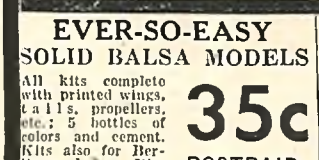
READY TO FLY
Assembled in 3 minutes. Rises off ground, flies 400 to 600 feet. Weight ⅛ oz., each model painted in three colors.
Complete—each 25c P.P.

Our regular flying scale models were 99c, now 55c, postpaid, including ready-made propellers. S.P.A.D., Lockheed Vega, Fokker Triplane, and S.E.5.
4 for 2.00 P.P.

EVER-SO-EASY SOLID BALSA MODELS

All kits complete with printed wings, tails, propellers, etc.; 5 bottles of colors and cement. Kits also for Berliner Joyce, Pitcairn Autogiro, Wedell-Williams.

35c POSTPAID 3 for 1.00



Monocoupe-110

Boeing Pursuit XP-936

Curtiss Akron Fighter XF9C-1

SCIENTIFIC SUPPLIES

Highest Quality Materials! Guaranteed as Represented

Lowest Prices! OR MONEY REFUNDED

Scientific Balsa 36" lengths

1/16x1/16,	10 for 5c
1/16x1/8,	7 for 5c
1/16x3/16,	6 for 7c
1/16x1/4,	6 for 7c
3/32x3/32,	6 for 5c
1/8 x1/8,	6 for 5c
1/8 x3/16,	6 for 8c
1/8 x1/4,	6 for 10c
1/8 x3/8,	5 for 10c
3/16x3/16,	5 for 10c
3/16x1/4,	5 for 10c
1/4 x1/4,	6 for 15c
1/4 x1,	3 for 15c
3/8 x3/8,	5 for 15c
1/2 x1/2,	3 for 20c

36" Planks

1x1½,	.20	2x3,	.45
1x2,	.25	2x6,	.75
1x3,	.30	3x3,	.90
1x6,	.50	3x6,	1.50

Banana Oil or Acetone
Large 2 oz. can, 10c
Per pt. 60c

Hoosier Compressed Air Motor
Complete kit 99c

Sheet Balsa 36" lengths

1/32 x 2	4c
1/32 x 3	7c
1/16 x 2	5c
1/16 x 3	8c
1/8 x 2	6c
1/8 x 3	10c
1/4 x 2	10c
1/4 x 3	15c
1/64 x 2 x 18",	2 for 5c

Propeller Blocks

¾ x ½ x 5	1c
½ x ¾ x 6,	3 for 4c
½ x ¾ x 6,	3 for 5c
¾ x ¾ x 7½	3c
¾ x 1 x 8,	2 for 5c
2 x 1½ x 11	7c
1 x 1½ x 12	9c

Colored Jap Tissue
Red, blue, yellow, orange, brown, green, 5c. 6 for 25c.

Jap Fine Tissue
5c; 6 for 25c

Thrust Bearings
Large or small, each 2c

Round Nose Pliers
Very handy tool, each 29c

Ever-Gloss Colored Dope
1/10th the weight of ordinary dope. Colors: Red, yellow, blue, brown, violet, green, and orange.
1 oz. bottle 6c
2 oz. can 10c

Ready-Made Finished Balsa Wood Pants

For	per pr.
¾" wheels	15c
1" wheels	17c
1⅜" wheels	20c
1⅞" wheels	25c

Dowels
⅛" x 36" 2 for 5c

Featherweight Aluminum Wheels

	per pr.
1" diam.	10c
1½" diam.	15c

Scientific Cement
5 oz. can 30c

Reed
1/32", 1/16", 3/32" 1/8", 6 ft. 5c

Camel Hair Brushes
Each 5c

Pinhole Washers
Per doz.
⅛" or ¼" 1½c

Wood Veneer Paper
Sheet 20" x 30", 2 for 25c

Scale Model Tissue
2 for 5c; doz. 25c

Music Wire (Not Coiled)
.010", .014", .017", .020", .024", .028", and .034", 3 ft. 1c
.037", and .040" 3 ft. 2c

Scientific Cement

1 oz. bottle	10c
Large 2 oz. can	16c
4 oz. bottle	25c

Scientific Rubber
1/16" sq., 1/16" flat, 3/32" flat, 1/8" flat, 3/16" flat, 3 ft. 1c

Celluloid Wheels In all colors.

¾" diam.	pr. 6c
1" diam.	pr. 8c
1¾" diam.	pr. 11c
1⅞" diam.	pr. 16c

Double-Geared Winders
Each 20c
Large wood handle 49c
With automatic counter attached $3.50

Propeller Shafts or Rear Hooks
4 for 5c

Bamboo

1/32 x 1/4 x 8",	doz. 5c
1/16 x 1/4 x 12",	doz. 7c
1/16 x 1/4 x 15",	doz. 8c
1/16 x 1/16 x 8",	doz. 3c
1/16 x 1/16 x 12",	doz. 5c

Bushings
Per doz. 4c

Insignia Sheets
Enough to decorate a whole fleet of models. Rudder strips, stars, circles, bullseyes, German crosses, instrument board, and squadron insignia. 48 insignias in all for only 10c

Sandpaper
Pkg. of 4 for 5c

Balsa Wood Wheels

	pr.
1" diam. Balloon,	4c
1⅛" diam. Thin,	4c
1⅜" diam. Thin,	6c
1¾" diam. Bal.,	6c
1½" diam. Bal.,	6c

Round Nose Pliers
Each 29c

Aluminum Tubing

1/16", per ft.	8c
3/32", per ft.	8c
1/8", per ft.	7c
3/16", per ft.	11c
1/4", per ft.	13c

Sheet Alum.
12" wide

.001" per ft.	15c
.002" per ft.	15c
.003" per ft.	15c
.005" per ft.	12c
.010" per ft.	18c

Celluloid Pants
Takes 1⅜ or 1"⅞ wheels. Per pr. 39c
Small pants for ¾" or 1" wheels.
Per pr. 15c

Jap Silk Tisue
Large sheet 8c
2 for 15c

Rubber Air Wheels

1" pr.	18c
1¼" pr.	20c
1⅝" pr.	25c

Rubber Lubricant
Gives 25% more turns to rubber.
Large 2 oz. can 30c

Featherweight Alum. Cowlings
Closed and open face

1½" diam.	18c
2" diam.	20c
2½" diam.	28c
3" diam.	30c
3½" diam.	40c

Alum. Drag Rings

1½" diam.	18c
2" diam.	20c
2½" diam.	25c
3" diam.	27c
3½" diam.	35c

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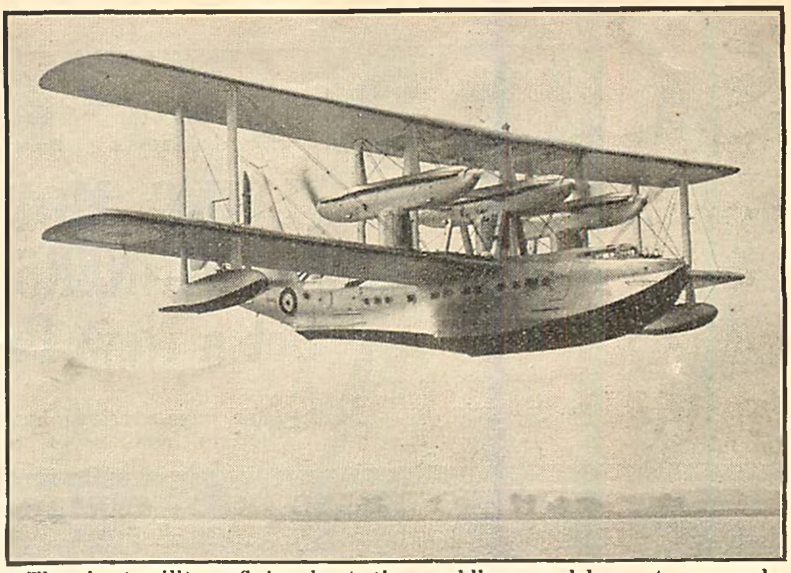
Flying Boats vs. The Atlantic

Problems Confronting the Trans-Atlantic Flying Boat Designers. Will They Be Solved in the Near Future?

By ALEXANDER KLEMIN

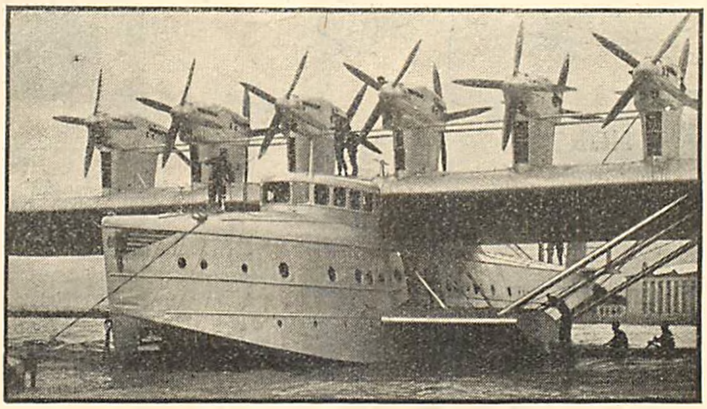
Prof. of Aeronautical Engineering, N.Y.U.



The short military flying boat, the world's second largest, powered by six Rolls Royce engines.

PART I

FOR many years the friends of lighter-than air craft have maintained that the use of the airship was the only feasible method of establishing regular commercial air services across the Atlantic or the Pacific Oceans. Exponents of the airship argued that the large rigid ship was the only type of aircraft capable of flying three thousand miles non-stop, of carrying the huge fuel loadload required and yet having sufficient capacity for fifty or sixty passengers and ten thousand pounds or more of mail and express.

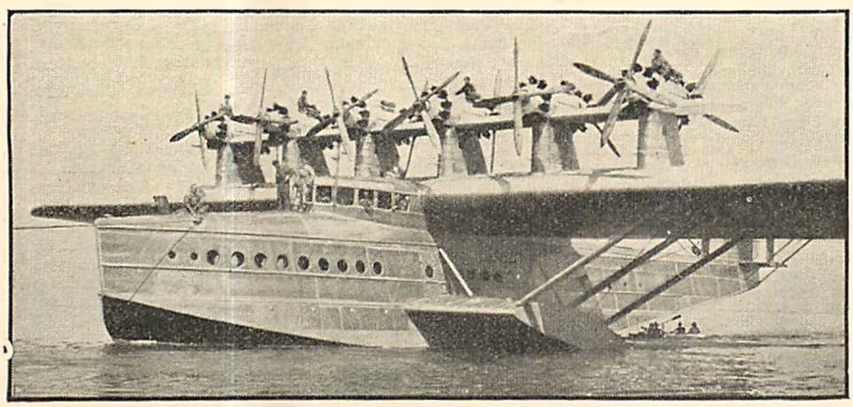


The German DO-X, the largest airplane in the world, equipped with twelve Curtiss conqueror engines.

On such large airships, it was argued, passengers could have the comfort of individual sleeping compartments; dining rooms, smoking lounges, and perhaps even a dance floor. They could take daily exercise on a gangway some two hundred feet or more in length. They would have indeed almost all the comforts of the ocean liner and yet be able to travel more than twice as fast, going from New York to London or Paris in approximately two days.

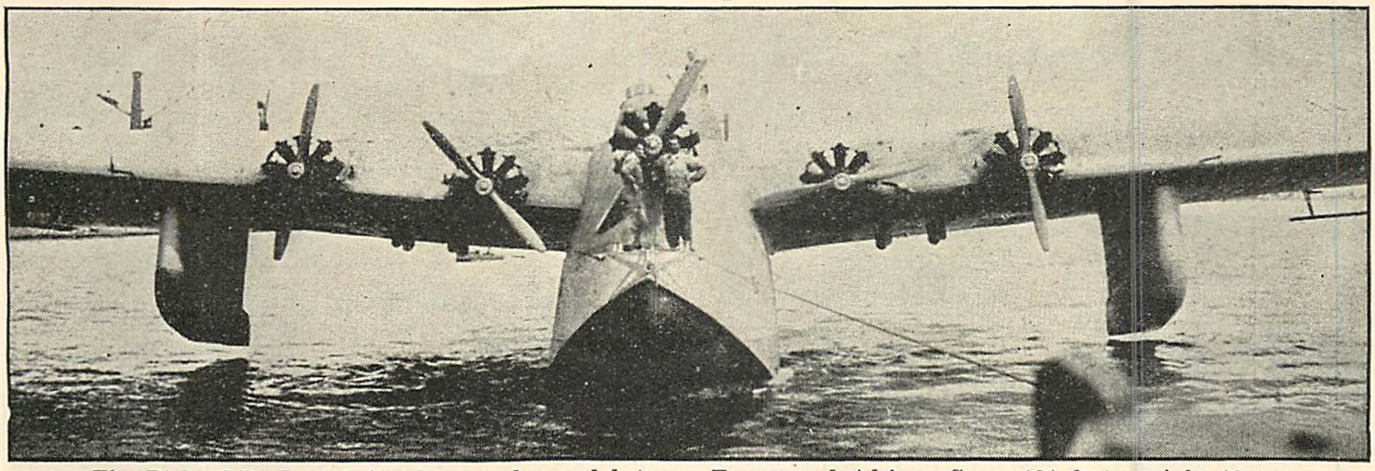
The long and successful career of the Los Angeles; the exploits of the Graf Zeppelin in circumnavigating the globe and in making splendid voyages across the North Atlantic; the experimental service so successfully maintained by the same airship across the South Atlantic to Brazil, (in which twelve trips were made without a mishap), all lent strong support to this view.

The National Advisory Committee for Aeronautics in its annual report to the President also lent its authority to the soundness of the idea. Admiral William A. Moffett, Late Chief of the Navy Bureau of Aeronautics voiced approval again and again, of plans for trans-oceanic airship service. With the construction and flight tests of the Akron hopes were raised even higher. A number of powerful industrial concerns and a group of New York bankers had been for several years actively studying the problem, and formulating plans for raising the huge capital required, namely of fifty million dollars. With the advances made in the ground handling of airships, the right moment for launching such an enterprise seemed close at hand.



The DO-X as it looked when equipped with twelve Jupiter engines before conqueror engines were installed.

The terrible disaster of the Akron gave these hopes and efforts a tremendous setback. Admiral Moffett himself, as our readers will remember, perished in the disaster. The loss of an investment of some five million dollars and of seventy brave men, shocked the entire country. It is wrong to say that airships will never be built again, for they have a distinct place in aviation that the airplane cannot fill. The Macon, a sister ship of the Akron has taken the air and has proved herself faster and more maneuverable than the earlier craft. In warfare, the long range

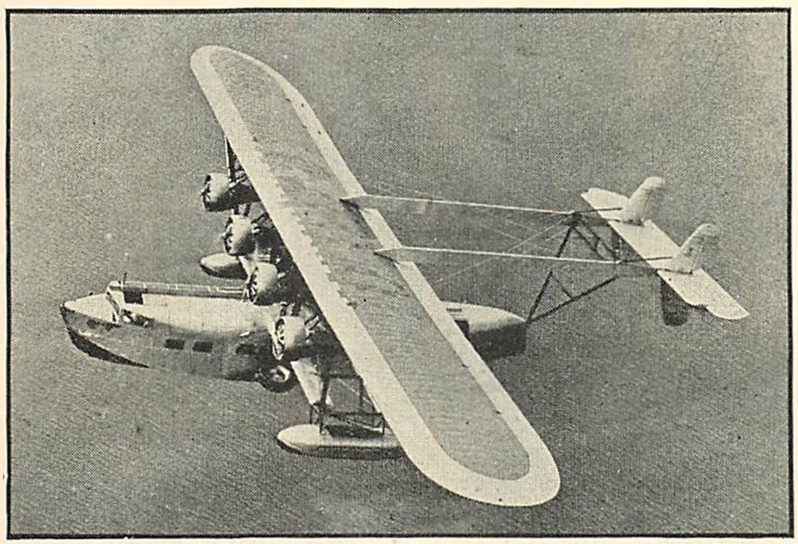


The Richard-Penhoet flying boat to be used between France and Africa. Span, 131 feet; weight 19 tons.

scouting ability and load carrying capacity of the airship will always remain a great asset to our fleet, especially when it can carry four or five small pursuit airplanes.

Flying Boat Service Now More Likely

FOR the time being, however, the possibility of a a flying boat service across the Atlantic seems far more likely. The great argument in favor of the flying boat as compared with the airship lies in its speed. Whereas the maximum speed of a dirigible has barely exceeded eight-five miles per hour, large flying boats have already passed the one hundred and fifty mile an hour mark. Progress with the seaplane is so rapid, that we may, in a few years hope for flying boats with a speed of two hundred miles an hour and then the trans-Atlantic voyage could conceivably be made within the space of twenty-four hours. The one great difficulty to be conquered by the flying boat lies in the range; great distances which have to be flown non-stop and the vast amount of fuel required. It is true that Lindbergh was able to cross the Atlantic in a small single engine plane, but his craft carried nothing but himself, a couple of sandwiches, a small bottle of water and gasoline. But the giant DO-X with its full complement of passengers had only a range of some seven or eight hundred miles. Let us see what the requirements for a successful trans-Atlantic flying boat are:



The Sikorsky S-40 used on Pan-American Airways. It is America's largest "Boat."

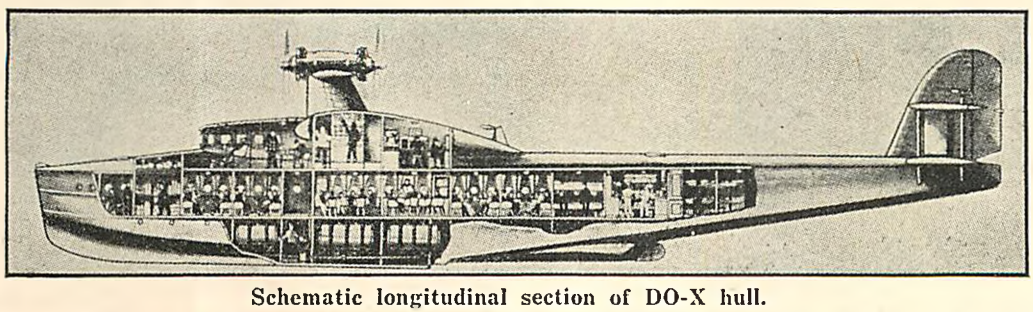
Requirements for a trans-Atlantic Flying Boat

FIRST of all a flying boat must have speed. Cruising speed (which means the speed when flying at about two-thirds full engine power) must be at least one hundred and twenty-five miles per hour and if possible, considerably more. Since the seaplane may have to cover a distance of nineteen hundred miles non-stop between the Bermudas and the Azores, its useful range should be twenty-five hundred miles, to provide for all emergencies. To meet these performance requirements and yet have sufficient payload, the ship must be streamlined to the last degree so that the power and fuel requirements are reduced to a minimum. The structure of the plane must evidently be as light as consistent with safety. These are problems which are likely to test the designer's ability to the full.

The power plant has to be the subject of equal attention. We must have engines which are as light as possible for a given horse-power, and as economical as possible of fuel and oil. A multiple power plant is necessary with at least four engines, so that the breakdown of one engine does not terminate a voyage. With larger ships, and longer flights, the mechanic should be able to get to the engine while the boat is aloft. Fire prevention has to be carefully studied. It is a great temptation to utilize the hull for storage of gasoline, but it is far safer to place the inflammable fuel in the wing.

And then there is the

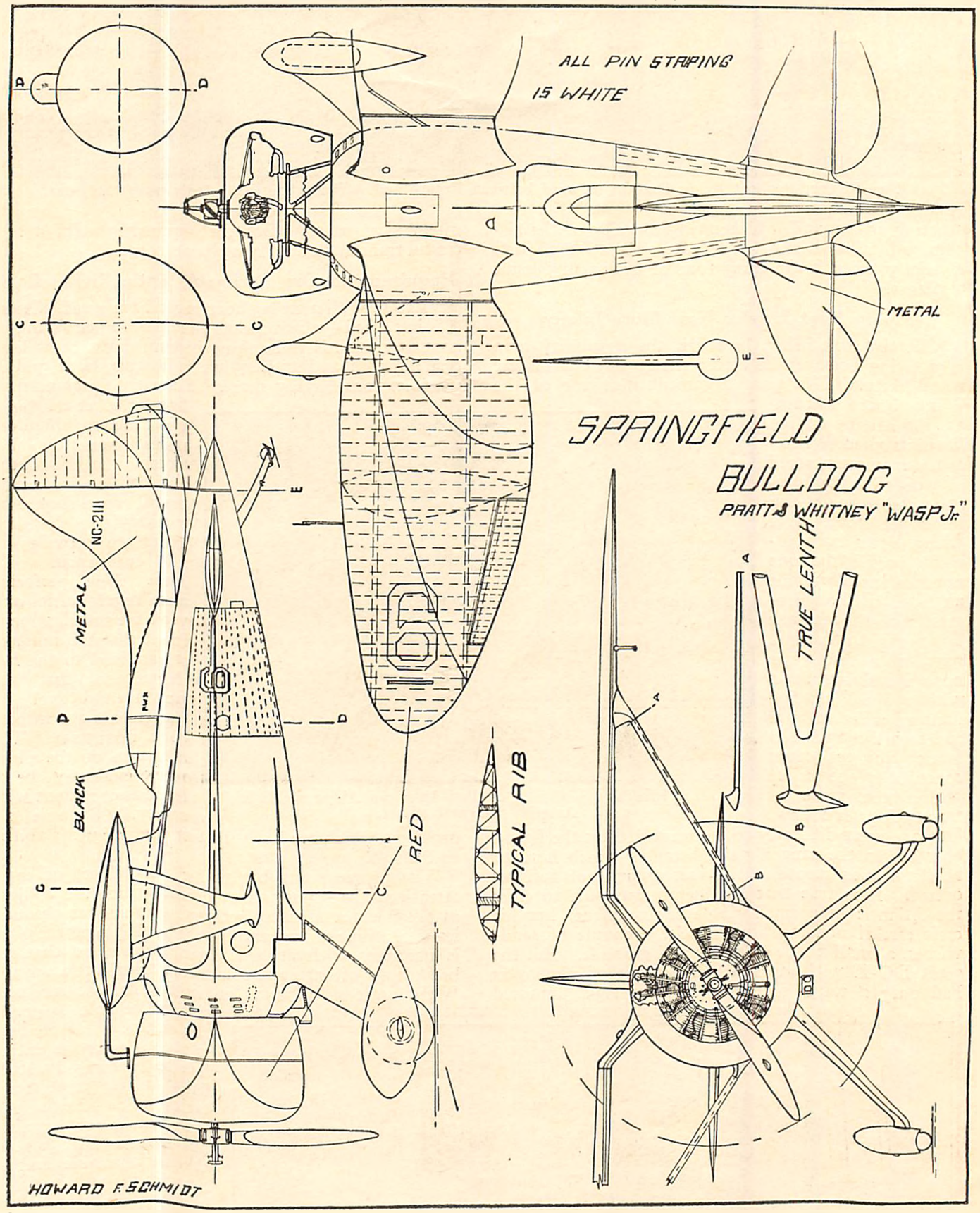
(Continued on page 42)



Schematic longitudinal section of DO-X hull.

The Hall - Springfield Racer

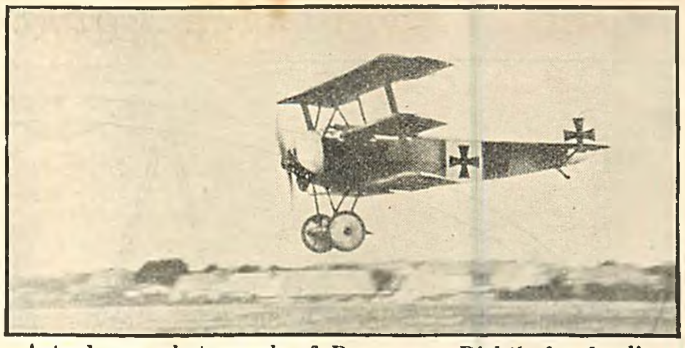
THIS speedy gull-winged ship was one of the outstanding competitors at the Cleveland, Ohio, air races last year. It cuts through the air at a rate of 250 m.p.h., or more. It was designed by Mr. Hall, designer of the Gee Bee planes and retains several characteristics of the Gee Bee ships. The high wing and larger tail surfaces are the outstanding differences. The characteristics of this plane are such that they lend beauty and fine flying qualities to it in model form. Sufficient details are given in the plans for a careful builder to complete satisfactorily either a solid scale, detail scale or flying model. The plans have been drawn to a scale of one-quarter inch to the foot. Try your skill with this model.



Fighting Wings

A Vivid Story of Capt. Swaab's Experiences in The Furious Air Battles of The Last Days of the War

By ORVILLE H. KNEEN



Actual war photograph of Baron von Richthofen landing his red Fokker Triplane after a raid.

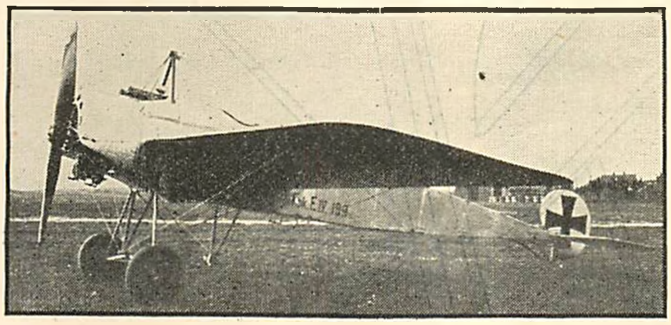
PART FOUR (Conclusion)

FOR a few moments, as I saw my late antagonist whirling to an agonizing death, I felt nauseated all over. Why did a brave boy have to be hunted down and sent to a terrible death? What had he done to me? Who gave me the right to kill a fellowman? But thoughts such as these had to be dismissed. Wiser men than I have tried to answer such questions. And war goes on.

I tried to pick up my patrol, when, in the distance, I saw another enemy. He was lazing along close to the ground, near our lines. A hasty glance, and down I swooped. A few hundred meters away came the glint of a German chasse patrol! They were diving from the heavens, straight for me!

I had been trapped! Many a better man, trying to clear the skies, had lost his life in such a mantrap. But I had a second or two before my callers dropped in. Almost upon the slower biplane, I opened my guns — and at the same instant the enemy observer did the same.

One of the greatest war aces, Baron Manfred von Richthofen



Boelkes' own Fokker E. IV monoplane. Actual war picture.

The brief burst against me stopped. I must have hit the observer. In that split second I held the guns on the enemy, till he headed earthward in an unnatural glide.

I doubled backward in a sharp turn. The attackers were almost upon me when I opened my throttle and to gain every ounce of power and mile of speed, nosed downward in a nearly vertical dive.

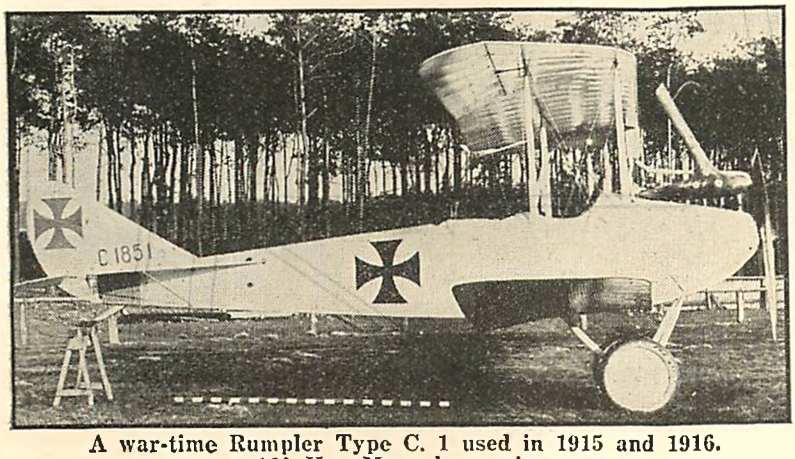
So fast did I travel that the avenging six were left behind at once. Being out of ammunition, my highest ambition was to keep out of range. I reached camp intact. General orders a few days later gave me only one of the two victories, the first. My total was now six.

Next day Jimmy Beane and I left the patrol to swoop down on a Fokker. He closed in and opened fire. I hung back to watch the sky—and the battle.

"The Baron's" guns stopped just before he had the enemy's range. They had jammed of course. I dove to the attack and he pulled up behind me. The Fokker pilot worked feverishly, whirled, twisted and spun dizzily, with my little Spad ever on his tail.

I pulled up and over him, caught him in my sights, and let my two Vickers crack out their hot messages. He fluttered, slowly lost balance.

Then, like a great wounded bird, the graceful machine whipped into a tight vrille and spun to earth in its last whirl of death. I followed him down. Smart pilots sometimes spun like that to get away. But he plunged head-on to earth, perhaps as the wounded pilot lost consciousness and fell against the stick.

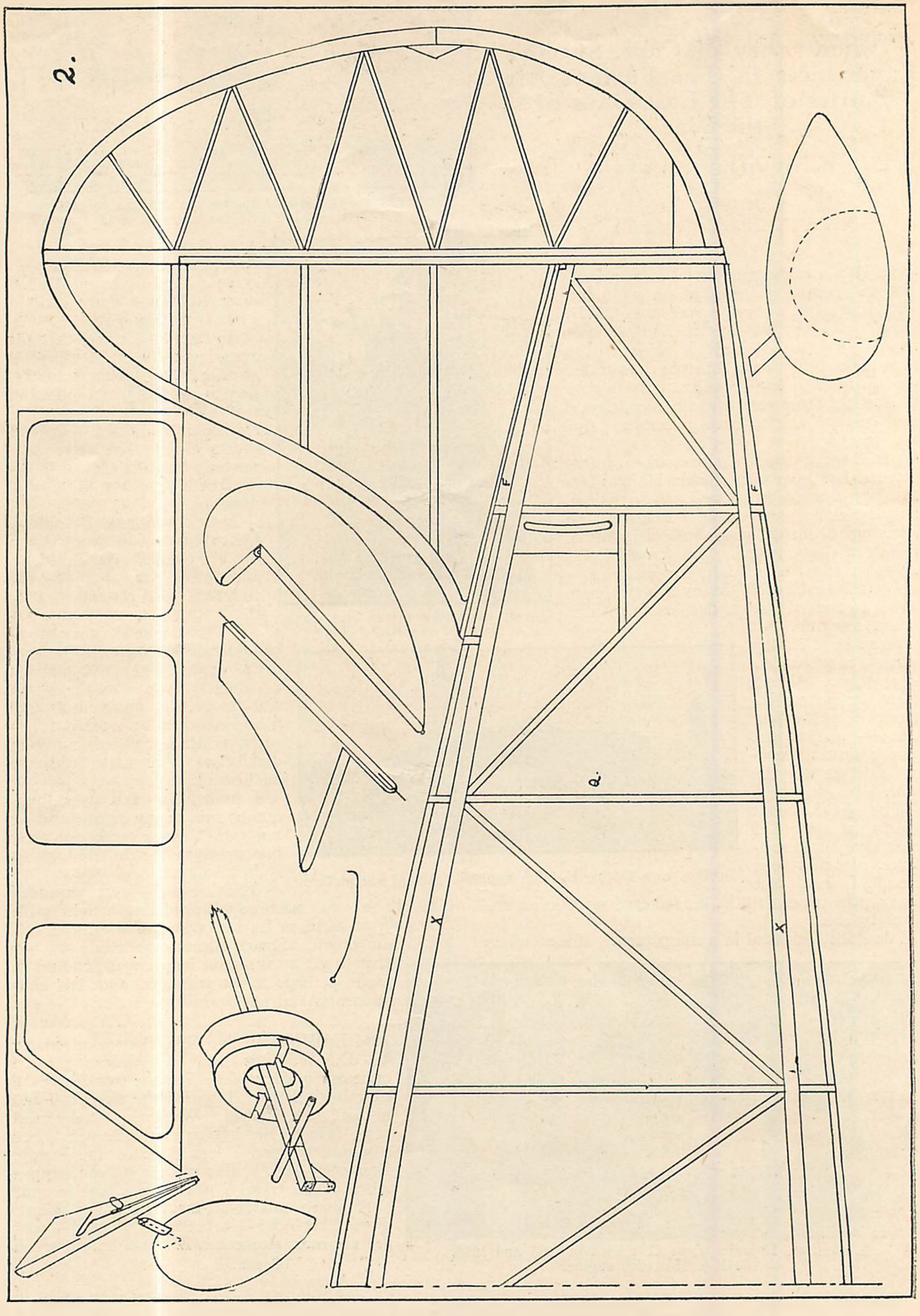


A war-time Rumpler Type C. 1 used in 1915 and 1916. 160 H.p. Mercedes engine.

CLIMBING to find The Baron, an enemy D.F.W. shot into view below me. I came out under and behind the two-seater, all clear behind me. I pulled the trippers—and my left gun jammed. Working fast, I leaned 'way over to the left to clear the jam. For a second or two I lost sight of the enemy, flying "by feel." But what a lot can happen when planes travel 200 feet in a bare second!

A sharp rat-tat-tat-tat chilled my heart. Two short pops—inches from my ear—stopped my heart altogether. My eyes bulged when

(*Continued on page* 38)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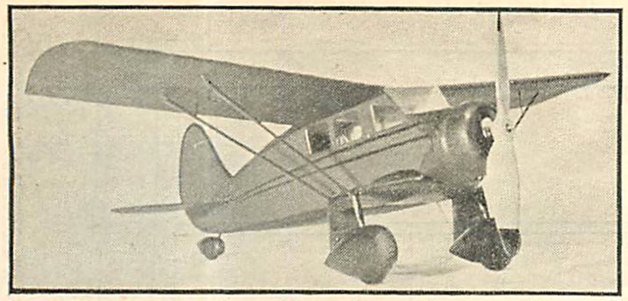
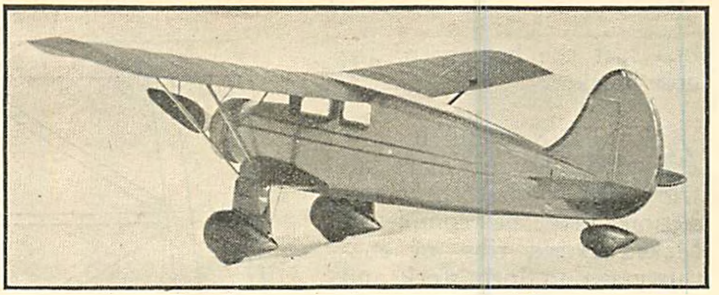


The completed model ready to fly is realistic.



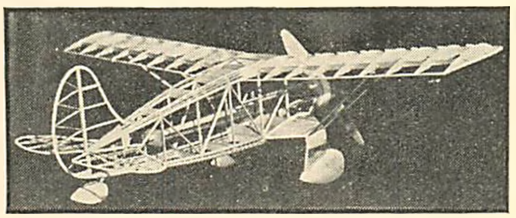
Details are carried out accurately.

Building A Flying Stinson "R"

Complete Plans and Instructions to Build a Clever Flying Scale Model of One of the Most Popular Cabin Planes

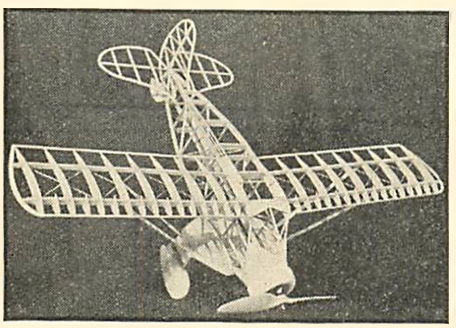
By C. L. BRISTOL

THE Stinson "R" is without question a step forward in airplane design and its structural and aerodynamic advantages can be readily applied to make a truly fine flying model. Noticeable among these is the exceptional balance of the plane, the centralizing and distribution of the various stresses through a cradle-like landing gear and the low center of gravity maintained. Three point shock absorbers, good streamlining and dihedral wings also combine to make your model a dependable one.



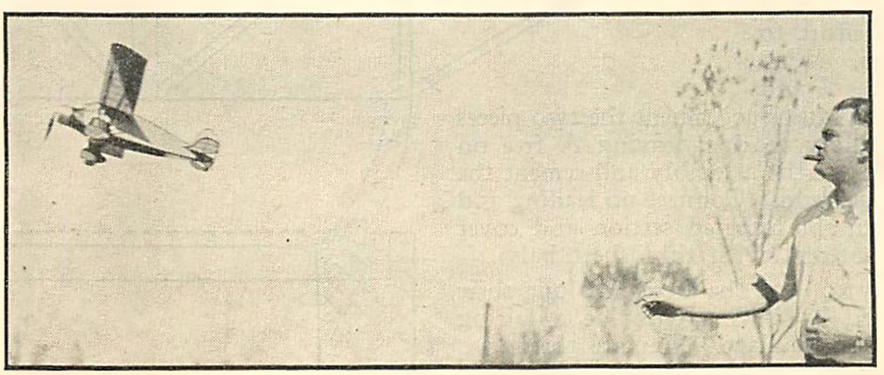
The framework has been carefully designed and is exceedingly sturdy.

The model described herewith is designed primarily for use with the controllable stabilizer, drawings and directions for which have appeared in UNIVERSAL MODEL AIRPLANE NEWS. The drawings presented herewith may be used as a guide for making your own layouts, or cut out and joined together themselves for the same purpose. All are full size except the angular descriptive views of various parts. Bear in mind at all times that the different parts must fit each other and that the thickness of balsa stock often varies enough to affect the length of another piece as in the landing gear spar shown. Remember also that the width of your pencil line in tracing around a cut out pattern may decidedly alter the shape and size of the part under construction.



Details of the wing construction show this to be a real job.

In drawings 1 and 2 the longerons are indicated by the letter X and are of one-eighth inch square stock. With the two forward diagonals, (0) and the tail upright, the drawings outline as much of the fuselage as can be built in the flat plane. V marks the wedge-shaped piece that goes under the top longeron at the center section. All pieces shown here are one-eighth inch deep and as wide as shown. Make two of these sides, using the same layout for both to insure their being exactly alike. Cut four cross members of one-eighth inch balsa, half an inch wide and two and one-half inches long. These are cemented in place between the fuselage sides at the location of the two heavy forward uprights. A little care in cutting the ends of these cross pieces exactly square will save a lot of annoyance in obtaining a true fuselage. After they have dried in place you can join the sides at the rear, cutting away a portion of each side so as to form a tail post just an eighth inch wide. All other cross members are of one-eighth by one-sixteenth inch stock and are located directly under the formers shown in the top view. The slotted segment that carries the forward stabilizer spar may be omitted at this time. The two piece nose block and cowl shown may be hand carved, built up or lathe turned, the latter being in most cases a little more satisfactory. Aluminum or celluloid cowlings of the 2¼ inch size may also be used. The nose block is first cemented to the projecting side points of the fuselage, after which the vee shaped and off-set extension of the window frame is installed at the top center point on the block. The top view, drawing 3, shows this clearly, as well as the construction of the windshield or front window frames of sixteenth inch square stock. Place a similar heavier pair of

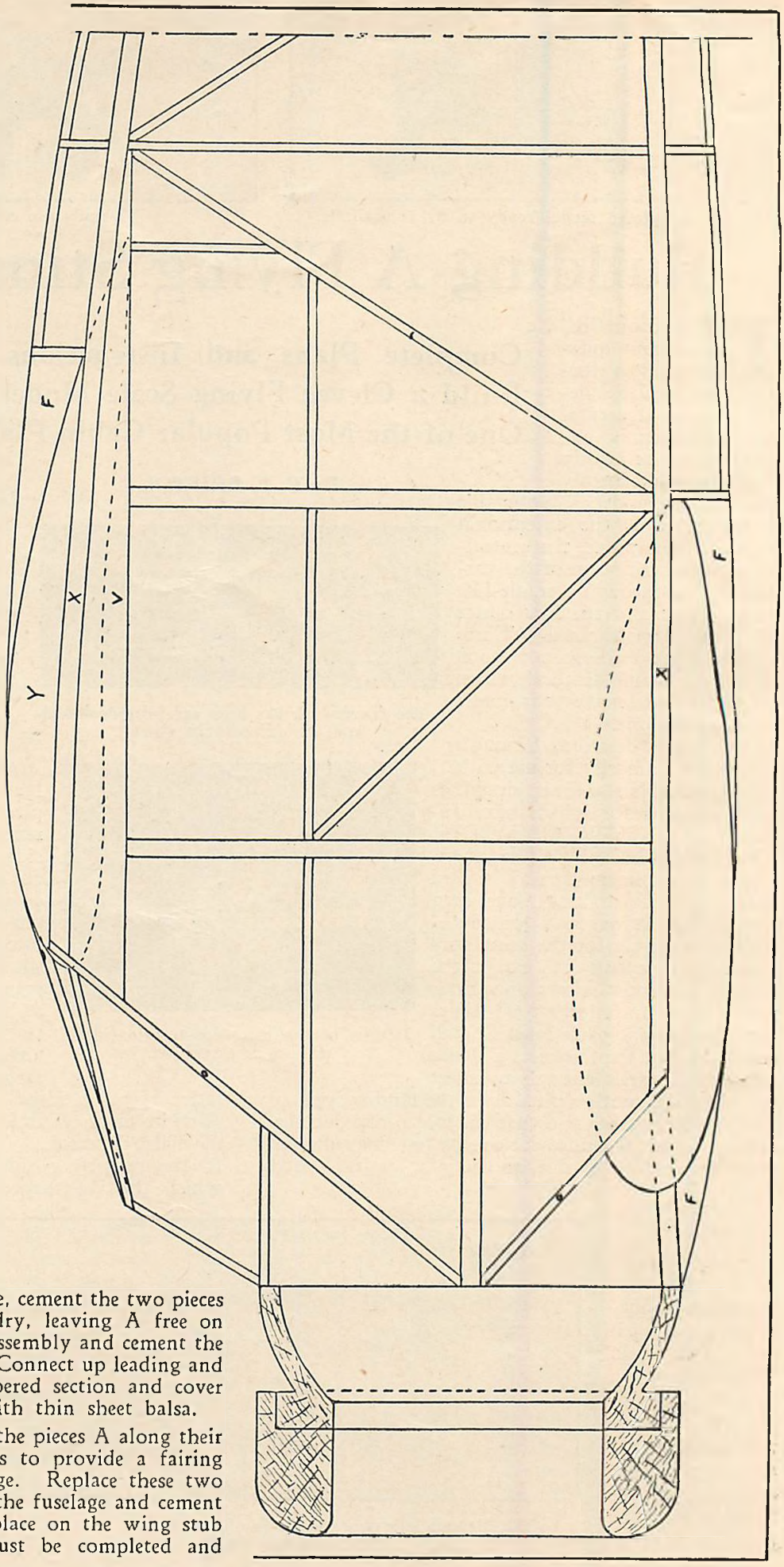


Mr. Bristol lets one go. It is off for a flight of 250 to 300 feet. Good stability makes crashes rare.

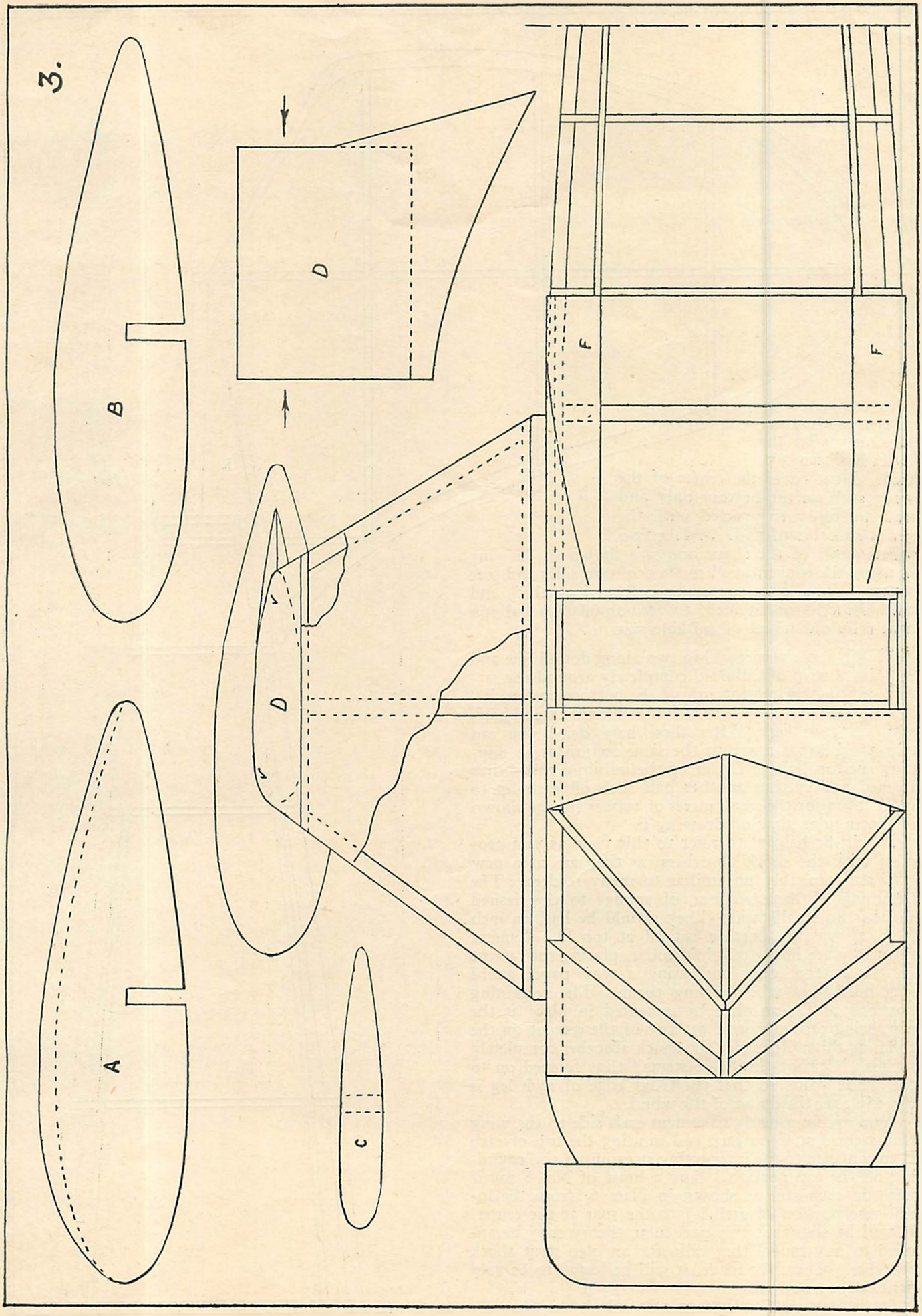
braces at the bottom of the nose block.

AT THIS point it is a good idea to make all wing ribs so that the center section may be completed. Make sixteen ribs of one-thirty-second inch stock and four of one-sixteenth, cutting two of the latter away to form the pieces V in drawing 1, and cementing them in place on the top longeron of each side. You are then ready to install top and bottom formers and stringers. These formers should be rectangular with quarter-round shoulders, at which point three stringers are spaced around them on each corner. Cover the top of the center section at the leading edge with a piece of thin sheet balsa cut as indicated in plate No. 3. Cover the rear portion just forward of the front former in the same manner, cutting the center away again after the fairing blocks are in place. These must be carved and sanded to fill the gap at this point as shown in drawings 1 and 3.

Refer to plates 3 and 4 for detail of the landing gear parts. Make two of each of the parts A, B, C and D, A being of one-eighth inch stock and D of three-eighths inch. The spar, also on one-eighth inch balsa is shown in full size on plate 4, with the positions and thickness of the other pieces indicated by the dotted lines. Do not be confused by the leading edge block also shown here and be sure that the spar is notched so that it fits your model when the other pieces are in place. Sand the pieces D to a streamline section below the point indicated by the small arrows, making no effort to shape the top portion. With the spar and the pieces A and BB held in place on the fuselage, cement the two pieces B to the spar and allow to dry, leaving A free on each side. Then remove the assembly and cement the small sections C on each end. Connect up leading and trailing edges of a suitable tapered section and cover each side, top and bottom, with thin sheet balsa.



You are then ready to sand the pieces A along their top edges as indicated by dots to provide a fairing between wing stub and fuselage. Replace these two sections and the wing stub on the fuselage and cement the fairing plates A in their place on the wing stub only, as the landing gear must be completed and


3.
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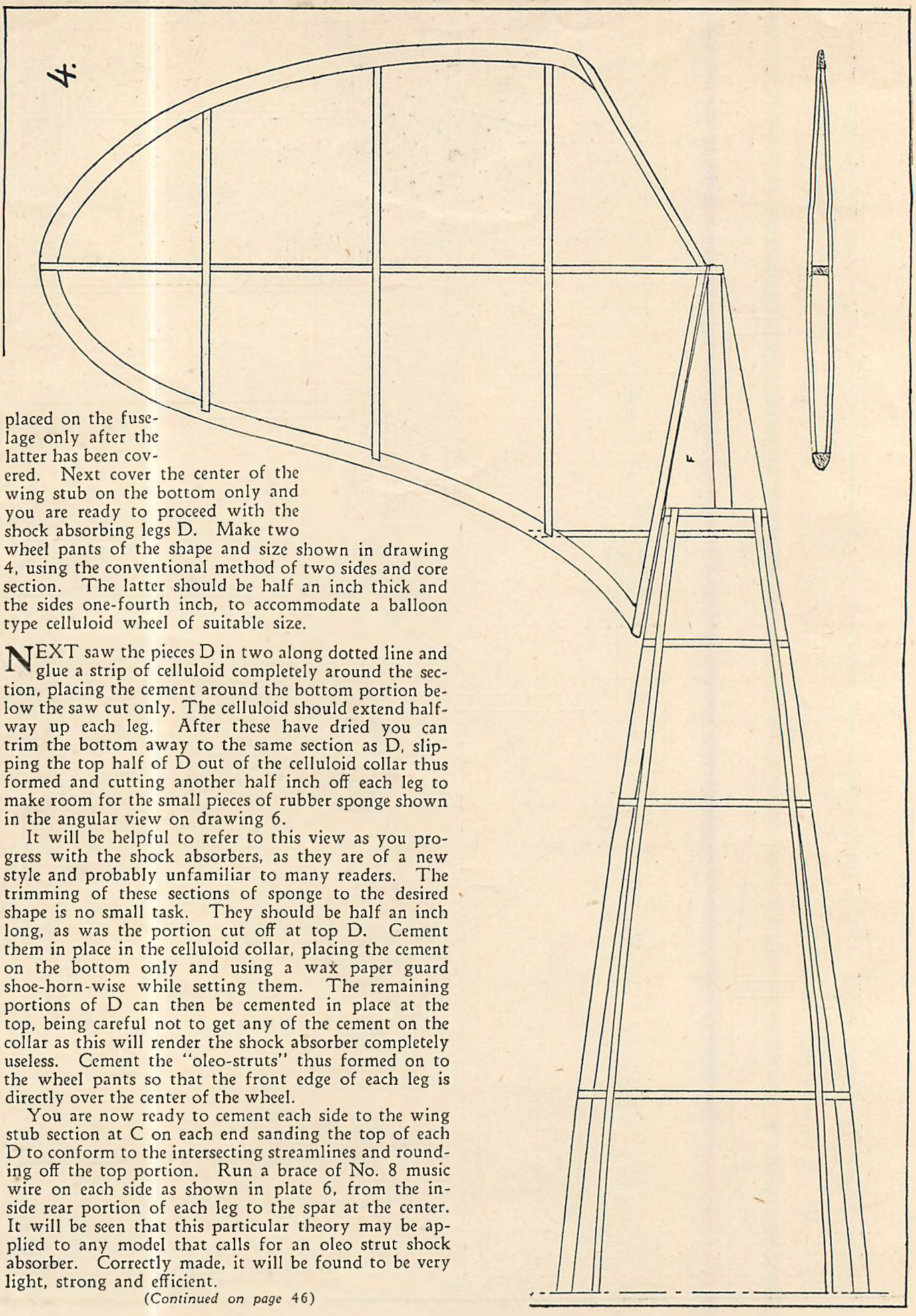


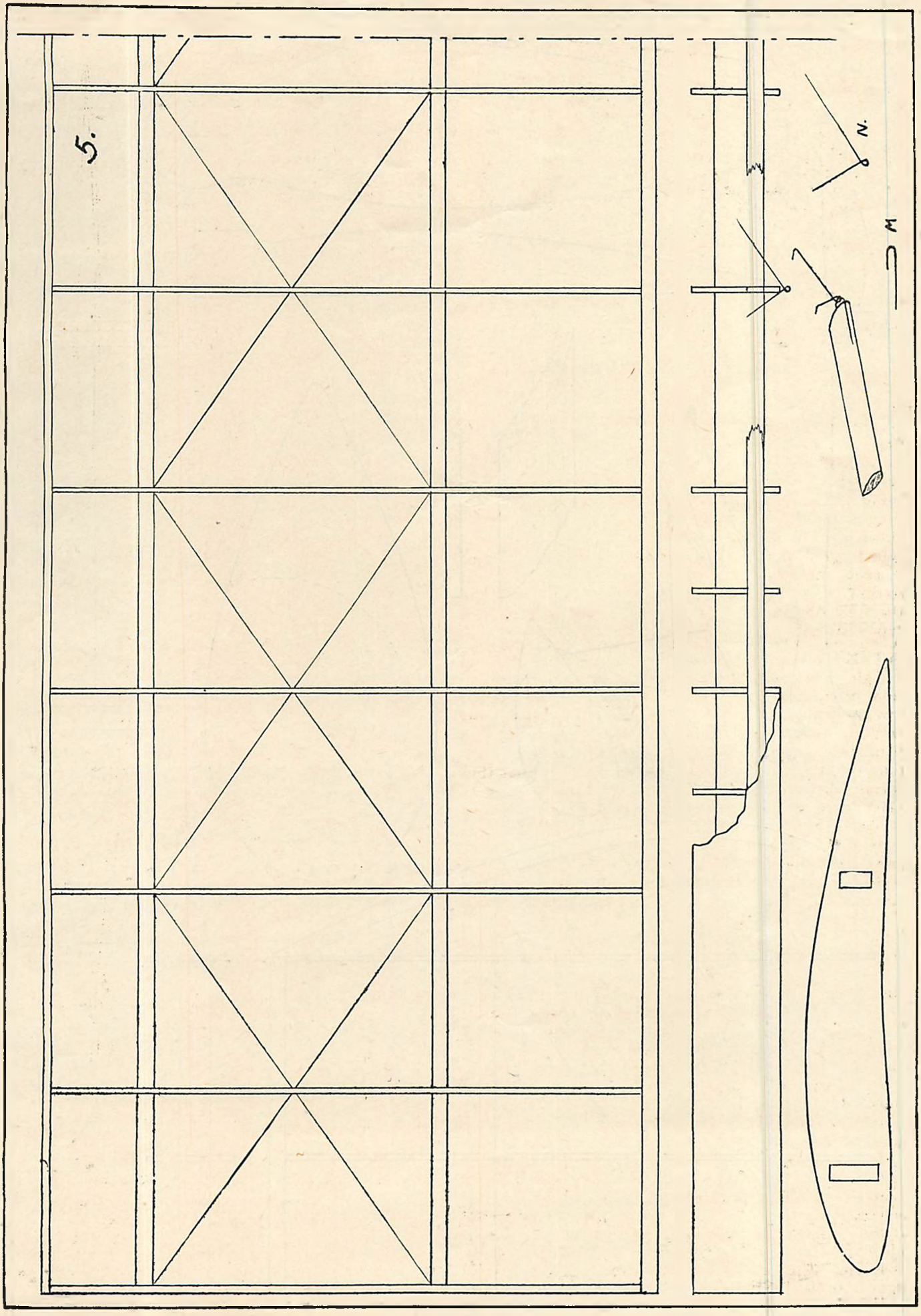
placed on the fuselage only after the latter has been covered. Next cover the center of the wing stub on the bottom only and you are ready to proceed with the shock absorbing legs D. Make two wheel pants of the shape and size shown in drawing 4, using the conventional method of two sides and core section. The latter should be half an inch thick and the sides one-fourth inch, to accommodate a balloon type celluloid wheel of suitable size.

NEXT saw the pieces D in two along dotted line and glue a strip of celluloid completely around the section, placing the cement around the bottom portion below the saw cut only. The celluloid should extend halfway up each leg. After these have dried you can trim the bottom away to the same section as D, slipping the top half of D out of the celluloid collar thus formed and cutting another half inch off each leg to make room for the small pieces of rubber sponge shown in the angular view on drawing 6.

It will be helpful to refer to this view as you progress with the shock absorbers, as they are of a new style and probably unfamiliar to many readers. The trimming of these sections of sponge to the desired shape is no small task. They should be half an inch long, as was the portion cut off at top D. Cement them in place in the celluloid collar, placing the cement on the bottom only and using a wax paper guard shoe-horn-wise while setting them. The remaining portions of D can then be cemented in place at the top, being careful not to get any of the cement on the collar as this will render the shock absorber completely useless. Cement the "oleo-struts" thus formed on to the wheel pants so that the front edge of each leg is directly over the center of the wheel.

You are now ready to cement each side to the wing stub section at C on each end sanding the top of each D to conform to the intersecting streamlines and rounding off the top portion. Run a brace of No. 8 music wire on each side as shown in plate 6, from the inside rear portion of each leg to the spar at the center. It will be seen that this particular theory may be applied to any model that calls for an oleo strut shock absorber. Correctly made, it will be found to be very light, strong and efficient.

(*Continued on page 46*)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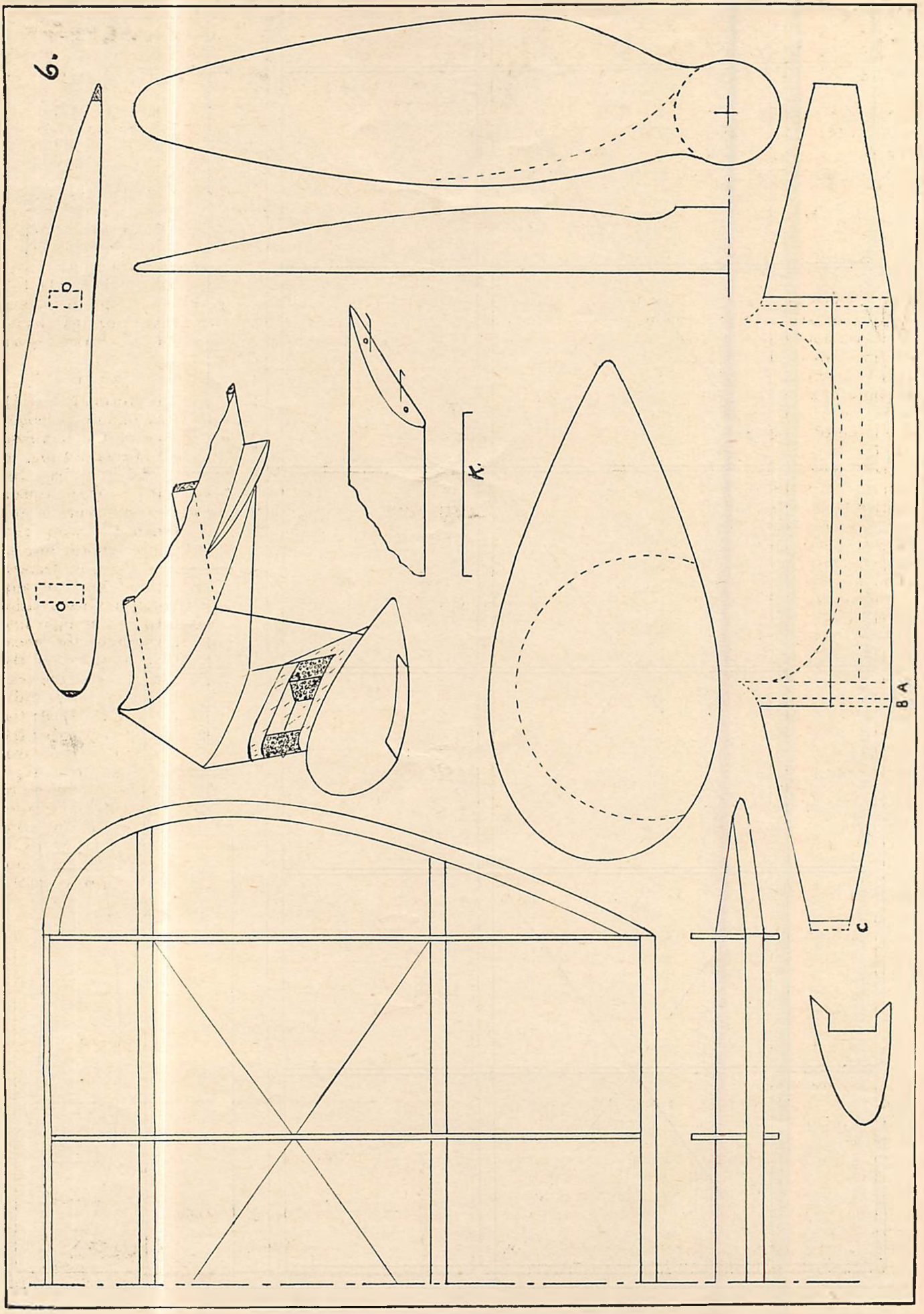
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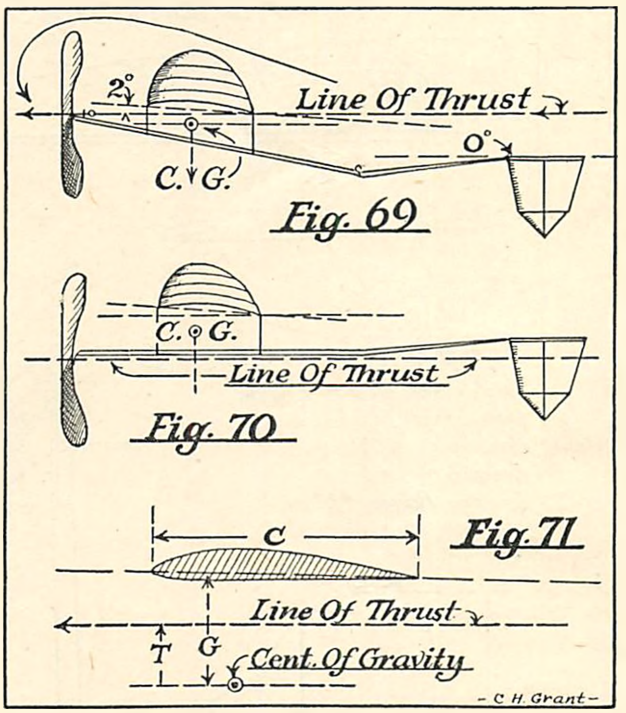
The Aerodynamic Design of the Model Plane

How To Cure Longitudinal Stability Troubles in All Types of Model Planes Through the Correct Design of the Stabilizer

By CHARLES HAMPSON GRANT

ARTICLE No. 17. CHAPTER No. 3

WE HAVE a few more useful facts about longitudinal stability this month. In our last discussion you were given approximate rules for stabilizer area of various types of planes. Now we are going to show you how to be more exact in your calculation of the area of the stabilizer. Therefore, let us see what effects the amount of stabilizer area required and what allowances in area we have to make for variations in the design of the plane. These rules apply to the large full scale planes as well as to the model.



From what we have learned in the preceding articles, it may be said that the stabilizing effect is produced and influenced by a combination of the three corrective factors: 1—angular setting of the stabilizer relative to the wings: 2—the stabilizer moment arm, (the horizontal distance from the center of the wing to the center of the stabilizer): 3—the stabilizer area.

In order to secure sufficient longitudinal stabilizing effect in the *average* model, the three factors should have the following values: 1. The stabilizer should have an angle of incidence which is one to three degrees less than the wing, (as given in the table in last month's article). 2. The moment arm should be equal to one-half the wing span, approximately. 3. The stabilizer area should be about one-third the total wing area, (wing area is equal to the wing span times the average wing chord, times the number of lifting surfaces or wings). The required stabilizer area varies with different types of machines, from 25 per cent of the wing area, to 40 per cent. (The required area for various types were given in the preceding article.)

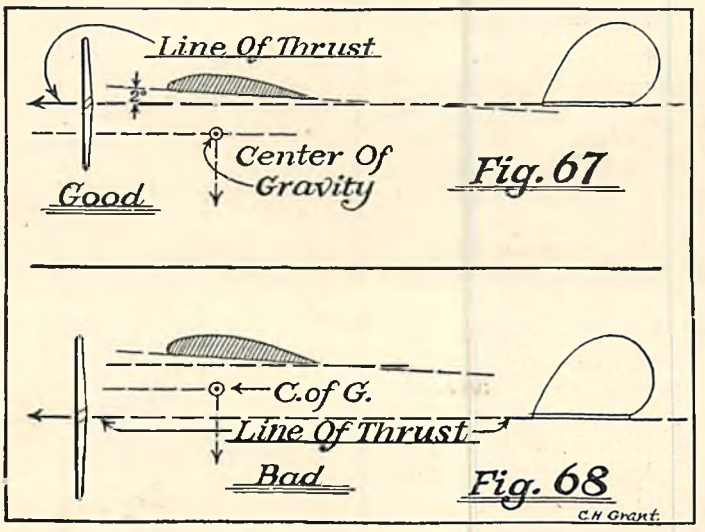
Now, if for any reason of convenience or necessity, we choose to change the normal value of any one of these three factors, let us see how the others must be changed in order to keep the stabilizing effect at the proper value.

First, if the negative setting of the stabilizer should be increased, the moment arm and area remaining the same, then the stabilizing effect would be increased as far as *recovery* from incorrect flight attitudes of the plane is concerned. Thus, the moment arm could be made shorter or the area reduced. On the other hand, if the angle between the wing and the stabilizer was made less than the correct amount for any given type of model, then the moment arm or area would have to be increased to create sufficient stabilizing effect.

IN OUR preceding discussions of stability, correct stabilizer angles have been given for various possible wing distances, above the line of thrust. If you see fit to change this angular setting for any particular case, increasing or decreasing it, then you must change either the moment arm or area accordingly. The following formula will give you the amount to increase or decrease either of these two factors, for any change in the *normal* angle of the stabilizer, already given

It is:- $X = \frac{-Y}{(3+Q)}$

In the formula:- (Y) equals the amount of *angular change* of the stabilizer from the normal setting, in degrees, (see Page No. 36, May issue). (Q) equals the normal difference in angle between the wing and the stabilizer chord lines as previously given, in degrees. (The "chord line" of any airfoil in all of these articles is taken to be a straight line passing through the most extreme front point of the leading edge, and the extreme rear point of the trailing edge.) (X) equals the amount to change either the length of the moment arm or the stabilizer area. Usually, it is more convenient to change the area, for in order to change the moment arm, it may be necessary to modify the whole design and construction of the ship. Suppose, we work out an example to make the problem clear to you.



Example:—You have a model plane, the stabilizer of which you wish to decrease by (1/5), without losing any stabilizing effect. The new stabilizer is to be 1/5 *less* or 80% of the old stabilizer. You can do this by changing the angle of the stabilizer, but the moment arm must be the same. How many degrees must the stabilizer be changed when the stabilizer is set at an angle of attack of 2 degrees less than the wing?

In this case we know the value of (X) to be (—1/5). (Q) equals (2) degrees. We are to solve for (Y). Then, $-1/5=\frac{-Y}{3+2}$ or multiplying both sides of the equation by (5), we have Y=1 degree. Thus, we see a one degree *increase* in the difference in angle between the stabilizer and the wing must be made.

If a situation arose in which we wished to decrease the angle of the stabilizer one degree, it would be worked out in the following manner. Y= —1, and Q=2 degrees. We are to solve for (X), the amount to change the stabilizer area. Then: (X) $=\frac{-(-1)}{3+2}=\frac{+1}{5}=1/5$. Thus the stabilizer area should be *increased* by 1/5 or by 20 per cent.

If it is preferable, you may decrease or increase the length of the moment arm the proper amount instead of the area as illustrated here.

If it is undesirable to change the angle of the stabilizer (and this should be the last thing to do), yet you wish to shorten the moment arm by (1/5), bringing the stabilizer closer to the wing, then the stabilizer area should be *increased* by 1/5. Vice versa if you wish to reduce the area of the stabilizer, then you must make the moment arm (1/5) longer. In other words, the product of the moment arm value and the area of the stabilizer should always be constant for any given angular setting of the stabilizer.

INSTEAD of using these approximate values for stabilizer area, you may wish to be more exact and take into account changes in chord length, distance of the propeller from the wing, center of gravity, position center of thrust and other factors which may effect the area required under these general classifications.

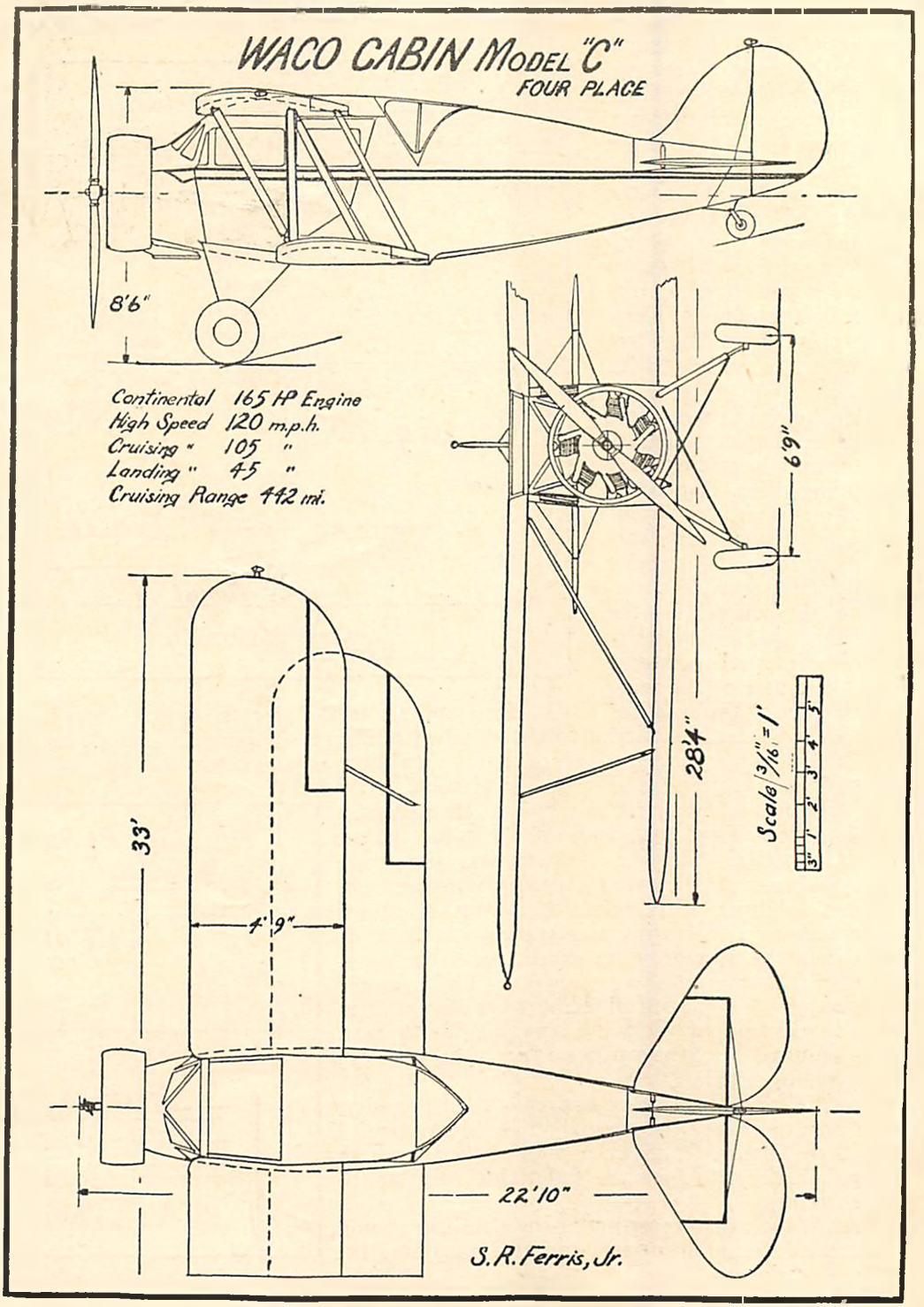
You can figure the stabilizer area very accurately by incorporating all the factors which enter the problem, into a formula. Obviously the corrective factors must balance the disturbing ones.

Here is a formula which does not take into account the corrective effect of the center of gravity when it is low, but which will apply to planes where the center of gravity is about on the line of thrust.

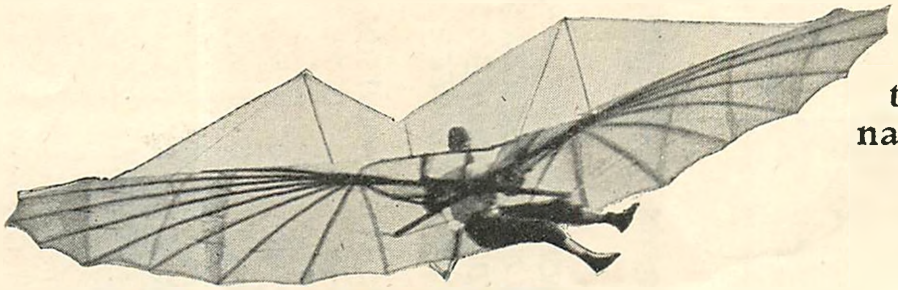
$$A_s=\left(\frac{A}{3M}\right)(1.5C+N)\left[1-\left(\frac{Q+\frac{2X}{M}-2}{5}\right)\right]$$

Don't let this scare you. All you have to do to solve

(*Continued on page 41*)



Who Developed The Airplane?



Otto Lilienthal flying in one of his gliders.

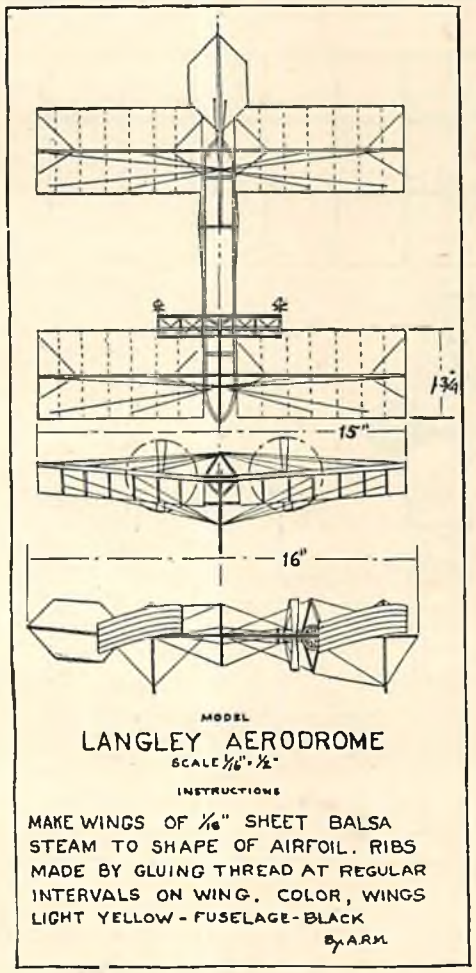
The Pioneers of Aviation and How They Laid the Foundation of Aeronautic Science.

By ALLEN R. MOULTON

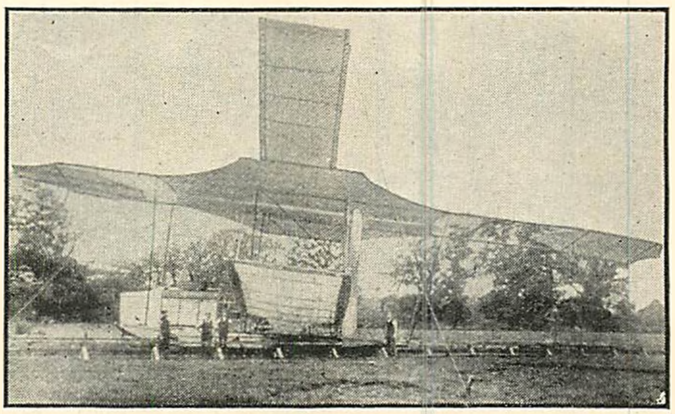
PART TWO

AFTER the pioneering efforts of Caylay Henson and the others, the progress of the problem of flight remained at a standstill until 1887 when Professor Samuel Pierpont Langley, head of the Smithsonian Institute, first began his investigations of the laws of aeroplane flight. At that time he built the whirling table, (forerunner of the modern wind tunnel), consisting of a horizontal rotating arm at the outer end, on which planes and propellers were tested. By means of ingenious recording devices, the lifting power at different angles of incidence was ascertained, and in the same way the thrust of various types of propellers was recorded.

After laying the foundation of the science of aerodynamics, Langley proceeded to reduce his theories to practice. Between 1891 and 1895 he built four models, one driven by carbonic acid and three by steam. On May 6, 1895, he tried out aerodrome number 5, which was driven by a steam engine and had a span of 14 feet. This aerodrome was launched from a houseboat anchored in the Potomac River near Washington, D. C., and made a flight of 300 feet.



Langley constructed several other models and finally, encouraged by the War Department, constructed a man-carrying plane. Through faulty launching devices the aerodrome was unable to fly and Langley was forced to give up his costly experiments dying soon after, a broken-hearted man, a martyr to the science of flight.

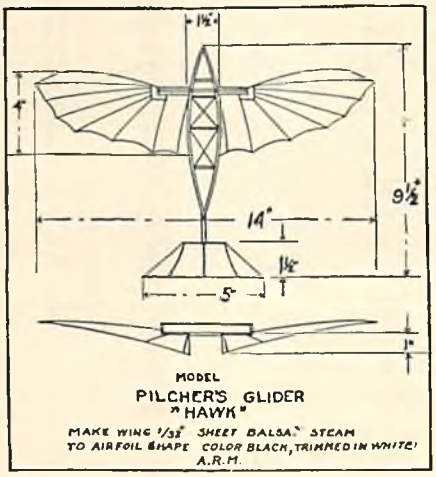


Hiram Maxim's Aerodrome, built in 1894. This machine generated so much lift that it tore up the rails upon which it was mounted for testing.

An interesting aftermath of his experiments happened on May 28, 1914, when Glenn H. Curtiss attached pontoons to Langley's aerodrome and flew the plane in the air. Of all the scientists who undertook the solution of the problem of flight, Langley's was undoubtedly the most thorough.

SIMULTANEOUSLY with Langley's experiments, Sir Hiram Maxim was carrying on experiments of his own in England. In 1894 he undertook the construction of a huge biplane. Fully $100,000 was expended on this machine. Some idea of the size of Maxim's plane may be realized from its supporting 4,000 square feet. The wings combined had a total lift of 10,000 pounds. The motive power was a steam engine capable of 363 horse-power driving two propellers, 17 feet, 10 inches in diameter. With its crew of three men aboard, the machine weighed more than 3½ tons.

On the preliminary tests a railway track was laid and the machine fitted with iron wheels. It was not intended to make a free flight at first. On the day of the trials the machine, after running along the



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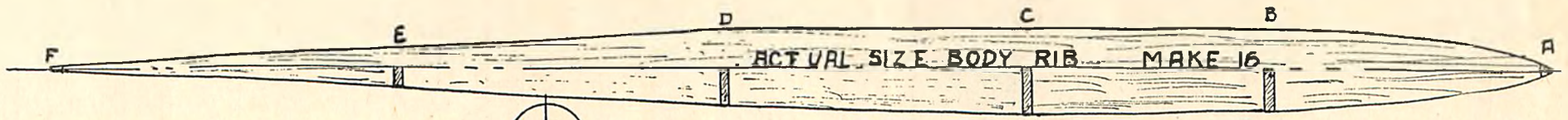
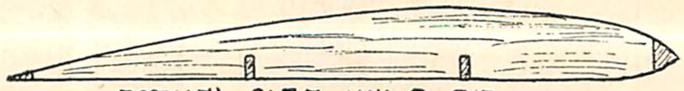
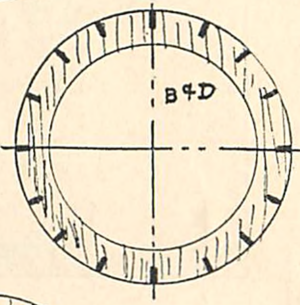
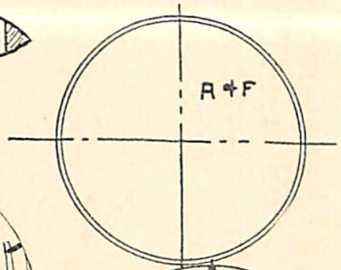
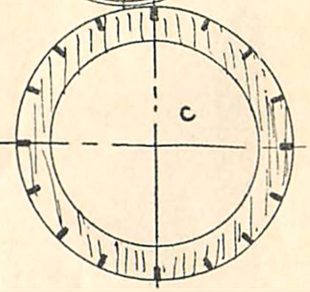


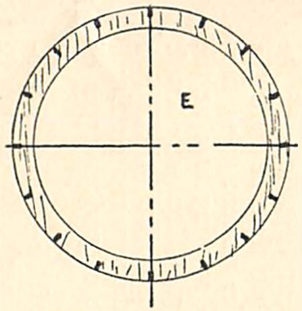


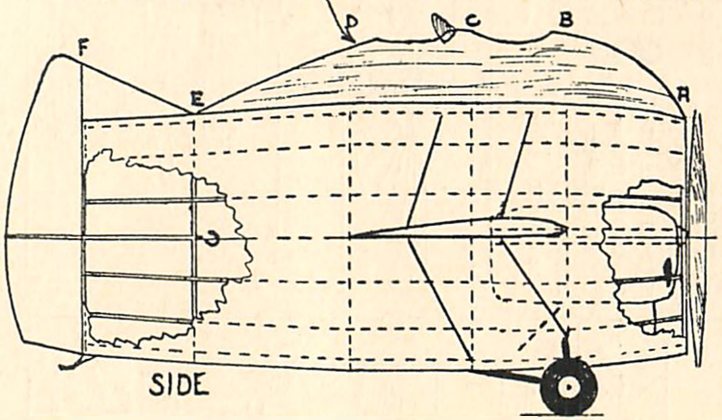
ONE THIRD FULL SIZE

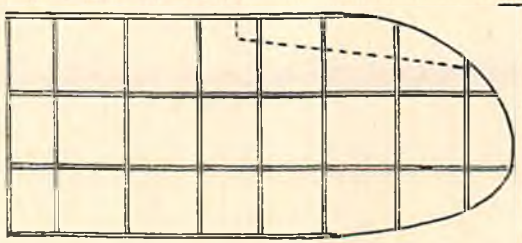


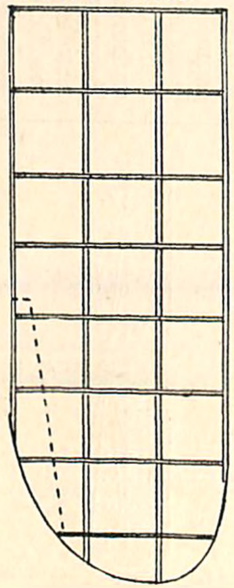


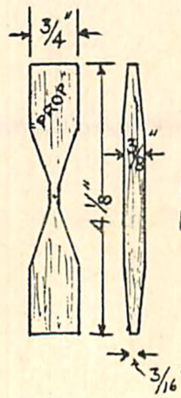












NOSE PIECE FITS MOTOR BLOCK

COVER INSIDE AND OUT ~PUT REAR HOOK ON STABILIZER'S LEADING EDGE ~ MAKE TAIL SURFACES OF 1/32" VENEER ~

SECTION ~	INSIDE DIA. ~	OUTSIDE DIA.
A	— 3 9/16"	— 3 11/16"
B	— 3 3/16"	— 4 5/16"
C	— 3 1/8"	— 4 5/16"
D	— 3 3/16"	— 4 5/16"
E	— 3 5/8"	— 4 1/16"
F	— 3 9/16"	— 3 11/16"

WHEELS 3/4" CELLULOID

ITALIAN "FLYING BARREL"

checked 1/12/33

RR

The Barrel Sprouts Wings

How You Can Build a Model of a Plane That Represents Man's Latest Efforts to Improve Airplane Performance Through Radical Design

By RICHARD RIOUX

THE Italian "Flying Barrel" made the interest in aeronautical circles go up because of its radical design and performance. The model, since it has a small diameter propeller, will not give as much endurance as many other models of the same size but it fulfills its purpose in realistic performance.

The Fuselage

The fuselage is really a Venturi tube built up of sixteen body ribs and six circular formers. Make these ribs and formers of 1/16" balsa veneer. Notice that the formers A and F, and also, B and D are identical. The "upper camber" of the body ribs should be on the inside. Cement the notched formers and body ribs together and, after making sure the fuselage is symmetrical throughout, cover both inside and out with superfine and then dope. Make the pilot and passenger nacelle of solid balsa and gouge out to paper thin sides.

Tail Surfaces

Make the tail surfaces of 1/32" veneer. Notice the notch in the half stabilizer. This notch allows the stabilizer to fit over the section of the body. The halves of the stabilizer are cemented together and the rear hook attached to its leading edge . If you cover the leading edge of the stabilizer with superfine before attaching the rear hook, the latter will not split the thin veneer.

Dummy Motor and Propeller

The dummy motor is shaped from a solid block of balsa. Bore a 5/16" hole through the length of the motor. Mount in the fuselage with pointed bamboo struts and brace from the side if necessary. Carve a left-handed propeller from a 4⅛"x¾"x⅜" block and attach with a shaft to a conical nosepiece that fits in the hole in the motor snugly. Drop a loop of ⅛" flat rubber through the motor clock and fasten to the rear hook and propeller shaft.

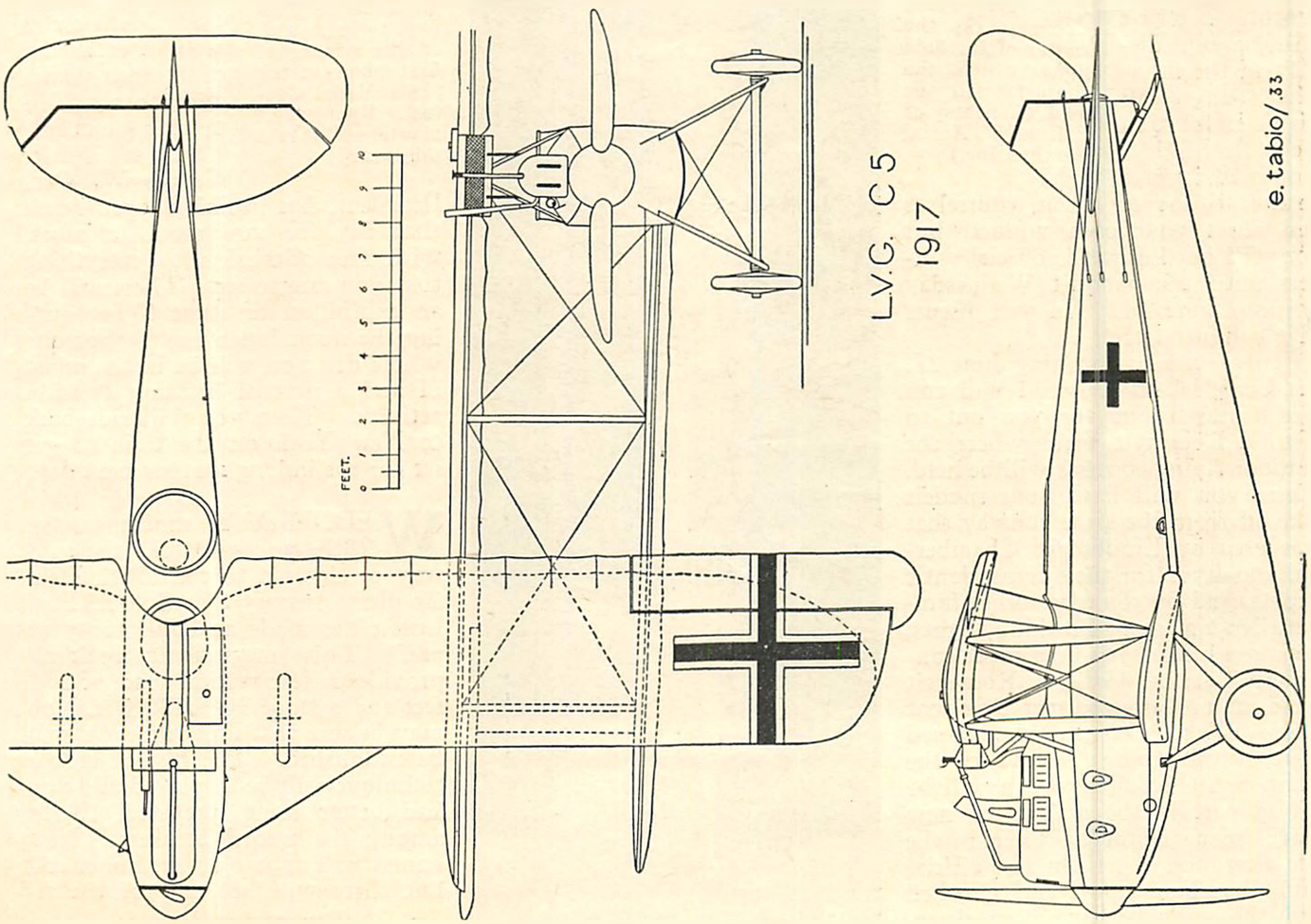
Landing Gear

The landing gear is a very simple arrangement of sturdy bamboo. The bamboo should be pointed and forced into the balsa. The wheels are ¾" diameter feather-weight celluloid. Bamboo 1/16"x1/32" is the ideal size. Simple axles may be formed of light wire.

The Wing

CUT 16 wing ribs of 1/32" veneer for the wings. The right wing is longer than the left one. The model of the real plane from which these drawings were made had a left-hand propeller and though it

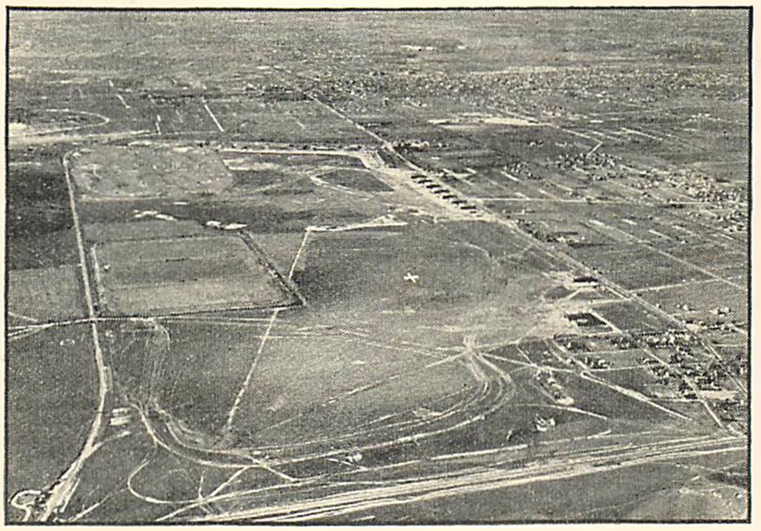
(Continued on page 47)



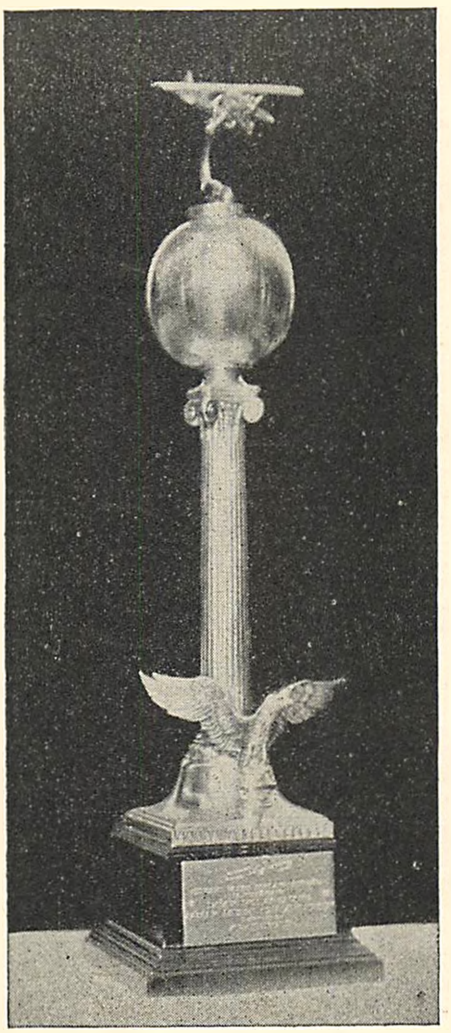
The National Model Airplane Championships

Some Interesting Experiences that Await You at the National Competitions

YOU still have time to join that armada of the air that will swoop down on New York City June 26, the day before the 1933 National Model Airplane Championship Meet officially opens. Model plane builders and flyers are coming from all directions in ever increasing numbers. New York City will welcome you. Don't hesitate to arrive early Monday, June 26. There will be special entertainment features to keep you occupied while you are not busy working on your models. There is always plenty to see and do in New York. Your headquarters, the Hotel Pennsylvania, is right in the middle of everything. There will be special rates in effect for your benefit. There will be on display in the beautiful lounge, all the Exhibition Scale Models. You will have a chance to inspect them yourselves and select your own winner, but you will not know the official winners until the banquet Wednesday evening, June 28. We will discuss that banquet later.



Above: — Plane's eye view of Roosevelt Field. Cross marks the center of the field upon which the contest will be held. (Courtesy of Fairchild Aerial Surveys Inc.)



Left: — The Universal Model Airplane News Trophy, to be awarded the winner of first place in the Scale Model Contest. Upon who's mantel will it rest this year?

Early Tuesday morning June 27, the Long Island Railroad will run special rate trains for you out to historic Roosevelt Field where the outdoor flying contests will be held. There you will have your models take off from the same runway that was used by Lindbergh, Chamberlin, and Byrd for their transatlantic flights, and by countless other famous fliers on record-breaking flights. Aviation history has been made continuously since 1909 at Roosevelt Field, named after former President Roosevelt's son Quentin who trained there before going across to the front in 1917. There you will be taking part in the making of new model plane history. Then in the late afternoon when the last official flight has been timed and recorded and the winners have been determined, the fortunate first and second place winners in all three of the outdoor events will be given a wonderful cross-country flight in a modern cabin plane. Picture if you can the sky-line of Manhattan, viewed from the sky, illumined by the glow of the setting sun! That is what those six winners are going to see, and below them they will see the panorama of busy New York Harbor shipping, and the incomparable vista of the entire Metropolitan area.

All day long at Roosevelt Field you will see all the activity of a busy airport. There are housed at Roosevelt more planes than at any other commercial airport. There is a new Historical Aviation Museum with a collection of famous planes and motors. The management, through Mr. George W. Orr, President, has promised open-house that day for you model aviators, with free admission to everything that you care to see. There will be an exhibition of stunt flying during the noon lunch hour. For one whole day you will be in the midst of and a part of bustling aviation activity. Then you will ride back to New York on the train to get set for the indoor contests next day.

WEDNESDAY morning, the 28th, you will take the subway or elevated to the 258th Field Artillery Armory that Colonel Paul Loeser has made available for your use. This magnificent building provides a clear vertical space of 106 feet and a floor 300x600 feet. You may be sure that indoor records will be established. The best of indoor technique will be displayed and you had better come prepared to be among the record breakers. New names will appear on the honor roll but there will be some of the al-

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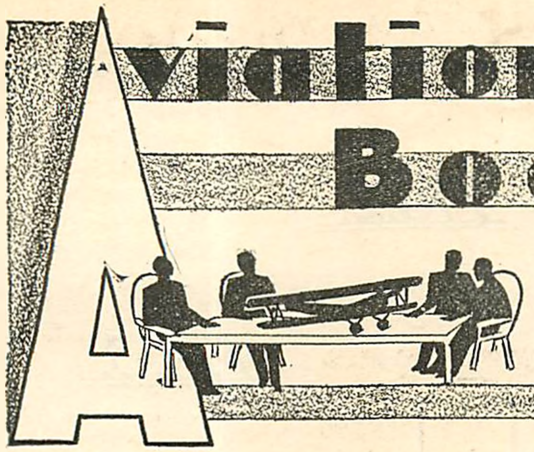

Aviation Advisory Board

Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U. S. Army

IT SEEMS that our good readers have been working overtime this month, thinking up unanswerable questions. However, we have managed to select a few that we feel we can answer accurately and which will be helpful to model builders.

A letter from Leonard Ribuffo of 36 Willow Street, Port Chester, New York, is the first appearing on the pile on my desk. Here are some of his questions.

Question: What is the apron method of cooling an in-line air-cooled aviation engine?

Answer: The system which I believe you are referring to in this instance is the one in which metal shields or skirts are placed along the sides of the cylinders or over the cylinder heads in such a way as to circulate the air as uniformly as possibly around the entire cylinder. The air coming in the air vents at the front of the motor, strikes the aprons and is deflected so that it passes between two adjoining cylinders. On several of the inverted in-line engines such as in one of the Fairchild planes, the air comes in the front, passes down one side of the cylinder bank and seeps through between the cylinders, making its exit upon the opposite side through the fuselage vent.

Question: Is it not possible to place the ailerons on the trailing edge of the landing gear struts in order that the aileron area may be omitted on the wings, thus cutting down the wing area and making it possible for higher speeds?

Answer: There is no reason why you cannot cut the wing area down and leave the ailerons on the wing at the same time, in order to gain higher speed. Except to make construction easier, there is no point in putting ailerons on the chassis. Ailerons placed on the chassis as you suggest, would have very little effect as they are located a very short distance below the center of gravity and thus have a smaller amount of leverage. The area would have to be increased about three times in order that they give the same result as in the case where they are placed on the wings.

Question: Are the flying and landing wires of airplanes made of one flat streamlined wire or are they many small wires put in a sock?

Answer: It is common practice to make the landing and flying wires, one flat streamlined wire. Usually two of these wires are used for flying wires and one wire is used for landing wire in any particular part of the structure. Occasions may arise where a multiple number of wires are used in a sock. However, this is rare and is not the custom.

QUESTION: Because of the great speed accomplished by Page in his Parasol Hawk, is it not possible for the Curtiss-Wright Company to make ships of the Hawk type, similar to Captain Page's.

Answer: It is perfectly possible for the Curtiss-Wright Co. to do this and the ship would unquestionably be exceedingly fast. However, in pursuit work speed is not the only essential. It is necessary that the pilot be able to maneuver his ship quickly and easily. A monoplane of the type that you suggest, would not give this quality and therefore would not fulfill requirements of pursuit work. It could run away but not attack with success.

Here are some more questions from Ronald Leslie of 9 Bay Street, Glace Bay, N. S., Canada. This young man is a stickler for information and he has asked us several interesting questions before.

Question: Just what do you consider an experienced model builder?

Answer: An experienced model builder in the mind of any person, is someone who understands the subject to a greater extent or at least nearly as well as the person passing judgment. In other words, it is purely a relative term and a matter of opinion. Probably one would consider an experienced model builder a person who had been building models continuously and intelligently for three or four years. Many young men have been building models for a longer period. However, very little brain matter has been used

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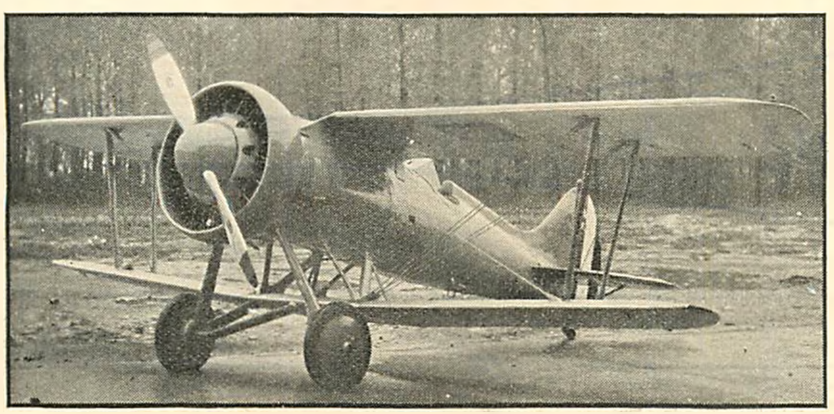


Here is one of the Navy's latest single seater shipboard fighter, powered with a 500 h.p. Wasp engine. It is the B/J XFJ-2. This is a sweet little "job" that tears off a speed of 193 miles per hour at six thousand feet altitude. Its initial rate of climb is 1700 feet per minute. Service ceiling 24,700 feet.

FIG. 2.

8

FIG. 1.

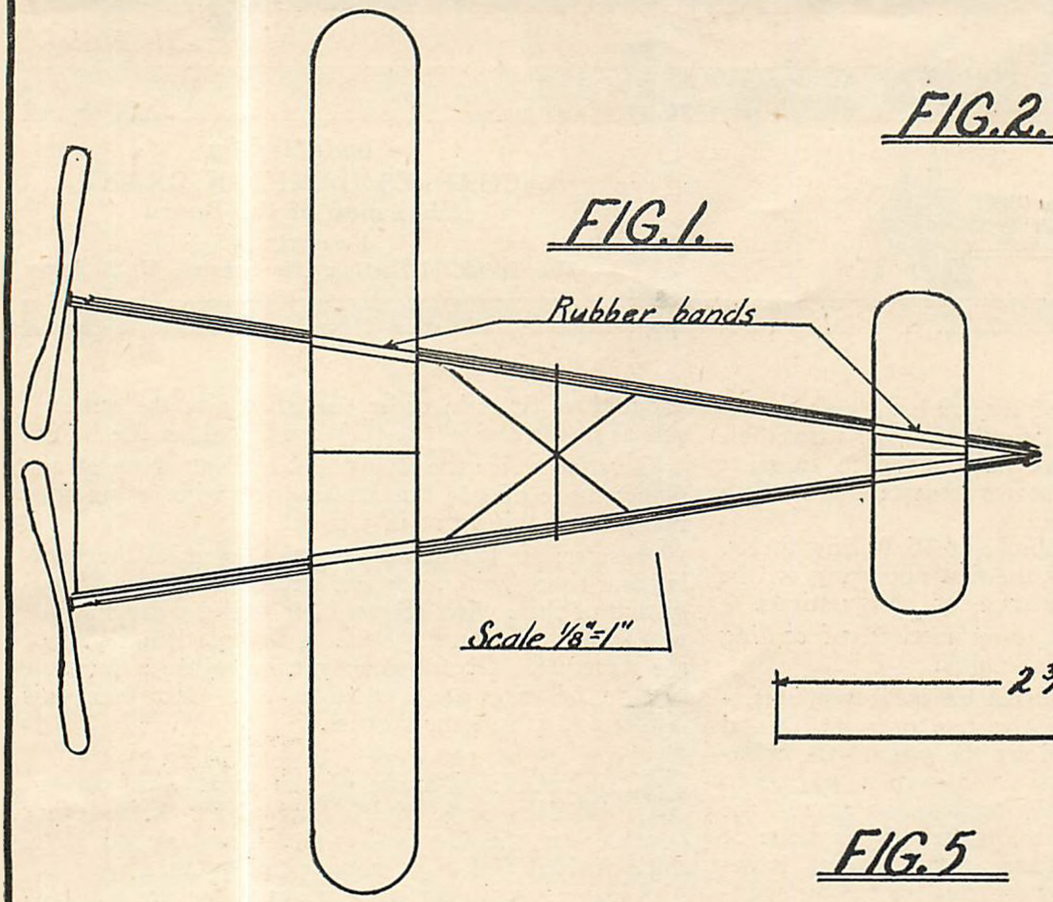
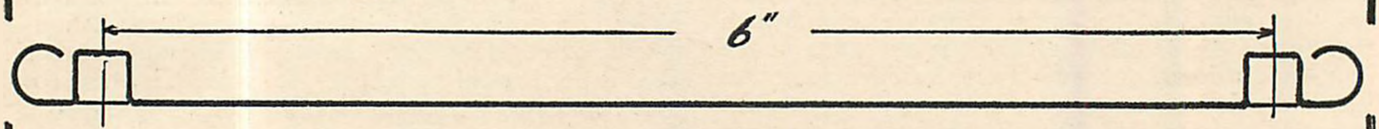


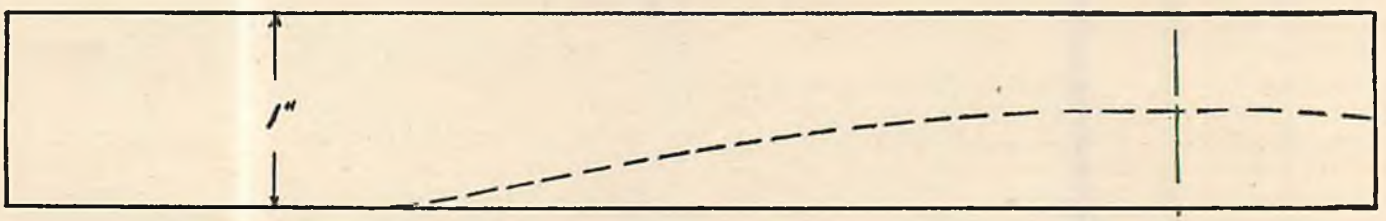
FIG. 3.

FIG. 4

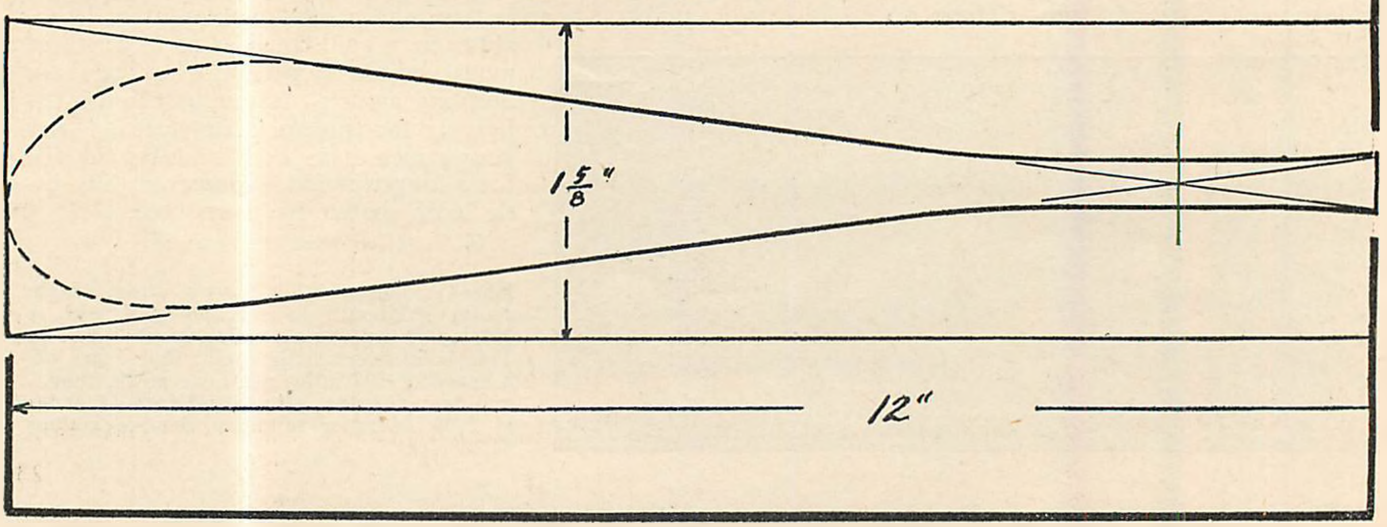
FIG. 5



Prop. Blank FIG. 20



Part to be cut away after carving shown by dotted lines.



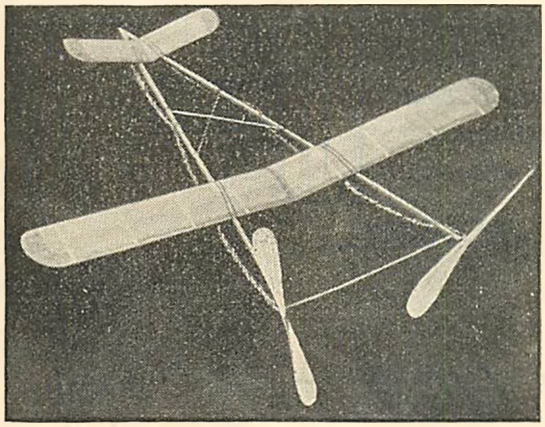
An All-Weather Twin Pusher

How to Construct the Plane that Won the 1931 Mulvihill Contest and Which Will Consistently Place Among the Winners in Any Contest

By STOCKTON FERRIS JR.

NOW that the big natonal contest is close at hand you model builders will be scurrying around trying to get plans for a sure winner twin pusher or some ship of similar character, with which you can bid for the Mulvihill Trophy.

Well, we are going to make this job easy for you by telling you how to construct a consistent winner; a plane that won this trophy in 1931, the Grant Twin Pusher. Yes, it was designed by your editor and he has given me all the details of its contruction, so I am passing it on to you as a "good bet." Of course you can dress up this ship to suit yourselves . Put on all the frills you like; make it lighter or heavier as required by the rules, or your own fancy. However, you will find that the finished ship will weigh about one ounce for every fifty square inches of wing area, to which specification it has been designed. It has just 153 square inches of wing area (large wing) and should weigh not less than 3.06 ounces.



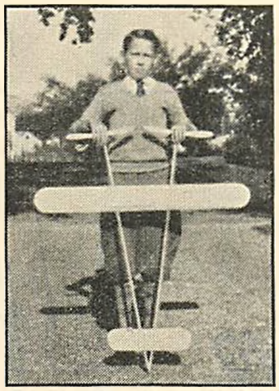
The actual model that won the 1931 Mulvihill trophy in a "35 mile" wind, against 200 competitors. It flew out of sight. The upper wing surface is a smooth balsa sheet 1/32" thick.

The unusual feature is one of Mr. Grant's ideas and lies in the wing. The whole upper surface is formed by a smooth sheet of thin balsa. This preserves the true airfoil shape with no sag between the ribs. It has proven to be very efficient.

If you wish to build this ship, this is how you do it, after getting your tools and material.

CONSTRUCTION:

Study the drawing carefully before you begin as it contains all the important measurements.



Leslie Jenkins, Mulvihill trophy winner with his all-weather twin pusher.

Frames

The motor sticks in this ship consist of balsa "I" beams, ¼"x¼"x 40". The detailed cross section measurements of them are shown in Fig. 9. the solid ones can be used if desired. They may be purchased from model supply houses and routed on a circular saw or left solid. However, it will be more convenient in most cases to build these from easily cut pieces of stock. Notice that the web (center piece) runs clear through the beam, while the flanges are divided by it. This is a better construction than having the flanges continuous across the top and bottom.

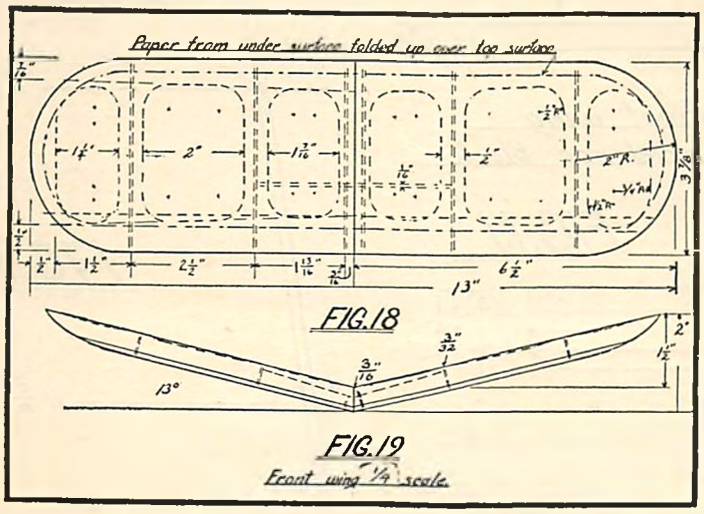
At all points on the motor sticks where a structural member is fastened, the I section is filled in. The fillets used for this purpose are made as shown in Fig. 11.

The cross pieces, G are laid out in Fig. 6, and piece H is shown in Fig. 5. These with the "S" hooks (Fig. 2), yoke (Fig. 3), and the prop shaft (Fig. 4) are all made of 1/32" dia. steel wire. The cross piece I is not drawn full size but the ends are bent much as in piece G. This brace is 13⅛" long before being bent.

At all points marked (Y), the frame is bound with thread. The complete layout of the frame is given ¼ actual size in Fig. 7.

The thrust bearings are flattened and bent from aluminum tubing as shown in Fig. 8. They are inserted in vertical slots cut in the ends of the motor sticks, bound with thread and coated cement.

At the front of the frame and 2½" from the apex are mounted the incidence blocks for the front wing. They are shown in detail in Fig. 10.



Wings

THE main wing is identical with the wing of the twin tractor, except for the dihedral, which has been decreased as shown in Fig. 13. The upper surface is very light 1/32" balsa veneer, 4½ inches wide. A strip of this is also used on the lower surface of the leading edge. The rest of the lower surface is held to the ribs with paper clips and pins while the cement is drying.

The ribs are cut from 1/16" sheet balsa. To make these accurate, use a template laid out from Fig. 14. A spar runs across the ribs and tapers from ¼"x1/16" at the butt to ⅛"x1/16" at the ends.

The front wing is laid

(Continued on page 36)

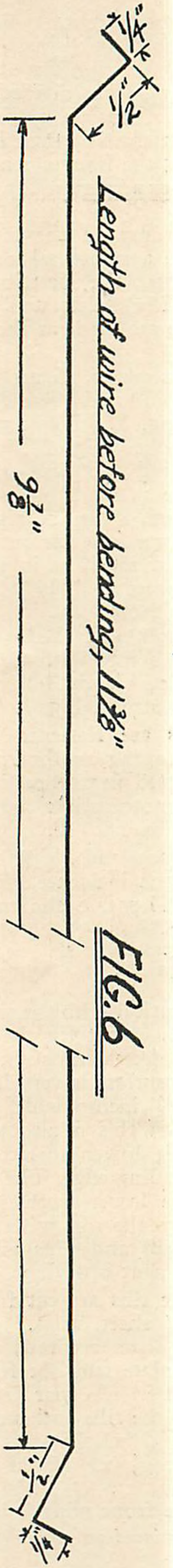
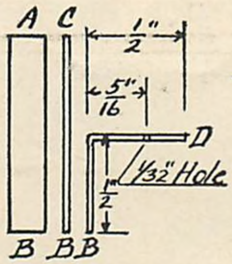


FIG. 6

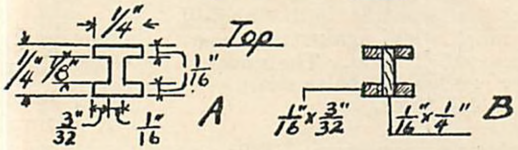
FIG. 8

AB=Aluminum tube 1/8" inside Dia., 1/64" wall, 1" long
CB=Tube flattened
DB=Bearing bent as shown.



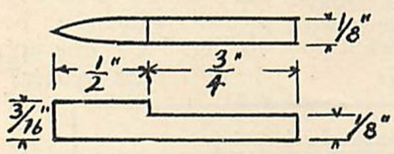
BEARING

FIG. 9



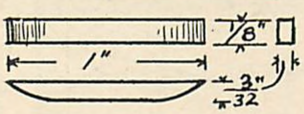
Cross sections of "I" beam motor sticks.
A- solid wood, routed.
B- built up.

FIG. 10



Front wing incidence block.

FIG. 11



Fillets are all this size except at "X" where they are 2"

FIG. 7

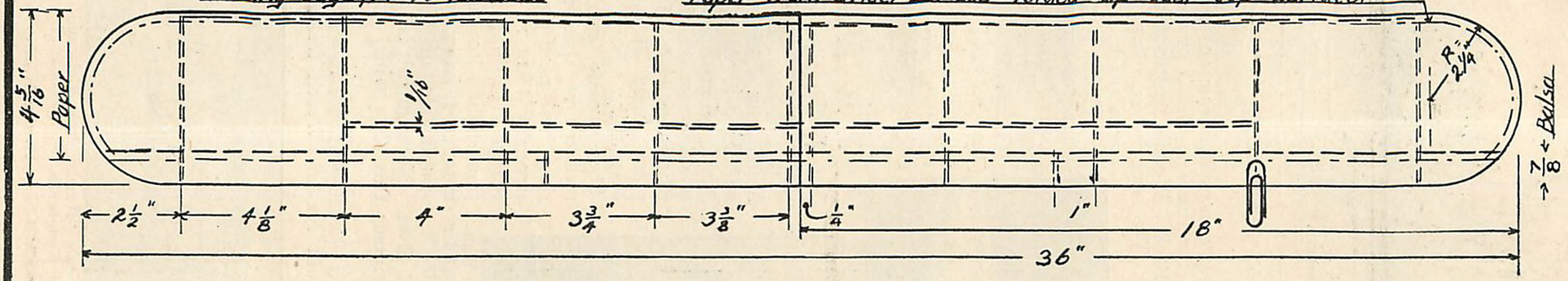


FIG. 12

Scale = 1/4 actual size.

FIG. 13

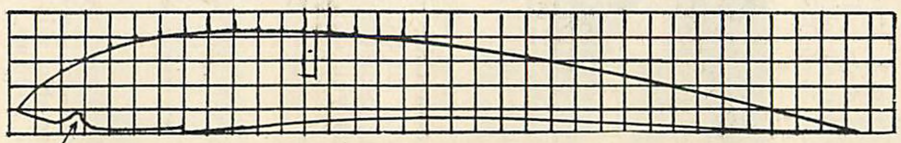


FIG. 14

Main wing ribs

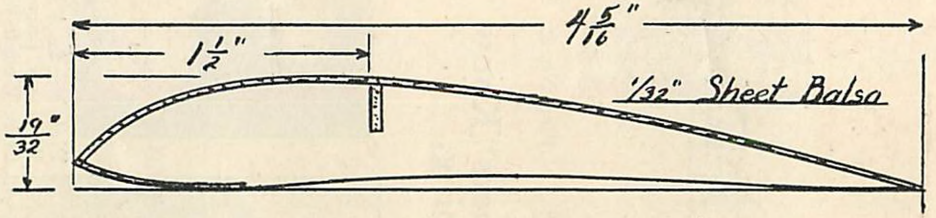


FIG. 15

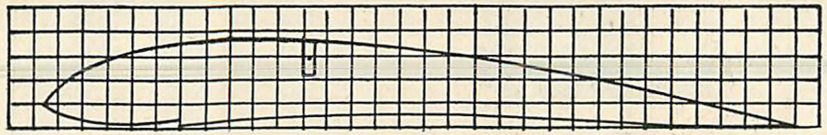


FIG. 16

Front wing ribs

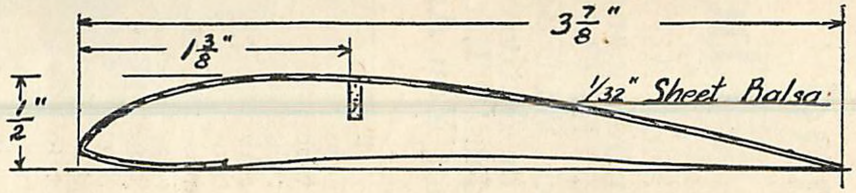
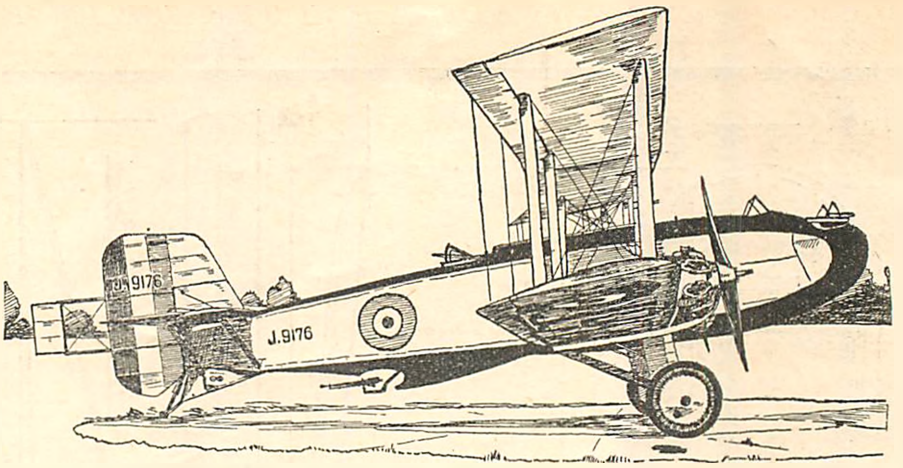


FIG. 17

Air Ways

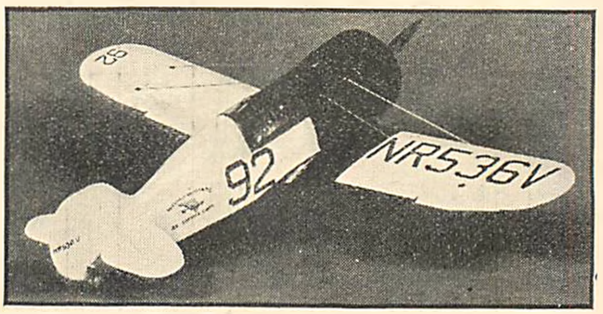
Here and There



Pict. No. 1. The Boulton and Paul (English) "Sidestrand", by H. C. Wood.

Get Busy and "Air Your Way" of Building and Flying Planes. In This Column, Space Will Be Devoted to the Activities of Our Readers. Let Others Know What You Are Doing.

BEFORE setting out to tell you the news this month, I wish to apologize for the shortness of Air Ways. The National Model Competition has occupied so much of our time and space that you readers have had to suffer in respect to having your personal news printed in this colmun. However, we guarantee that you will not suffer if you will come to this big 1933 Meet that will be held on June 27-28, here in New York. We will all welcome you. Many pleasant surprises await you in the form of free entertainment.



Pict. No. 3. A Wedell-Williams Racer, built for Wedell-Williams Service Corp., by N. H. Ranck.

Pict. No. 9. Bill Givdinger has made a good job of his detail scale Boeing P-26A.

Pict. No. 8. Herbert Kanner and his soaring glider which flies nicely.

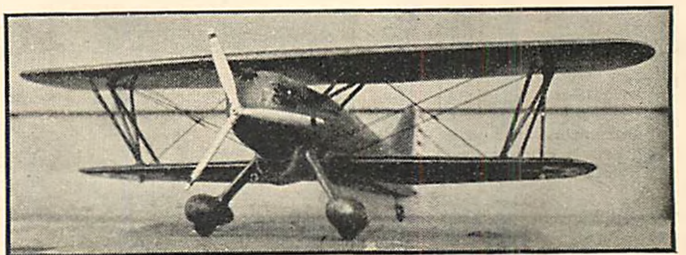
Pict. No. 4. Harry Trimble crashes through again with a picture of this Heath. It is a fine flyer.

Harland C. Wood of Lyndonville, Vt., has spent his time to very good advantage while snowed in recently up there in the Green Mountains. He presents you with a very fine drawing of an English Boulton and Paul "Sidestrand." This ship has several unique features as you can see, one of them being the gun protruding from an opening in the underside of the fuselage. This provides protection from a rear attack. Wood's artistic ability seems to be improving. We hope he keeps up the good work.

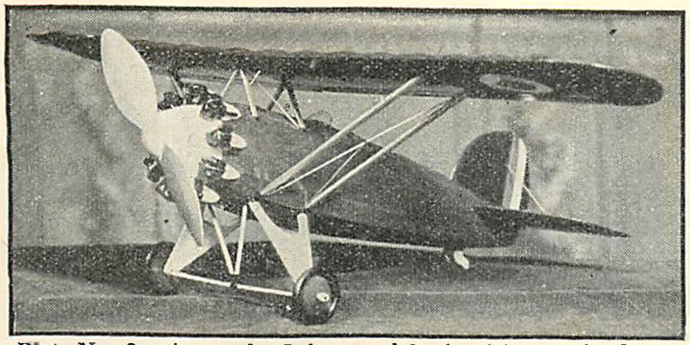
The best picture this month comes from R. Glenn Rymer and George R. Wilson of 1241 Jefferson Avenue, Akron, Ohio. It is a photograph of a beautifully built model of the Morane Saulnier monoplane, picture No. 2, plans of which appeared in the March issue of Universal Model Airplane News. This picture was by far the best that we received. The plane itself is also beautifully built. These young gentlemen tell us that the ship has great speed especially as they changed the wing section slightly to make it faster. It has a color combination of blue, white, orange, black and silver. No wonder it is fast. Perhaps our friends painted this ship with "fast colors."

Picture No. 3 shows a Wedell-Williams Racer No. 44, which has been built for the Wedell-Williams

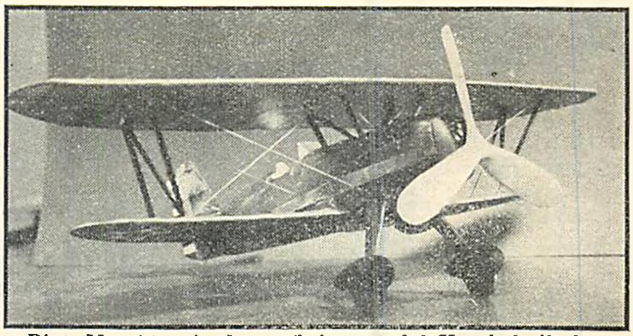
Pict. No. 6. Though it looks like a large ship, this is only a model Monocoupe by Gordon Williams.



Pict. No. 7. A solid scale "Hawk" from Colorado by Bill Geopfarth.



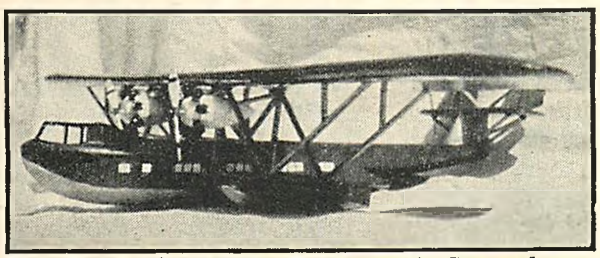
Pict. No. 2. A speedy flying model of a Morane Saulnier, by R. Rymer and Geo. Wilson.



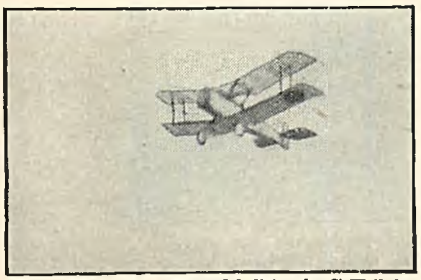
Pict. No. 14. A clever flying model Hawk built by Geo. Ginn of Columbus.

Service Corp., at Patterson, La., by Nathan H. Ranck and William Feallock of 409 Earl Road, Michigan City, Ind. It has been built up in detail and is an excellent job. The model has been turned over to the Aeronautic Branch of the Department of Commerce, to be exhibited in the Federal exhibits at a Century of Progress World's Fair. We thank our friends for this picture. It should be of great interest to the readers who may stop in at the World's Fair to see the actual model.

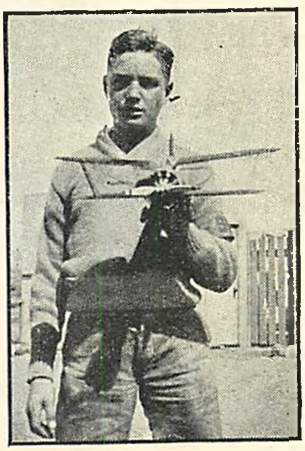
Mr. Harry Trimble of 9-B Forsyth Street, Fort Riley, Kansas, sends us picture No. 4 of a neatly built Heath Parasol. This little ship has great stability and makes excellent flights. Trimble is an old and regular contributor.



Pict. No. 5. Careful detail graces this Commodore "Boat" by Fred Fettig.

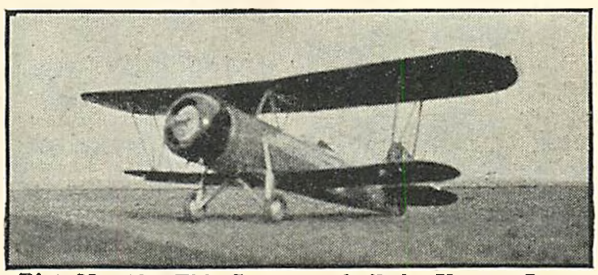


Pict. No. 12. Harold Dion's S.E.5 in full flight. It gives fine performance.



Pict. No. 11. Hugh Williams of New Mexico and his F. 9 C.2.

In picture No. 5 you see a solid scale Consolidated Commodore Flying Boat, built by Fred Fettig of Elm Street, Newport, Ky. One can readily see that Fettig is no novice at this business. His model shows excellent workmanship and great patience. The ship has a wing span of 25¼ inches.



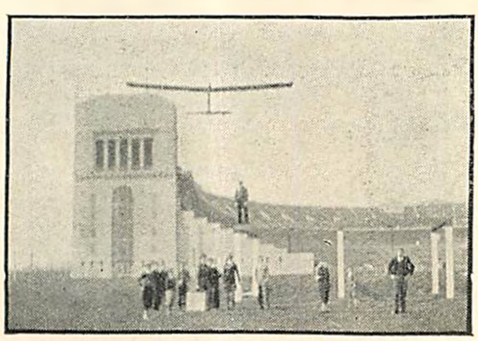
Pict. No. 13. This Stearman built by Vernon Jones is not a large ship.

GORDON S. WILLIAMS is responsible for the Monocoupe which is warming up in Picture No. 6. Williams, who lives at 5740 36th Ave., N.E., Seattle, Washington, belongs to a very active group of builders in his city, called the Plymouth Sky Cadets. This club is divided up into squadrons with an experienced model builder at the head of each. They make models for window displays, courtesy displays and are planning a big air show in the near future. This Monocoupe is to a scale of ½ inch to one foot. Great detail has been carried out in its construction. From appearances it might well be a real ship ready to take off. I am sure readers would be interested to hear more about this model; what form of power is used to spin the prop, will the ship fly?

A solid scale Hawk P6E is shown in Picture No. 7, which was built by Bill Geopfarth, 825 North 7, Grant Junction, Colo. This is an exceedingly neat job. The cockpit has an aluminum seat and floorboard, a safety belt that can be fastened, controls, dashboard, fire pump, throttle, spark and gas control. Some of our builders seem to be sticklers for detail. More power to them.

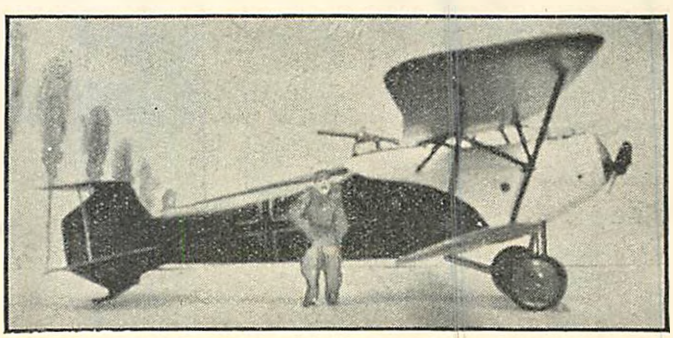
Herbert Kanner of 1117 Gerard Avenue, New York, N. Y., sends us picture No. 8 showing him with a six foot soaring glider which he built from plans in this magazine. He says he has been unable to give it extensive trials because of the weather. However, on some short flights, it performed exceedingly well and he is well pleased.

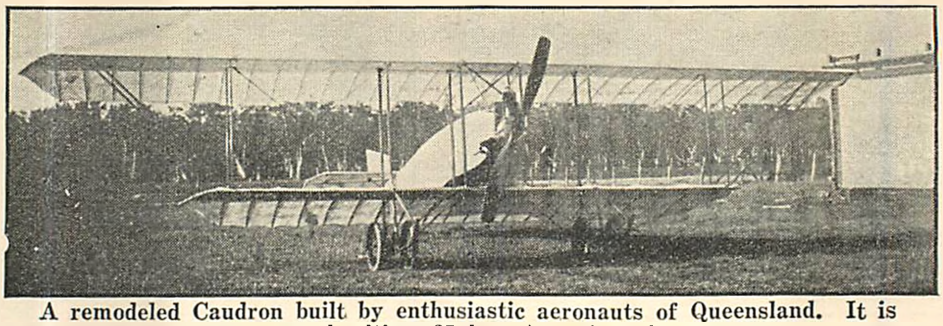
(Continued on page 32)



Pict. No. 15. Roy Chapman starts his thermal glider on its skyward journey.

Pict. No. 10. Laurence McCready's pinhole camera caught this model of a Hannover while "at ease."



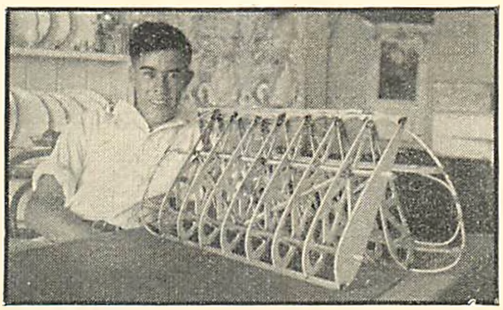


A remodeled Caudron built by enthusiastic aeronauts of Queensland. It is powered with a 35 h.p. Anzani engine.

Foreign Activities

AUSTRALIA has submitted a feature of special interest this month. Mr. Ivor Freshman, general secretary of the Model Flying Club of Australia has sent us the picture of the rebuilt Caudron biplane appearing at the top of the page. Model fans who are well versed in construction of war craft will notice that the outriggers of the orthodox Caudron have been replaced by a streamlined fuselage. This machine was rebuilt after a crash and is considered to be the first airplane built in Queensland. It is powered with a 35 h.p. Anzani engine. This should be an extremely interesting ship to fly. It takes one back to the old pre-war days.

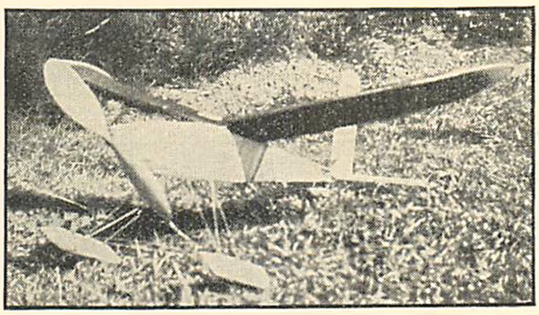
The second picture on the page, shows W. R. Baty of Gympie, Queensland, with a set of large model wings which he has built. The wings as you see, are uncovered and show considerable detail of construction. They are a very nice-looking job.



W. R. Baty is contemplating an angelic career. Here are his wings.

From the Model Flying Club of Australia, New Zealand branch, comes a picture of the "Seagull" in flight, shown in the lower left hand corner. The picture shows clearly that this machine is doing its stuff, flying with great stability and attaining good altitude.

In the middle picture at the bottom of the page, Mervyn Morgan is shown in the act of launching a new type cabin model. This may be a scene in Australia but it looks very much like many of our suburban districts.



Albert Hopkins' hydro flies for 5 minutes, 36 seconds.

Mr. Freshman was kind enough to send us the Australian records for model flying, which are as follows:

Scale Models R.O.W., 25 sec.

Hand-Launched Fuselage Models, 17 min. 7-1/5 sec.

R.O.W. Fuselage Models, 1 min. 12 sec.

R.O.W. Stick Models, 4 min. 37 sec.

Indoor Hand-Launched Stick, 5 min. 36-2/5 sec.

(We have no airship sheds)

Single Pusher record, 14 min. 45 sec.

Stick Tractor, 28 min. 27-2/5 sec.

HE says, "We hold a contest each month for the Angus & Coote Cup in which one hundred or more contestants take part. In each one of these contests the winner is awarded a miniature cup and whoever wins it most often in twelve months becomes the possessor of the actual trophy. This contest is open to all types.

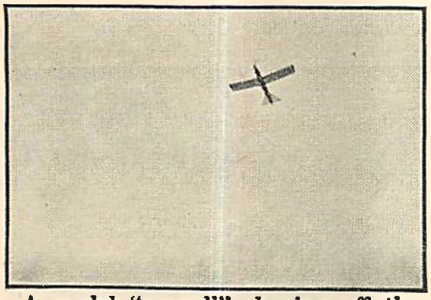
"We would like to mention the formation of a club which is a branch of our own, known as the Bondi Wings, which is rapidly progressing and will very soon be equalling Australia's best."

Mr. Freshman particularly wishes me to ask through our columns if model builders who would care to make an interchange of model plans would not write to him. He says "I guarantee to answer every letter personally." Address letters to Secretary, Model Flying Club of Australia, 375 Kent Street, Sydney, Australia.

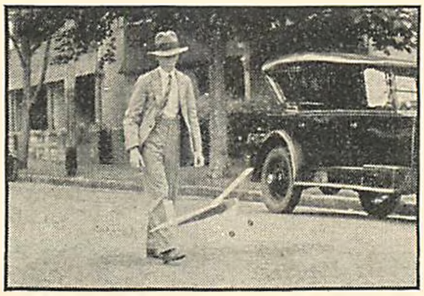
Here we have news from another organization, the Model Airplane Association of Australia. Mr. Albert E. Hopkins, Squadron Commander of the Hurstville "Falcons" with headquarters at 89 Cronulla Street, Carlton, N.S. Wales, Australia, writes us the following:

"I am writing you to let you know of the activities of the Hurstville "Falcons" which is a suburban branch of the Model Aeroplane Association of Australia. This association is the

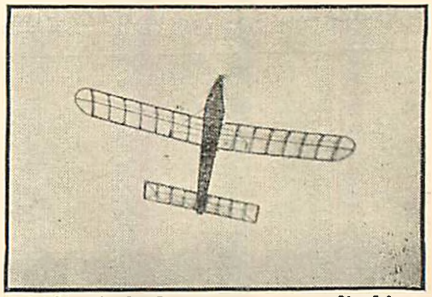
(Continued on page 44)



A model "seagull" shaving off the underside of a few clouds, way down in New Zealand.



Mervyn Morgan gives his new type cabin model a work-out before a contest.



A 40 inch span steep climbing model built by Mr. Cross of the Hurstville "Falcons."

"Whats" and "What Nots" of Model Plane Building

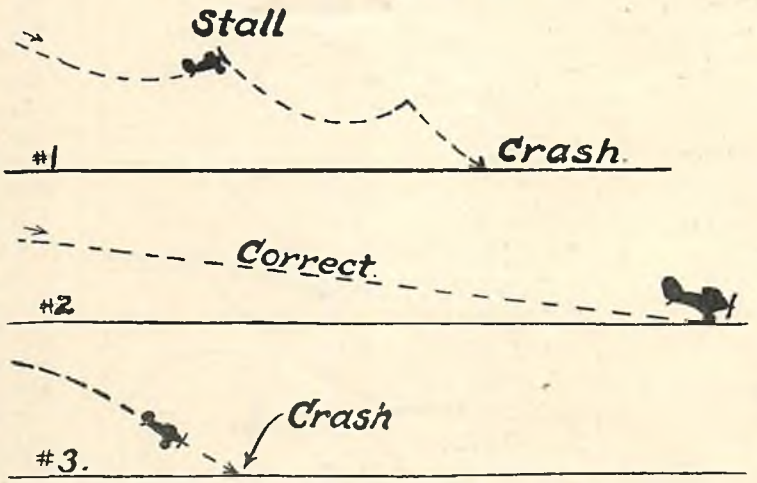
Some Helpful Hints on Scale Model Building and Flight Adjustment of Flying Models

By HOWARD G. McENTEE

VERY little has been said in this series about the building of so-called solid scale models. These, as most of us know, are non-flying models and can, therefore, be made to exact scale and without any regard to weight. Wind tunnel models also come under this heading, but these are a bit beyond the scope of this article.

The main difference between flying and solid scale models is of course, detail. Thus, while we use cylinders made of corks wrapped with thread on a flying model, the solid model builder can use metal castings in which every tiny detail is reproduced.

As the name implies, these models are solid. Therefore, there is no intricate framework to build. Balsa is usually used for wings and fuselage because it is so easily worked.



No. 1—caused by over elevation or heavy tail.
No. 2—correct glide—flat and straight with no dips—model lands with tail slightly high.
No. 3—crash caused by heavy nose or under elevation—also by incorrect launching.
All above apply to gliding tests.

One very realistic way to make the wings is as follows: cut them carefully from balsa board and finish to the proper airfoil section. Also finish the tips and center section cutout if any. Sand the piece off well, then mark out where the ribs are to go, both on leading and trailing edges. This must be done accurately. Now with a small triangular file, cut shallow notices in front and rear. You see, we are going to use thread to represent the ribs, and as you know, the ribs in a real ship do not show at the front and rear extremes, hence the notches. Next, stretch rather fine thread around the wing, holding in place with glue at the rear where the ends meet. Do not make a knot. When the glue dries, trim off the thread ends and cover the wing with ordinary model paper. Silk may also be used. Finish as usual by spraying with water, then apply whatever paint or dope is required.

This system, of course, applies only to fabric covering. If the large ship is plywood or smooth metal covered, leave the wood smooth. The thread can also be used on the fuselage the same way to imitate strings which sometimes show through the covering.

Corrugated metal can also be represented by thread, except that the threads must be laid close together and no paper covering is used. Instead, the threads are coated rather heavily with dope, which fills in about them somewhat, giving a very realistic appearance.

THE fuselage of solid scale models is usually hollowed out, not for any saving in weight, but to provide for cabin or cockpits, and right at this point is where you can show your ingenuity and workmanship and lift your model out of the ordinary class. Put in all the details you can think of. Study pictures or if possible, look over the real ship, making notes so you can install a full set of gadgets.

Make your instrument board look real. Cover glasses for instruments may be made of celluloid cut out with a piece of sharpened tubing. If you want the ultimate in realism, cut holes behind the instruments and put a tiny electric bulb behind the panel. It is best to build a small compartment for the bulb, otherwise too much light will leak out and spoil the effect. Some of the large electrical supply houses carry what are called "pea lamps." These are really just about the size of a small pea and work on small flashlight cells. They may be used all over the model, for navigation lights, cabin lights, landing lights, etc. The batteries can be kept in a small compartment behind the cabin or cockpit.

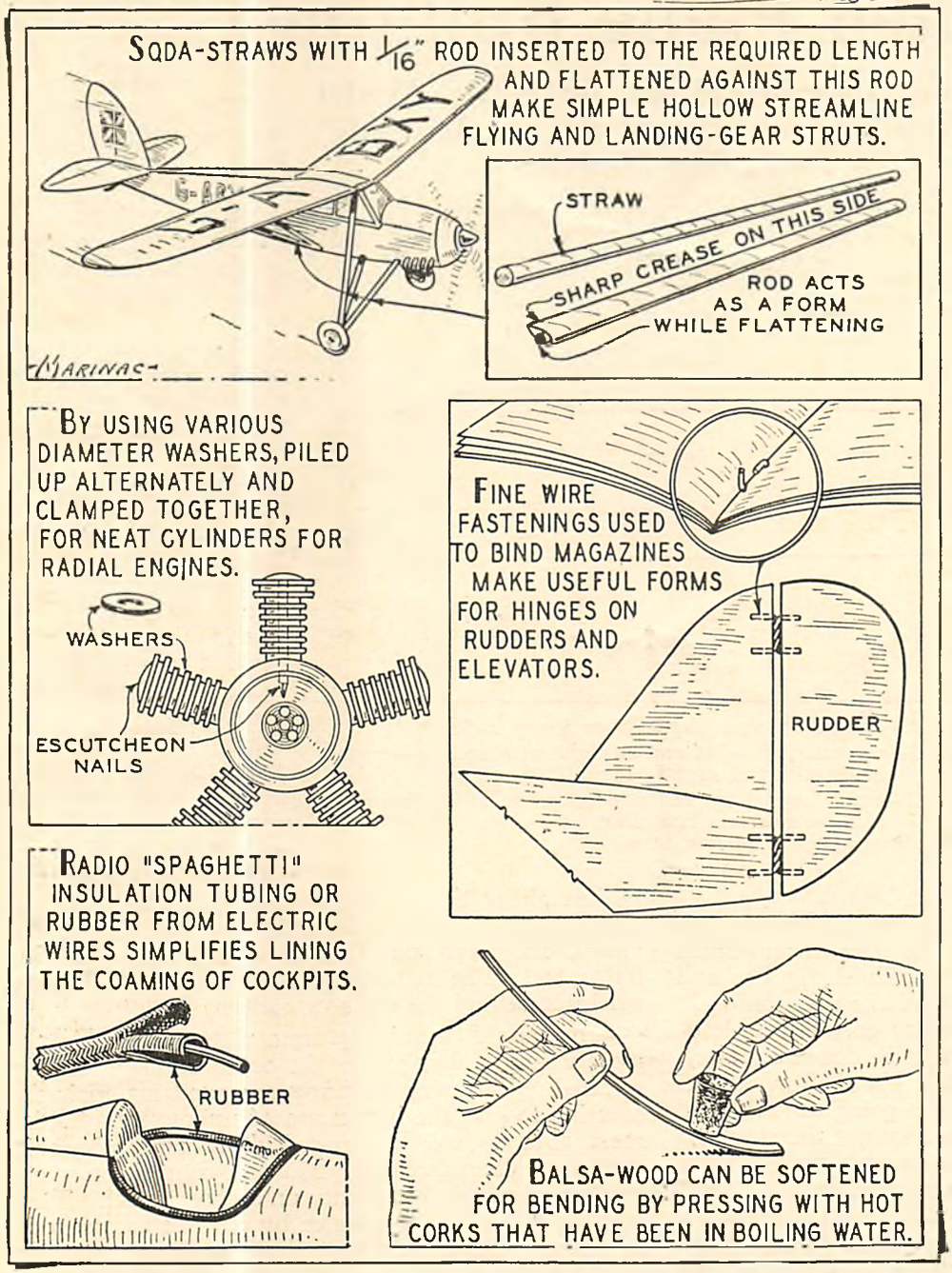
Seats should be built up from sheet metal. Do not use aluminum, but rather tin or some metal readily soldered. Velvet or corduroy are good materials for covering to give the impression of upholstery. Cabins must always have a carpeted floor and preferably cloth on walls and ceiling. Movable controls on wings and tail are almost a necessity on a good model. They may be worked by threads or by push or torque rods. It is very often a help to follow the large ship procedure in this matter.

Simple brakes and shock absorbers add a good deal to your model and are quite easy to make.

The writer believes that if you wish to make a solid scale model, you might just as well put on all the possible details as to put on just a few, as the value of the model is immeasurably increased, and besides, who doesn't enjoy hearing the "ohs" and the "ahs" of the awed spectators as they are shown all the features of the model by its proud builder.

So many builders, especially the beginners, are doubtful as to the exact procedure to follow when flying a model, that a few suggestions in this line will be given. When a new model is ready for testing, the first thing to do is to balance it roughly. Support it in your fingers at a point about one-third back from the leading edge of the wing. If the model is a biplane, the effect of the stagger, if any, must be taken into account. Thus the support point must be further

MODEL · KINX



back than if no longer wing is used. Since this preliminary balancing is very rough and only approximate, there is no need to try for great accuracy. If the test shows the model to be out of balance, correct it with small weights. Strip or wire solder is ideal for these weights. Use the solid variety if possible, as the rosin or acid core solder is not so heavy and more is needed. For these preliminary trials, place the weight on only temporarily, as more or less may be finally needed. The lead must be as far fore or aft as possible. There will be very few times, however, when a weight is needed in the rear, if a true to scale model is made.

THE writer favors trying a model on the ground before flying it from the hand. A good deal of knowledge of the performance can be gained by watching a model skimming along the ground. You can correct any tendency to turn sideways or to stall and the model never gets high enough to crash and cause real damage. When this preliminary flying is over, a short flight from the hand may be attempted. The very best procedure of all is to fly or glide the model in a field where there is high grass and then no amount of dives or stalls will hurt the model. Few of us are fortunate enough to have such a field nearby, however, so other methods must be used.

Watch the ship very carefully on its first flights. It is not at all hard to find out what to do to correct a poor flight but one must know what to look for.

If the ship stalls under power, but glides perfectly, it may have one of several faults. If the elevator is set at a large negative angle, it will cause such a condition. The remedy is to add a small weight to the tail and flatten out the tail somewhat. If the stall persists, the best remedy is to raise the rear end of the propeller shaft so that the propeller points slightly downward. This will cure the most obstinate cases. Remember that you should always have the model in good gliding trim first and then make flying adjustments. Thus, when the power gives out, the ship will come down in a decent glide instead of a crash dive. Whenever you make any changes, try the model to see if its gliding qualities are still correct.

Very often a weight well below the wings will increase the stability. Such a weight could be fastened to the landing gear and is particularly helpful on low wing ships with very little dihedral. If you find the weight helpful, it can sometimes be substituted by a pair of rather heavy wheels.

If your model needs a weight on the nose, make a prop for it of heavy wood which will add the necessary weight and yet be much more rugged than a balsa one.

It is best to make all flying models so that the wings have a fair amount of dihedral, or at least so that the dihedral may be varied, this being one great advantage of using wire pins, sliding into tube to hold the wings on. If the original ship has no dihedral, the pins may be straightened so that the model has none, but when the model is flown sufficient dihedral is easily obtained.

Too much dihedral is easily detected by the fact that the model will rock somewhat from side to side in flight. It is virtually imperative to have dihedral on a flying model and the writer can remember no

(*Continued on page* 42)

Airplane Maneuver Contest

What Maneuver is Being Executed by the Plane on the Cover?

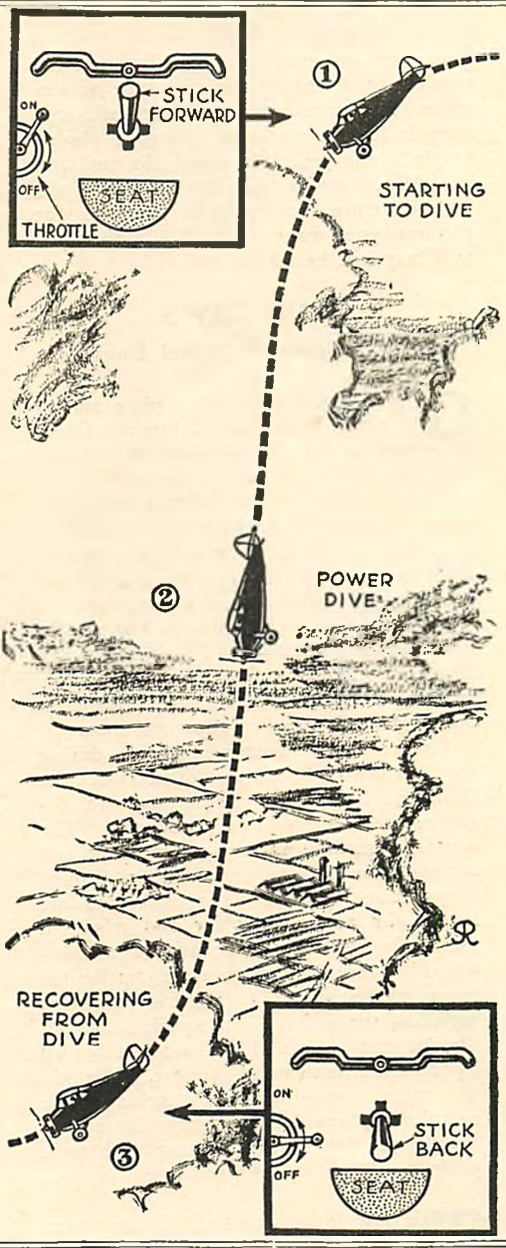
Winner of April Contest

Do you wish to become a pilot? If you do, you will want to know how and why a plane is made to perform the maneuver pictured on the cover. Enter this contest and learn the basic principles of flight. The winner of each monthly contest will receive, as a prize, the beautifully colored, original painting of the cover picture. $100.00 in prizes given to winners of the contest of six monthly cover pictures, February to July.

SOME of our worthy readers may not have been able to enter this contest when it started in February. However, do not let this fact discourage you for the winner of each separate monthly maneuver problem is awarded the original painting of the cover picture for the particular months of which he is winner. Also, do not be disappointed if you have sent in answers to the first four cover pictures and have not placed well up toward the head of the list of winners and runners-up, for your answers given for the problems may raise your average for the six covers to such an extent that you will ultimately place among the winners. Remember, there are nineteen prizes, not including the cover pictures.

The Winner for April

There is another extremely happy young man this month. At least he will be happy we hope, when he receives the striking oil painting of the April cover picture, entitled: "Howard's "Ike" Rounds a Pylon." We know you are anxious to know who the "lucky dog" is so we will not make you hold your breath any longer. We take great pleasure in announcing Roger F. Parkhill, 501 West 27th Street, Minneapolis, Minn., Maneuver Contest winner for April. Congratulations, Parkhill, for the excellent entry you submitted. It was very thorough in respect to describing the use of the maneuver, its advantages, its correct execution and the position of the controls. The drawings and diagrams were beautifully made and on the whole, it was about as fine as possible.



There were many other excellent answers which we had to consider carefully before the winner could be chosen. Those who have placed well up towards the front are:

Raymond D. Filipiak, Milwaukee, Wisc.

Albert R. Cline, Derry, Pa.

Ike Kibbe, Austin, Texas.

John Alfirevic, Chicago, Illinois.

William C. Drake, Malden, Mass.

Alvin J. Brault, New London, Wisc.

E. Ronald Schuver, Minneapolis, Minn.

Robert Jack, San Carlos, Calif.

Dominick Osmulski, Philadelphia, Pa.

Walter M. Smith, Wildwood, N. J.

Frank S. McDonald, Hardin, Ill.

William Tracy, New Rochelle, New York.

Answer to the May Maneuver

OUR contest friends should not have a hard time deciding what maneuver the ship on the May cover is performing. It is A POWER DIVE. The difficult part for most of the contestants, it seems, is to make an accurate and neatly presented explanation of the maneuver and how it is executed.

Have you ever made a power dive? Probably you have not, but let me tell you, your first power dive is bound to be an unforgettable experience. It will certainly throw a scare into you and will thrill you in a way that will make you want to repeat it. It is awfully tough on the airplane's wings and when you nose down,

(*Continued on page 44*)

Here is How You Win the Awards

EXAMINE the cover picture carefully and determine what maneuver the plane is executing. This can be done by noting the position and attitude of the plane and the setting of the ailerons, rudder and elevators. When you think you can give the correct answer, write us, naming the maneuver and how it is performed. Also give your name and address, printed or typewritten. The last maneuver in this contest will appear on the cover of the July UNIVERSAL MODEL AIRPLANE NEWS.

Winners will be chosen on the basis of accuracy, neatness and the amount of detailed information given about each maneuver. The awards will be as follows:

Winner of 1st place, $25.00; 2nd place, $15.00; 3rd place, $10.00; 4th to 7th places, inclusive, $5.00; 8th to 11th places, inclusive, $2.50.

All answers to any particular pictures must reach this office by the 20th of the current month.

The correct answer for any particular cover will appear in the following issue of this magazine, with diagrams explaining the maneuver.

Send answers to **Maneuver Contest**, UNIVERSAL MODEL AIRPLANE NEWS, 125 West 45th Street, New York City.

Air-Ways Here And There

(*Continued from page* 27)

I find that a good many of our readers have built this model and we will look forward to hear how their ships perform when the hot weather provides enough thermal currents for some real flights.

Bill Givdinger of Concordia College, Oakland, Calif., lets us all see what he looks like in picture No. 9. He is holding a detail, built-up Scale Boeing P26A, which he has built. He deserves a lot of credit for the excellent job he has turned out. The ship contains about 625 individual parts, the engine alone being composed of 150 pieces. The whole job required 65 hours to compelte.

Laurence S. McCready of 1027 Grant Avenue, Pelham Manor, N. Y., is a pinhole camera expert. In his few spare moments he is busily engaged either in building pinhole cameras or in building models, which he uses as suitable photographic subjects. We look forward to receiving a manuscript describing how to build a pinhole camera so that you can take some pictures for yourselves. We hope to publish this in the near future. Picture No. 10 shows a sample of his art. It is a German Hannover. C12 German Fighter. Mr. McCready pays great attention to detail, as you can see. Apparently this ship is resting on some level field in France during the war. You will notice the Lombardy poplars in the background. Of course these are not real but merely sketched on the picture as scenery. The man standing beside the plane might be Boelke or some other German Ace from appearances. It looks as if McCready was headed for a job with some large movie concern judging from the way he engineers his set up.

PICTURE No. 11 shows Hugh Williams of 1147 Don Gaspar Avenue, Santa Fe, New Mexico, holding his solid scale Akron Fighter. Williams works under difficulties as he lives so far away. We can imagine that it is difficult to get authentic data in that part of the country. In places where model building is not a national activity, a young man has to have the pioneer instinct to run his race along these lines alone. I often wonder if the young men living in the vicinity of New York, appreciate the advantages which they have in comparison with young fellows like Williams.

Harold Dion of 554 East Olive Street, Turlock, Calif., has honored us with a picture of his S.E.5 in flight, picture No. 12. This model is not strung on wires. Many of you who have built the S.E.5 will appreciate what excellent flying qualities this ship possesses. It seems that this model belonging to Dion is no exception to the rule. It has managed to get up in the world to a considerable extent.

Vernon Jones of Thawville, Illinois, has contributed one of the most realistic pictures that we have ever received, picture No. 13. It shows a picture of a Stearman Mailplane. You might well imagine that it is a real ship just taxiing in after a landing, to unload its cargo. In fact, it was difficult for me to tell whether this picture was one of the models or a full size plane. It was necessary for me to read Jones' letter carefully to learn the truth of the matter. Jones says it is not exactly to scale as he was compelled to make his own blue prints. The only drawings he had to start with were three view three-inch drawings. If there are any inaccuracies in the ship itself, it is hard to detect them from the picture.

Before telling you something about our clubs this month, I would like to impress upon my readers the importance of sending in carefully taken, clear photographs. It is not that I do not wish to swell Uncle Sam's income through the post office department, but rather to save you trouble for we have received many picture which have been so indistinct that it has been possible to determine even the type of airplane, let alone make a clear half-tone from it for the magazine. If your photograph is not perfect in detail, do not send it. Also, we will appreciate it if you will inclose return postage and envelope for pictures you want returned. Otherwise, you may not hear from us.

CLUB NEWS

Columbus Society of Model Engineers

GREAT activity is taking place among the model builders of Columbus, Ohio. They send us the following news of what they are doing. We feel it will be of special interest to model builders who wish to form clubs or societies in their communities. This model group is showing the way to many of the clubs throughout the country. Among its active members is a young man named George Ginn. He has sent us Picture No. 14 of his model Hawk. This is a built-up flying scale model and performs nicely. The Society's Secretary sends us the following dope.

Due to the growing membership during the last two years, the officers of the C.S.M.E. have found it necessary to organize the members into squadrons. The squadron method is now under way and seventeen such groups are being formed throughout the city. The squadrons are headed by adults or older and advanced model builders . All squadrons are restricted to certain territories and are limited to a maximum of twenty-five members including the leader. The squadron is then divided into patrols of six each and headed by a competent model builder. Already the various squadrons are attacking their neighboring squadrons. Many fierce battles will be fought this summer with twin pushers, gliders and stopwatches.

THE last indoor contest of the season was held at the Crystal Slipper Polo Hall on March 19th. Seventy-one entrants were reported and many good flights were obtained. However, due to an unusually damp atmospheric condition no records were established until the contest was moved outdoors to the Ohio State Polo Field. A flight of eighty-four seconds was obtained on a flying scale Curtiss Robin by Mr. Deitsch, when the little model climbed into a rather stiff breeze and flew for more than a half mile.

A Thermal Glider built from plans in the UNIVERSAL MODEL AIRPLANE NEWS by Roy Chapman proved to be the attraction of the day however, picture No. 15. This simple type of glider is meeting with unusual success and many are building them for the next outdoor meet. A very successful season is anticipated, since the discovery of a sensational new type of rubber which gives more winds and endurance.

International Amateur Aircraft Photo Exchange

Air Ways cannot go to press until we say something about this very commendable and active organizations. What we particularly like about this organization is the fact that it is extremely idealistic regarding the quality of those who are invited to become members and of the work they turn out. We are going to take great pleasure in announcing the activities of this organization under a separate heading each month in our magazine. We therefore, invite all its members to communicate with each other through this column. It will not only be helpful to members of the organization but will be of interest to other readers who may see what this group of progressive young men are doing to improve photographic art in connection with aviation. We hope to print a number of pictures which have been submitted by Fred Bamberger of 817 West End Avenue, New York City, S-18, I.A.A.P.E. However, this month we have found it difficult to present these pictures in the proper manner. However, you may expect to see them in our next issue. All the pictures printed under the column of this society will be shots which are unusual in some respects, either planes which you find trouble in getting pictures of or some special incident of interest. These gentlemen are not satisfied with the commonplace.

We hear that our good friend, Mr. Ernesto Tabio has become or is about to become a member of the Society. We wish to congratulate him on his new affiliation. Many of your readers will remember that this gentleman has contributed to your pleasure in the form of plans in the magazine. He is very prominent in aviation circles down in Cuba, and is one of the few aeronautical men who had his early training during the pioneer days of aviation. We hope the members of this Society who read this column will not fail to avail themselves of the opportunity of saying a word to fellow members through it.

Greater New York and Long Island 1933 Model Airplane Derby

The National Aviation Reserve Association of America, with the assistance of Queens Unit No. 1, will hold its annual model airplane derby at Curtiss Valley Stream Airport, Valley Stream, Long Island, on Sunday, June 25th, 1933. Proceedings will start promptly at 10:00 A.M. All those who wish to enter this contest will communicate with the National Aviation Reserve Association of America, 92-35 Union Hall St., Jamaica, New York, immediately.

The events will be Twin Pusher and Tractor (Endurance), Commercial Models (Endurance), Free for All Speed, Replica Scale Model (Non-Flying), and Novelty Flying Model Event (Originality). Prizes will be given for the first three places.

National Aeronautic Association
Model Airplane Definitions and Competition Rules

DEFINITIONS AND CLASSIFICATIONS

Adopted April 12, 1933.

All model airplanes are divided into the following classes:

Class A—A model airplane is in class A when the area of its effective main supporting surfaces does not exceed 30 square inches .

Class B—A model is in class B when the area of its effective main supporting surfaces does not exceed 65 square inches, and is greater than 30 square inches.

Class C—A model is in class C when the area of its effective main supporting surfaces does not exceed 125 square inches, and is greater than 65 square inches.

Class D—A model is in class D when the area of its effective main supporting surfaces does not exceed 150 square inches, and is greater than 125 square inches.

Class E—A model is in class E when the area of its effective main supporting surfaces does not exceed 250 square inches, and is greater than 150 square inches.

Class F—A model is in class F when the area of its effective main supporting surfaces exceeds 250 square inches.

RISE OFF THE GROUND (R.O.G.)—A model airplane of the R.O.G. type has landing gear that permits it to take off from the ground or floor from a standstill under its own power. The landing gear must be strong enough to support the model while taking off and landing, and its usefulness must be demonstrated by gliding the model from a height of at least four feet, landing without damage and without nosing over. The wheels shall turn freely and be of such size as to permit the model to taxi freely on an ordinary platform. The minimum diameter of the wheels shall be not less than the following:

Class A— ½ inch
Class B— ¾ inch
Class C—1 inch
Class D—1¼ inch
Class E—1½ inch
Class F—2 inches

RISE OFF WATER (R.O.W.)—A model airplane of the R.O.W. type can take off from or alight on water. It must demonstrate its seaworthiness by taxiing at least six feet on the surface of the water. It must take off from the water from a standstill under its own power.

AMPHIBIAN—A model airplane of the amphibian type has the combined characteristics of the R.O.G. and R.O.W. types, fulfilling these specifications without substituting landing gear. The model's time shall be the average of two flights, respectively, the best one of three R.O.G. flights and the best one of three R.O.W. flights.

HAND-LAUNCHED—A model airplane is hand-launched when it is released into flight directly from the hands of the launcher. The model shall be launched from an elevation of not more than six feet above the ground or floor.

GLIDER—A model glider is similar to a model airplane but without power plant. It may be launched in three ways: (1) hand-launched, (2) catapult-launched, (3) tow-line-launched. Hand-launching is defined above. Catapult-launching is accomplished by exerting an initial flying impulse by means of a sling-shot or similar device. Tow-line launching is accomplished by pulling the model into the air with a string from the ground like a kite. The tow-line shall be no longer than 100 feet and shall be released from the model by the launcher. The model's time starts when the tow-line is released. Model gliders need have no landing gear, but in other applicable respects shall conform to the classifications of model airplanes, and resemble man-carrying gliders.

PUSHER—A model airplane of the pusher type has its propeller or propellers behind the main supporting surfaces.

TRACTOR—A model airplane of the tractor type has its propeller or propellers forward of the main supporting surfaces.

TRACTOR-PUSHER—A model airplane of the tractor-pusher type has one or more propellers forward of, and one or more propellers behind the main supporting surfaces.

INDOOR MODEL—A model of the indoor type is designed primarily to fly indoors. The area of the effective main supporting surfaces shall not exceed 150 square inches.

OUTDOOR MODEL—A model of the outdoor type is designed primarily to fly outdoors. The area of the effective main supporting surfaces shall be no less than 125 square inches. Outdoor models shall weigh, complete and ready to fly, not less than one ounce avoirdupois for each 50 square inches of effective wing area.

STICK MODEL—A model of the stick type has a body composed of a single stick or open framework, rather than a fuselage. Models using tubes to enclose the motors, and those that do not meet the fuselage type requirements are classed as stick models.

FUSELAGE MODEL—A model of the fuselage type has a built-up, enclosed fuselage. The minimum area of the maximum cross-section of the fuselage must correspond to the formula $\frac{L^2}{100}$ where "L" equals the over-all length of the model, excluding the propeller. The fuselage shall be of approximate streamline form and have not less than 90 per cent of its surface area covered. Outriggers and booms may be used on fuselage type models. The fuselage shall be a structure which supports the motor wings, empennage and landing gear. When rubber is used for motive power, it shall be contained entirely within the fuselage.

FLYING SCALE MODEL—A flying scale model is an exact replica of a man carrying airplane in every essential par necessary to the model's flight. Every part shall be proportional in size and location to the corresponding part of the larger plane. The propellers must con form in diameter to the original, but may be altered in blade-width and pitch.

EXHIBITION SCALE MODEL—An exhibition scale model is an exact non-flying replica of a man-carrying airplane, every part being proportional in size and location to the corresponding part of the larger plane. The N.A.A. does not recognize any categories of exhibition scale models, but for the guidance of local contest committees suggested rules are given later.

AUTOGIRO—An autogiro model is supported in flight by the action of the air on vanes which rotate freely on an approximate vertical axis, supplemented by the thrust of a propeller on an approximate horizontal axis. The area of the vanes' surface shall be not less than twice that of the fixed wing. There are no size-subdivisions of autogiro models. The launching method is optional.

HELICOPTER—A helicopter model must rise from the ground without any assistance and be supported in flight solely by the lift of a power driven air-screw or vanes. There are no size-subdivisions of helicopter models.

ORNITHOPTER — A heavier-than-air craft which derives its lift and propulsion solely from the flapping of wings. There are no size-subdivisions of ornithopters.

VACUUPLANES, ROTORPLANES and other experimental types are not yet classified or subdivided as they are not sufficiently standardized.

LIGHTER-THAN-AIR CRAFT are not classified.

CONTEST RULES

ACCEPTANCES OF RECORDS — No record is official until it has been accepted by the Contest Committee of the National Aeronautic Association. Only duration records for flying models are officially recognized. All records to be eligible for recognition must be made in sanctioned meets or under specific direction of the Contest Committee of the N.A.A. This committee shall be the final judge in the interpretation of all rules.

WHO MAY COMPETE—Contestants in any official contest shall be less than 21 years of age, and shall be members of the N.A.A. or of a model airplane organization recognized by the N.A.A. Contestants who are younger than 16 years are classed as juniors. Those who are 16 years or older are classed as seniors. There are separate categories of records for each group, the records being classed as senior or junior according to the contestant's age when the record was made.

OFFICIALS—The following officials shall be present to conduct a contest:

(a) Contest Director, who shall be officially recognized by the N.A.A.

(b) At least two timers timing each flight. Timers may also act as examiners.

(c) One recorder who may also act as a timer or examiner.

(d) Any additional assistants as circumstances warrant, may serve.

DESIGNS OF MODELS—There are no restrictions on the design of the models except that they shall meet the specifications named in the definitions and classifications. However, the models must be so designed that they drop no part in flight.

NUMBER OF MODELS—Each contestant will be allowed a maximum of three models in each event, and he may use any or all to complete his flights.

NUMBER OF FLIGHTS—Each contestant will be allowed a total of three official flights. A flight is a start that lasts 10 seconds or longer in an outdoor contest, and 30 seconds or longer in an indoor contest. Any flight less than that or failure to fly promptly when called shall be judged a delayed flight. Three successive delayed flights shall be considered as displacing one official flight. A contestant may at his option, declare a delayed flight when his model meets an obstruction that prevents further flight. If not declared to the timers at the time of the collision such a flight is

to be judged as an official flight. However, should subsequent official flights fail to surpass the duration of a delayed flight that has been declared, the contestant will be entitled to reinstatement of the delayed flight as official. If a contestant fails to make one flight of sufficient duration to be an official flight in his nine possible chances, his best time will be recorded as the time of his best flight.

TIME OF FLIGHTS—Flight time starts the instant a model is in flight and ends when the model first touches the ground or floor after being launched, or meets an obstruction that prevents further flights. Time also ends when a model passes from the timers' sight, but the timers shall make every effort to keep the model in sight until it lands. If a model meets an obstruction and falls free independently and resumes flight within ten seconds, time shall continue uninterrupted. However, if an obstructed model can be freed by any means within 60 seconds, time will continue but will not be credited for the period that model was not actually in flight.

BUILDER OF MODEL—Each contestant shall build his model himself with the exception of bearings and washers. The design may be obtained from any source.

TERRAIN—The terrain for outdoor meets shall not vary as to difference of level more than standard practice for landing areas of airports.

DISQUALIFICATIONS—Any contestant who breaks any rule of a contest, or conducts himself contrary to the ordinary requirements of common courtesy, may upon recommendation of the officials be disqualified. Models broken in landing are not disqualified.

PROTESTS—Protests will be considered only when presented in writing to the local Contest Director on the day of the meet.

NOTES

These rules are subject to change or enlargement by the Contest Committee of the N.A.A. The secretary of this committee invites suggestions.

Throughout, the promotion of duration has been given consideration; therefore there is no suggestion of limit to the length of fuselage, motor, or motor stick. It is believed that the limiting of wing area is sufficient. So long as models are within the specifications of the Definitions and Rules, they are eligible.

Speed records will not be recognized until it is clearly evident that there is need of this. Speeds of over 60 miles an hour are attained by models travelling a distance of 150 feet. Models of suitable weight, flying at this speed, are dangerous. It is difficult to time speed flights accurately. Hence the speed contest is not encouraged.

Altitude records are not recognized as accurate measurements are not obtainable.

Distance records are not recognized as they rarely reflect a model's true merit. The air is seldom still enough for distance contests.

CATEGORIES

The National Aeronautic Association recognizes official records in the following categories for both junior and senior contestants:

I-N-D-O-O-R-S

STICK MODELS

Airplanes

- Hand-launched ..... Class B, C, D.
- R.O.G. ..... Class A, B,
- R.O.W. ..... Class A, B,
- Amphibian ..... Class A, B.

Gliders

- Hand-launched—Class A, B, C.

Autogiros

- Launching optional, no class for size.

Ornithopters

- Hand-launched; no classes for size,

Helicopters

- R.O.G.; no classes for size.

FUSELAGE MODELS

Airplanes

- R.O.G. ..... Class B, C, D.
- R.O.W. ..... Class B, C.
- Amphibian ..... Class B, C.

FLYING SCALE MODELS

Airplanes

- R.O.G. ..... Class A, B, C.
- R.O.W. ..... Class A, B, C.
- Amphibian ..... Class A, B, C.

Autogiros

- Launching optional; no classes for size.

O-U-T-D-O-O-R-S

STICK MODELS

Airplanes

- Hand-launched ..... Class D, E.
- R.O.G. ..... Class D, E.
- R.O.W. ..... Class D, E.
- Amphibian ..... Class D, E.

Gliders

- Hand-launched ..... Class D, E.
- Catapult-launched Class D, E, F.
- Tow-line-launched Class D, E, F.

Autogiros

- Launching optional; no classes for size.

Ornithopters

- Hand-launched; no classes for size.

Helicopters

- R.O.G.; no classes for size.

FUSELAGE MODELS

Airplanes

- R.O.G. ..... Class D, E, F.
- R.O.W. ..... Class D, E, F.
- Amphibian ..... Class D, E, F.

FLYING SCALE MODELS

Airplanes

- R.O.G. ..... Class D, E, F.
- R.O.W. ..... Class D, E, F.
- Amphibian ..... Class D, E, F.

Autogiros

- Launching optional; no classes for size.

NOTES

There is no official recognizance given of whether a model is a pusher or tractor, or whether more than one propeller or motor is used.

Except where specified, the power is optional. Experiments with compressed air, internal combustion, steam, and other types of power are to be encouraged.

No separate categories are as yet listed for types of aircraft such as rotorplanes, paddle-wings, and other experimental types.

Should experience show that additional categories are needed, they will be listed; if certain categories prove to be unwarranted, they will be dropped.

Suggestions and recommendations will be considered by the Committee on Junior Activitiy and Model Building, National Aeronautics Association, Dupont Circle, Washington, D. C.

SUGGESTIONS FOR EXHIBITION SCALE MODEL CONTESTS

The Exhibition Scale Model Contest is not a flying event, but a contest of workmanship. The scale model is a miniature reproduction of a man-carrying plane, complete in as many details as the builder's skill will permit. These models are judged on their resemblance to the orignial, and on their workmanship.

A suggested Scale Model Score Card follows:

EXHIBITION SCALE MODEL SCORE CARD

Entrant's Number.....

	Full value.	Judge's Estimate
GENERAL WORKMANSHIP		
1. Neatness of workmanship	15	
2 Amount of detail (This includes such details as controls, engine parts, upholstery, fire extinguishers, instrument board details, lighting, etc.)	15	
3. Originality (This includes originality in reproducing details and parts of the entire model)	10	
4. Color and finish	10	
Total	50	
FIDELITY OF SCALE		
1. Fuselage (Length, depth, width, shape similarity, etc.)	10	
2. Wings (Span, chord, airfoil)	10	
3. Landing gear	10	
4. Empennage	10	
5. Engine, propeller, etc.	10	
Total	50	
Grand Total	100	

Signed .....

There should be at least three judges who are familiar with various types of aircraft and who by training and experience are qualified to judge workmanship and fidelity of scale. Each judge should score his opinion independently of the others. The average score of all the judges will determine the winning models.

A variety of sizes is desirable, and to simplify the grouping of these sizes, the following classes are suggested:

Class A—Models not over six inches in wing span.

Class B—Models larger than class A, but not over 12 inches in wing span.

Class C—Models larger than class B, but not over 24 inches in wing span.

Class D—Models over 24 inches in wing span.

Another suggested grouping would be by various scale reproductions, as:

Class A—Models built to scale of 1/16 inch to a foot.

Class B—Models built to a scale of ⅛ inch to a foot.

Class C—Models built to a scale of ⅜ inch to a foot.

Class D—Models built to a scale of ¾ inch to a foot.

Regardless of size the same principles of judging scale models should prevail.

Each model should be accompanied by an accurate and detailed plan, drawn to the same scale as the model, and approved by the manufacturers of the original plane.

NEW! SAVE MONEY ON SELLEY'S EXCLUSIVE

Knife-Cut Balsa Sprays

100% better than saw-cut sticks!

AT LAST! The model builder's dream realized! **Selley** scores the greatest beat in history's The first and only improvement in balsa wood production! After two years experimenting, **Selley** has created and perfected a semi-automatic machine that produces fine selected white balsa strips of INCREASED STRENGTH, PERFECTLY STRAIGHT, ABSOLUTELY ACCURATE TO SIZE, AND GLASS SMOOTH ON ALL FOUR SIDES!

Only due to the tremendous production, with no waste, can we offer these NEW LOW PRICES, passing the SAVINGS on to you!

Compare this wood with cut balsa. Saw-teeth tear the fibres, weaken the strength and produce uneven, inaccurate-sized sticks.

Our new knife compresses the fibres and actually increases the strength of the wood. SELLEY ALONE can supply you with any stick from 1/64" sq. to 3/16" sq., perfectly straight, uniform and accurate to size! Order now and stock in on all sizes!

MINIMUM WOOD ORDER 25c Postage 15c minimum 10% of order

5¢ 80 Strips

PATENTED LATA BALSA SPRAYS
18" lengths

1/32" x 1/64",	80 for 5c
1/32" x 1/32",	40 for 5c
1/32" x 1/16",	40 for 5c
1/32" x 3/32",	40 for 5c
1/16" x 1/16",	40 for 5c
1/16" x 3/32",	40 for 5c
1/16" x 1/8",	40 for 5c
3/32" x 3/32",	30 for 5c
3/32" x 1/8",	30 for 5c
1/8" x 1/8",	24 for 5c
1/8" x 3/16",	24 for 5c
1/8" x 1/4",	12 for 5c
3/16" x 3/16",	16 for 5c
1/4" x 1/4",	12 for 6c

LATA BALSA LOGS
36" lengths

1" x 1"	10c each
1" x 2"	17c each
1" x 3"	25c each
1" x 6"	50c each
1½" x 1½"	23c each
2" x 2"	34c each
2" x 3"	50c each
2" x 4"	68c each
2" x 6"	$1.00 each
3" x 3"	75c each
3" x 6"	$1.50 each

SELLEYS NEWEST FLYING KITS ARE MAKING RECORD BREAKING FLIGHTS! SELECT YOURS NOW

Each kit is packed complete in a strong, attractively colored and labeled box with printed balsa sheet, balsa sticks, special turned wheels, rubber cement, two colors Jap tissue, music wire, bamboo and reed with complete easy to follow building instructions and large, full-size 12 x 18 plan. 2 kits minimum.

14" WING SPAN

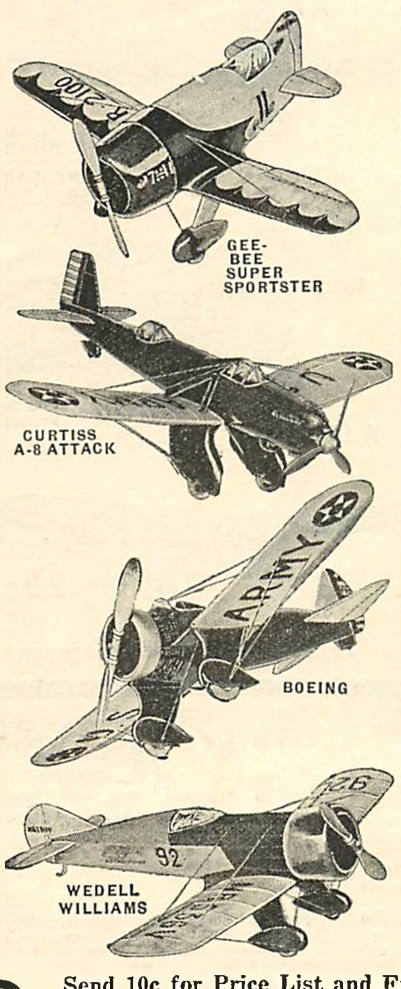
25¢ EACH

Postage 10c for two

Every models is packed in a separate box, labeled and sealed and comes complete with full-size 3-view plan, layout sheet with all details clearly shown, SPECIAL MACHINE-TURNED BALSA COWLS, PROP HUB, WHEELS. Printed balsa rib and bulkhead sheet, colored tissue, cement, music wire, rubber, reed, bamboo, printed motor dashboard, insignia sheet and best-grade balsa sized sticks. What a value! Select yours NOW!

18" WING SPAN

95¢ EACH *Postage 15c*



READ THIS FOR YOUR PROTECTION

Every SELLEY product is guaranteed to be the best obtainable and is manufactured in the largest and most modern factory in the world. You may safely choose any construction set or accessory and if it does not meet with your entire satisfaction your money will be immediately refunded!

SELLEY ALONE CAN MAKE THIS BROAD GUARANTEE!

Our kits and supplies are handled by leading department stores. Ask for them!

ORDERING INSTRUCTIONS

10% packing and postage charge must accompany all orders. 10c extra on orders less than 50c. We accept stamps, money orders or currency (at your own risk.)

Now-Selley Wheels Cost Less!

Aluminum Disc Rubber Tired

⅜"	5c ea.
½"	6c ea.
⅝"	7c ea.
¾"	8c ea.
1"	9c ea.
1¼"	10c ea.
1¼"	11c ea.

R.T. Air Whl.

1"	18c pr.
1¼	20c pr.
1½	25c pr.
1⅝"	25c pr.
1⅝	30c pr.
2"	40c pr.

Treaded Rubber Alum. Disc

1-3/16"	U.S.Cord 30c pr
1½"	Goodrich....40c pr.
2"	Goodrich....50c pr.
3"	Vulco Cord...60c pr.
5⅝"	All State $1.25 pr.

Celluloid Pants ¾" or 1" Whl.
25c pr.
1⅜ or 1⅞" Whl.
30c pr.

Balsa Pants Finished For all sizes

1"	25c
1⅜"	30c
1⅞"	35c
2"	40c

Pants Balloon Size

1"	45c
1¼"	50c
1½"	60c

Untired Wheels Celluloid

¾"	dia. 6c pr.
1"	dia. 8c pr.
1⅜"	dia. 10c pr.
1⅞"	dia. 16c pr.
3"	dia. 40c pr.

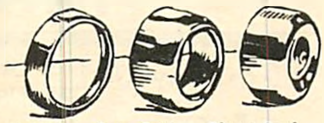
Celluloid Air Wheels

¾"	dia. 8c pr.
1"	dia. 10c pr.

Balsa Balloon Shape

½"	5c pr.
¾"	6c pr.
1"	7c pr.
1¼"	10c pr.
1⅞"	15c pr.

Spun Aluminum Cowls



Diameter	Anti-Drag	Open Cowl	Closed Cowl
1"	.15	.15	.15
1¼"	.20	.20	.20
2"	.25	.25	.25
2½"	.28	.30	.30
3"	.30	.35	.35
3½"	.40	.45	.45
4"	.50	.55	.55

Cowls can be had in ½" graduations up to 6", then in inch up to 10" dia. Packing and Postage, 6c each.

PROPELLERS

CAST METAL

2 BLADED	3 BLADED	2 BLADED	3 BLADED
3¼" 25c	4" 35c	1½" 20c	1½" 25c
4" 30c	4½" 45c	2½" 20c	2½" 25c
4½" 35c	5" 50c	3¼" 20c	4" 30c
5" 35c	5⅝" 60c	4" 25c	4½" 40c
5⅝" 40c	6¼" 70c	4½" 25c	5" 45c
6¼" 40c	7" 80c	5" 30c	6" 60c
7" 55c	8" 90c	5½" 35c	7" 70c
8" 65c	9" 1.00	6" 40c	8" 80c
9" 75c	10" 1.10	6½" 45c	9" 90c
10" 85c	11" 1.25	6¾" 50c	10" 1.00

Props can be had up to 24 in. dia. Postage 6c each.

Aluminum Adjustable Pitch Flying Model PROPELLERS

8" dia. 35c 10" dia. 50c

Special Shaft Hanger and Bearing for above, 20c

3 Bladed Adj. Prop. with Shaft and Bearing

8" dia. 85c 10" dia. 50c

Postage 3c on each

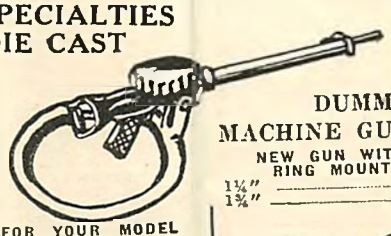
ALUMINUM TUBING .010 Wall

Rod	
1/16 I.D. 7c	1/16 5c
3/32 I.D. 8c	3/32 5c
1/8 I.D. 9c	1/8 5c
3/16 I.D. 10c	3/16 6c

BALSA CARVED PROP

4" dia. 10c ea. 6" dia. 15c
5" dia. 13c ea. 7" dia. 18c

SPECIALTIES DIE CAST



FOR YOUR MODEL AIRPORT

Anti-aircraft Guns 25c
Dummy Flood Light 25c
Postage 3c

BOMBS TORPEDOES

Just What You Need for Your Bombers

13/16" long	5c
1¾" long	10c
3" long	15c

Postage 3c

TAIL WHEEL FORK

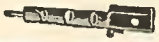
Tail Wheel Fork, with swivel joint. Will take wheel up to ⅝ dia. Complete, 10c Postpaid.

DUMMY MACHINE GUNS

NEW GUN WITH RING MOUNT

1¼" 25c
1¾" 30c

SWIVEL TYPE GUN 15c



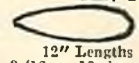
PURSUIT TYPE GUN 5c
Postage 3c each

WING AND TAIL LIGHTS

Just what you want to make your model perfect. 3 lights to a set

For 12" model 15c set
For 15" model 20c set
For 24" model 25c set
Packing and postage 3c set.

STREAMLINE METAL For Struts, Landing Gear, Etc.



Cross Section View

12" Lengths	Balsa
3/16 10c length	3c
1/4 10c length	3c
5/16 15c length	4c
3/8 20c length	5c
7/16 20c length	
1/2 25c length	

Postage 5c length

DEALERS WANTED

Send 10c for Price List and Free Plan

SELLEY MFG. CO. Inc., 1373A GATES AVENUE, Brooklyn, New York

An All-Weather Twin Pusher

(*Continued from page* 23)

out in Figs. 18 and 19. Its construction is the same as that of the main wing. The top surface may be cut away as shown by the dotted lines, if the machine is too heavy for the 50 square inch to the ounce ratio. The balsa used for the upper surface of this wing is 4" wide before being cambered. This will give the airfoil a chord of approximately 3⅞" when curved.

In putting the dihedral in these wings, it will be found necessary to cut the balsa upper surface at the center. A *very* narrow airfoil-shaped section of wood is removed from each side of the center line. The deepest part of this should be at the deepest part of the wing. The width of this sliver of wood will be about ⅛" in the main wing and about the same for the front wing. These joints should be generously coated with cement.

The propellers are carved, one right and one left from blocks shown in Fig. 20. They should be carved before the center is cut away and the tips rounded.

The rubber is divided into two lengths of 28'6" each. Tie a loop in *each* end of these lengths. Double the lengths back and forth until you have nine *strands*, (*strands* not *loops*), each of which should be 3'2" long. Hook the two motors on the machine in the usual manner, over the "S" hooks at the front and through the motor hooks at the rear.

Adjustments

The front wing should be given an elevation of ⅛". The rear wing lies flat on the frame stick. To adjust the model for the proper balance and climb, move the large wing backward or forward as may be required.

I would suggest that free wheeling propellers be used in order to insure good gliding qualities.

Well, model builders, here is a real ship for you to go to work upon. Just the thing for the National Contest. You will be well rewarded if you do your job carefully. Best of luck to you.

FOLLOWING is a list of material that will be needed to build this ship.

Balsa

Two ¼"x¼"x40" motor sticks, routed to the cross section shown, or two ¼"x 1/16" and four 1/16"x3/32".

One sheet veneer 1/32"x4"x13" (or two 1/32"x2"x13"), for upper surface of front wing.

One sheet of veneer 1/32"x4½"x36" (or two 1/32"x2¼"x36") for upper surface of main wing.

One piece 1/32"x⅞"x36" and one 1/32" x¾"x13", under surface of leading edges.

One piece ⅛"x3/32"x36" for fillets.

One piece 1/16"x2"x36", ribs and spars.

Prop Block 12"x1⅝"x1".

Miscellaneous

Aluminum tubing for thrust bearings. (Steel hangars may be used.) Approximately 40" of 1/32" dia. steel wire. Approximately 13" of .042 (42/1000) steel wire. One sheet of Jap tissue. 57' of ⅛" Flat rubber. Banana oil. Cement.

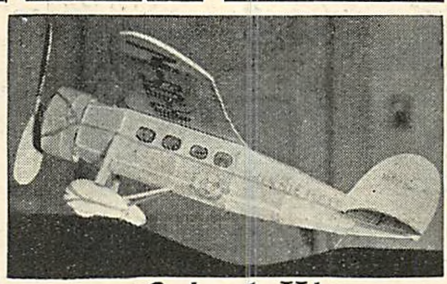
Yes, Again We Offer These Great Values

2-in-1 Kit

Contains the around-the-world "Winnie Mae" and the "Transatlantic Bellanca." Both 15" wing spans. Kit contains full-size plans, bulkheads, large tube of cement and all other materials needed to complete these two wonderful models. Get yours now.

75c

Add 10c for Postage

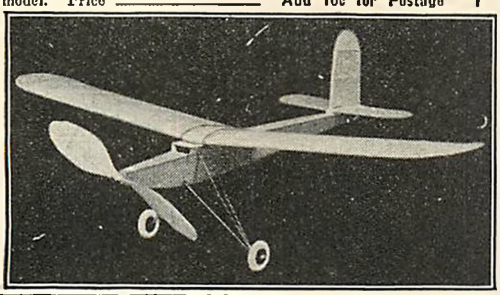


Outdoor Cabin Tractor

One of the snappiest flying models in its class, proper engineering and all balsa construction does it. This plane has a double surfaced, high lift wing, 30-inch span, all-balsa fuselage, extra strong landing gear to withstand the shocks of outdoor flying, and a large, wide-bladed propeller to keep it up for long endurance flights. The Kit contains complete plans and instructions, stamped ribs, large tube cement, 1 oz. bottle clear dope, pair celluloid wheels, and all materials needed to complete the model. Price _____

75c

Add 10c for Postage



Outdoor Twin Pusher

A twin pusher that has actually flown 12 minutes, not once—but several times. This plane has several features which cannot be found elsewhere. It has a 40-inch "A" frame that is a marvel for lightness and strength, a 36-inch high cambered, tapered wing, and two 12-inch, high pitch props, powered by 68 feet of ⅛ flat rubber. The kit contains complete plans ind instructions, stamped ribs, and all other materials needed for the construction of the model. Price

Add 10c for Postage

75c

3-in-1 Kit

Three R.O.G. Stick Models

75c

The Best Values In U. S. A.

NOTE

All Balsa shown here in 18" lengths can also be had in 36" lengths, if requested.

Balsa Wood

This balsa is clear, straight grained stock. It is strong, light, and free from defects. If hard or soft wood is desired, specify when ordering.

18" Lengths

1/16 x 1/16	26 for .05
1/16 x 1/8	24 for .05
1/16 x 1/4	24 for .07
1/8 x 1/8	24 for .05
1/8 x 3/16	24 for .09
1/8 x 1/4	24 for .12
3/16 x 3/16	10 for .06
3/16 x 1/4	10 for .07
1/4 x 1/4	10 for .08
1/4 x 3/8	6 for .08
1/4 x 1/2	6 for .09
3/8 x 3/8	6 for .09
3/8 x 1/2	6 for .10
1/2 x 1/2	4 for .10
1 x 1	2 for .16

40" Lengths

1/8 x 3/8	.03
1/8 x 1/2	.03
3/16 x 3/8	.03
3/16 x 1/2	.04

Sheets—18" Lengths

1/32 x 2	4 for .05
1/16 x 2	4 for .06
1/8 x 2	4 for .09
3/16 x 2	2 for .08
1/4 x 2	2 for .09

Plank Balsa

1 x 3 x 36	.25
1 x 6 x 36	.38
2 x 3 x 36	.42
2 x 6 x 36	.75
2 x 5 x 40	.75

Propeller Blocks

½ x ¾ x 5	8 for .06
½ x ¾ x 6	8 for .07
⅝ x 1 x 7	8 for .09
⅝ x 1 x 8	4 for .06
⅝ x 1⅛ x 8	4 for .08
¾ x 1⅛ x 10	4 for .09
¾ x 1⅛ x 11	2 for .07
⅞ x 1½ x 11	2 for .08
⅞ x 1¾ x 12	2 for .07
⅞ x 1½ x 12	2 for .09
⅞ x 1½ x 14	2 for .16

Dowels

Straight grained, true size birch dowels — highest quality grade.

1/8 x 18" long	7 for .05
3/16 x 36" long	6 for .05
1/4 x 36" long	4 for .05

For a limited time

12" lengths	12 for .05

Bamboo

Genuine, straight grained, no-knot, TONKIN Bamboo. Strong and light. Splits easily. Doz.

1/16 x 1/4 x 15"	.07
1/32 x 1/4 x 8"	.04
1/16 x 1/16 x 9"	.03

Japanese Tissue

A fine tissue for covering flying scale models. Strong, light, and takes dope well.

20 x 24 ..... 3 for .05

Veri-Fine Tissue

One of the lightest tissues known. Excellent for endurance models, because of its extremely light weight.

20 x 15 ..... .04

Colored Tissue

Just the thing for the new bright colored ships that are so popular nowadays. Red, Orange, Brown, Blue.

20 x 24 ..... 2 for .05

Wood Veneer Paper

Very useful in scale and flying-scale models. Strong, yet light enough to fly.

20 x 30 ..... .13

Celluloid Wheels

Experience has proven these wheels best for flying scale models. Pair

¾" wheels	.05
1" wheels	.07
1⅜" wheels	.09
1⅞" wheels	.13

Bushings

for wheels ..... 4 for .02

Music Wire

Strong, springy wire sold in this new, convenient manner.

1 ft. lengths—straight .014, .020, .028, .034

6 feet for .02

Dummy Motors

The very thing for adding that realistic touch to scale and flying scale models. Extremely light. Nine cylinders.

1½" diam.	.16
3" diam.	.28

Rubber Thread

Careful testing has proven this rubber to be the highest in energy content per unit of weight. This means more turns and less breakage.

.045 sq.	50 ft. for .12
3/32 flat	50 ft. for .13
1/8 flat	50 ft. for .13
3/16 flat	50 ft. for .16

ALUMINUM ITEMS

Drag Rings

Used on the real ships for cutting down wind resistance. Makes a beautiful addition to any radial motored model.

1½" diam.	.15
2" diam.	.17
2½" diam.	.22
3" diam.	.25

N.A.C.A. Cowlings

No dummy motor needed when this cowling is used. Has a hole for thrust bearing in the nose.

1½" diam.	.15
2" diam.	.17
2½" diam.	.23
3" diam.	.26

Aluminum Tubing

.010 wall thickness ft.

1/8 O.D.	.05
3/16 O.D.	.09
1/4 O.D.	.11

Aluminum Leaf

Real sheet aluminum, yet almost as light as paper. Makes a beautiful covering job.

.0003 thick

3½" wide ... 5 ft. for .05

Sheet Aluminum

12" wide

.003, 12c ft.; .005, 12c ft.

.010, 16c ft.

Washers

For indoor, outdoor, and flying scale models.

Large size, ¾ O.D. Dozen, 1½c; Per 100, 10c

Small size, ⅛ O.D. Dozen, 1½c; Per 100, 15c

Clear Cement

The fastest drying, lightest and strongest cement on the market. Try some now. You'll be amazed at its marvelous properties.

1 oz. tubes	.06
2 oz. tubes	.08
4 oz. cans	.20
1 pt. cans	.60
1 gal.	4.50

Clear Dope

Just suited for the model user's requirements.

2 oz. cans	.07
4 oz. cans	.13
1 pt. cans	.35
1 gal.	2.50

Acetone

For thinning out liquids.

2 oz. cans	.07
4 oz. cans	.13
1 pt. cans	.35
1 gal.	2.50

Colored Dope

Highest quality pigmented dope. Do not confuse with inferior grades. Leaves a smooth, even color upon drying. Blue, Red, Yellow, Orange, Silver, Black, Olive, Drab

2 oz. cans	.09
4 oz. cans	.17
1 pt. cans	.60

Thrust Bearings

Light, strong bearings. Hole is truly centered.

Large size .035 hole	
Each, .01½; Dozen,	.15
Small size .025 hole	
Each, .01½; Dozen,	.15

Sandpaper, large size sheet ..... .05

Insignia

U.S. Army and Navy type Improves the appearance of models by 100%. Each sheet contains 4 stars in circles for the wings, and red, white and blue stripes for both sides of the rudder.

sheet

1" diam.	.02
1½" diam.	.03
2" diam.	.04
2½" diam.	.05

READ BEFORE ORDERING

In Order for Prompt Delivery Please Comply with Instructions Below.

1. Orders under 25c not accepted — due to our very low prices. 2. Add 15c for packing and postage on orders up to $1.50; on orders for $1.51 and over add 10% for packing and postage charges. 3. Add 10c extra to above charges on Balsa plank orders less than $1.50 west of the Mississippi and Canada. 4. Postage stamps, Canadian or Foreign Coin not accepted as payment. 5. Remit by check, postal or express money order. Make payment to MADISON MODEL AIRPLANES, Inc., 134 Livingston Street, Brooklyn, N. Y. 6. Add 5c for insurance against breakage in transit.

Canadian Charges—

Add 25c for packing and postage on orders up to $1.50. On orders of $1.50 and over add 15% packing and postage. Postage stamps, Canadian or foreign coin not accepted as payment.

Dealers and Clubs Write for Special Price List.

GIVEN FREE

A Beautiful GLIDER KIT

Everything to Complete a Real Model Glider, with a purchase of $1 or more.

MADISON MODEL AIRPLANES, Inc., 134 Livingston St., Brooklyn, N. Y.

Our Kits and Supplies Are Handled by Leading Department Stores—ASK FOR THEM

Fighting Wings

(*Continued from page 7*)

I saw two holes in the center of my triplex windshield! *They had burnt the air at the very spot where my head would have been,* had I not leaned over to fix my gun, explaining why we all believed that nothing could hurt us till a bullet came along with our particular number on it.

The enemy had put his plane where his observer could train his guns on me. With any luck at all he could have chalked up "one American in a Spad."

It was my turn now. Both guns spoke for democracy as I dived under the enemy's tail. Both of us dived and I saw that the observer sat crumpled in his seat. I fired again. The enemy went into a long spiral, then nose-dived to earth far below me. He crashed, hopelessly wrecked. Fire would do the rest.

Deep in enemy territory, I turned toward home, picked up some of the patrol and we hied for home. I requested confirmation of two more of the enemy.

This time I had bullet-holes to prove I had been in a hot party. I presented my perforated windshield to Corporal Odlin, in gratitude for his fine work on my ship, a new one used for the first time that day! The boys decided my escape might be listed under the heading of "close," or narrow, or miraculous.

Not long afterward we had a good example of the necessity for sharp eyes and well-oiled eye muscles. Gibson, lately assigned to our squadron, began getting into tight places, though he did his best. Either he could not see well enough or could not act rapidly enough. We tried to get him to become an instructor. He insisted on sticking, though we were sure he realized his exceptional danger.

One day, while protecting our bombers some twenty miles in enemy territory, we got into a great dog-fight. Fokkers sprang up everywhere. I lost my attacker, turned —and spied Gibson heading straight for Berlin!

I WHEELED and began a vain effort to overhaul him. For thirty miles I urged my roaring motor on. I did my best to squeeze an extra mile or two out of her. Gibson paid no attention. He was getting deeper and deeper into Germany. So was I. Finally I got a little closer—and saw Gibson heading straight into a whole flock of the enemy!

We were up to 13,000 feet or better, toward the ceiling for those planes. I just caught him in time, made some frantic signals, and turned homeward. Gibson followed. I opened my motor wide, and how we traveled out of there!

Nothing could have caught us and we escaped any more combats en route. However, good luck rode with us for we might have run into scores of Germans. We got home okeh and all of us tried our best to convince Gibson that his forte was elsewhere. I felt he was too busy with flying to do any looking or fighting.

But Gibson refused. He stuck with it and of course the inevitable happened. Some days later he went on a bombing and strafing expedition, which was successful. But on the way home our patrol of six "Shooting Stars" was attacked by a horde of Germans.

Three or more of them were bested in the exciting dog-fight. But we too suffered, losing two men. Gibson was one who failed to return. Later his grave was found, marked with his helmet and identification tag. So went a brave lad who would not quit even to save his life.

On October 29th I went out with the patrol, to try and even up things. At 10,000 feet we had a marvelous view of the earth through the mist—but could see no enemy. Suddenly we spotted eight Fokkers, *chasse* planes, a mile below us, waiting to pull some devilment.

Jimmy Beane and I dived together and picked out the same victim. I swung behind his tail and began "follow the leader" through a great series of contortions. My fingers on the triggers, I watched my prey, and kept an eye on "The Baron."

The right moment—and I opened my guns. Almost instantly came a burst of fire. The German fell in a *vrille*. I followed him down nearly to earth, waiting for the crash.

But just before he struck, my motor sputtered, then quit! So did my heart, for a moment, as I realized I was over German territory.

Little *nourrice* carried me along, however, and I just managed to strike a French 'drome, where I filled up with gas. But it was now nearly dark. I took off, however, picked up a winding road, and followed the gray ribbon into the blackness, finally picking up the flares burning on my own field.

THAT was my first night flying at the front. It would be thrilling anywhere. But in a Spad—alone—over the battle-ground and with little to guide me—it was more nearly hair-raising.

That day Beane got a Fokker; Tyndall, in five combats, got at least one. Crissey got another—and his motor choked, which let him down among four Fokkers! Just then his motor got busy. The Fokkers made a ring, and Crissey edged for home, diving and sideslipping to dodge hot lead. He got away and landed on a French 'drome.

The days were full of grim action and our squadron showed its mettle in combat after combat. Tyndall and Vernam brought down a D.F.W. in flames, and Tyndall, in his five combats, fired 575 rounds and took some punishment. Once he nearly rammed an enemy and once Lieut. Little shot a German from Tyndall's tail just after besting his own attacker.

One day, when for some reason I did not fly (luckily, no doubt), our squadron had the time of its young life. Harmon C. Rorison, a newcomer, went with a group which escorted some Breguet bombers, ordered to bomb Beaumont, twenty-five miles behind the lines.

Rory's great ambition was to get five and be called an "ace." He had played in hard luck, on several occasions his guns jamming just as he got into position. He would come back cursing our Armament Officer, who would reply:

"That's nothing. They're the best guns we've received from the U. S. in a long time."

Two hours after the patrol roared off,

one man came limping in, alone. His plane was full of holes. Bullets had ripped away his machine gun, shot away his windshield. He gave us one look, said something about "a slaughter," and walked away, choking. Things looked bad.

Ten minutes later another staggered back, crying like a baby. They'd run into a big formation. He'd seen two of our boys go down and felt sure the rest would never come back. We tried to cheer up, but for two hours more not another plane was heard.

I jumped when the 'phone rang. It was Rory!

"Jack," he yelled, "had a fine time. Not much left of the plane, but I got three of 'em!"

We brought him home in the Cadillac. He was happy as a kid at his success. Jumped by eighteen of the enemy, (they believed it was Richthofen's circus, reorganized, perhaps the cream of the German forces), the fight was hot and heavy.

RORY could have escaped. Instead, he shot down an enemy, was attacked by two more, shot them both down, looked around for his comrades—and could not find them! So he kept on fighting, with odds at least sixteen to one against him.

Suddenly he felt everything going black and fell forward on the stick. He came to, still in the air, but flying away from the sun and home. Miraculously he reached home half an hour later.

He must have flown, while semi-conscious, some sixty miles within enemy lines! So do the gods of war watch over some airmen. His plane was a sieve, not enough left to make good scrap metal. Various parts were shot away. Probably a bullet had ricocheted from his gun and struck him a glancing blow on the forehead, where a mark was to be seen.

But Rory was plumb disgusted. He was still two victories short of being an ace!

All finally came home but two—Jimmy Beane and Vernam. Clint Jones shot an enemy down and streaked it home with bullet holes in everything but Clint.

Our victories over this circus were real victories. But it was hard to lose two of our best men.

I went up November 1st for one of the most amazing battle, flying rear high man as usual, I observed a bi-place L.V.G. My patrol misunderstood my diving signal, so I was left to attack alone.

The son of a Hun led me a merry chase—nearly twenty miles, both of us climbing. He certainly could travel. I did not touch my triggers till within a hundred feet of him. The observer returned my fire. My tracers marked a true trail of smoke to the seats of pilot and observer—but nothing happened!

An eerie feeling crept up my spine. Was this one of those rumored planes covered with bullet-proof armor?

Suddenly the observer's fire ceased. He collapsed. He must have been firing till breath left his body. Half my ammunition was gone and the enemy still flew on a level keel, when a terrific explosion wrecked the ship before my eyes!

The big machine simply burst into fragments. Snapping along but a few ship's lengths behind, the explosion rocked my

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THE NEXT ISSUE OF UNIVERSAL MODEL AIRPLANE NEWS APPEARING ON ALL NEWSSTAND JULY 1st WILL BE DATED AUGUST INSTEAD OF JULY. LOOK FOR THE MAGAZINE ON THE SAME DATE AS USUAL.
We are not skipping an issue but merely dating the magazine a month ahead. The expiration date of all subscriptions will be moved one month ahead in order that subscribers will not lose a month.
REMEMBER . . . . THE AUGUST ISSUE WILL BE OUT JULY 1st!

Fighting Wings

(*Continued from page* 39)

plane, picked it up, whirled it over on one side.

Then I began hurtling downward, sidewise, at terrific speed.

I said goodbye to myself. What had happened I could not fathom. I felt I must have been hit. My controls would not respond. It was all up!

I FELL over 1500 feet in a few seconds. From a side-slip I was slowly going over on my back. I kept working the controls and all at once we jerked a little. The controls began to grip the air.

The machine did a roll-over and then I was flying right-side up! I had driven squarely into the low-density air created by the enemy's explosion, and fallen nearly two thousand feet.

Heading for home and breathing easier, I noted the column of smoke marking the end of my fighting antagonists. I could not get my mind off this battle, with its strange explosion, which blew to pieces two boys of about my own age. Their terrible fate, ending with a plunge of over ten thousand feet, affected me more than the flaming spins of all the others I had sent down, or had seen whirling to earth in sheets of flame and clouds of smoke.

My nerves on edge from my own terrifying fall (fatal if it had been nearer the earth), the whole experience burned itself into my mind. As never before the frightful chaos of war—especially of war in the air—took possession of my being.

I landed, left my Spad in the middle of the field, walked shakily to the Operations Office and made my report. My commission as permanent Flight Commander was there. But for the first time I failed to rise to the occasion. The recognition of my work as deputy did not elate me. My comrades could not help me shake off my depression.

For the first time I wanted to get away—put the war behind me—forget destruction and death—lose myself in Paris! With a three days' leave of absence in my pocket, I headed for Versailles and Fontainebleu, then Paris itself.

The change, the excitement, the finding of new friends and old pals, some unusual experiences in the never-ending "battle of Paris," brought me to myself. The Cafe de Paris was crowded with uniforms, many of them American. And were we popular with the *femmes!*

Everywhere was an air of suppressed excitement, of something impending. But it was hard to run down. Even on the 7th of November, when the maid came running into my hotel and kissed me, saying rapidly and excitedly: "La guerre est fini! La guerre est fii!", none of us was ready to believe the war was really ending.

When I left Paris on the 9th, the city was ablaze with excitement. The first rumors, like so many before, had been officially denied. But the Germans were on the run. The Hindenburg line had been dented, cracked, then broken and blown to bits. Turkey and Bulgaria were already out of it. Bavaria was reported to have become a republic. German socialists were taking over the government.

And best of all, the Kaiser was reported on his way to being "E"!

I HURRIED to the front with the latest and best of news—we all felt that the war was *nearly* over, anyway—only to find my airdrome deserted! So rapid had our troops advanced, often in the lead, that our post was already "Service of the Rear."

I went on to our new home, Souilly, headquarters of the First Army, to which we were attached.

And then, on November 10, came the historic General Order that told us of the end. The Great Push was over. The Armistice—and PEACE!

My big battle of the 1st, in which I had fallen into an "air hole" caused by my antagonistic blowing up, thus was my last combat, and a fittingly thrilling finale it had been.

The great strain over, relieved beyond expression that we were still alive, we celebrated as we never had before. Given a holiday on the 12th, we set out for Nancy.

There lights blazed, where a few days before all streets were dark. Stores and cafes were crowded. France seemed to have gone mad. French, English and French Colonels slapped each other. Americans were cheered and kissed, wined and dined and entertained. Children ran after our carriages. Poilus, girls, youths and painted women joined in numberless snake dances, singing the Madelon or marching songs, while old men and women, many who had survived the horrors of 1870, slowly and happily walked the sidewalks or breasted the milling crowds.

That was a day to live forever in the hearts and memories of those who saw at least, not merely victory over the enemy, but peace to all the war-torn world.

On the 20th, obeying a sudden whim, I climbed into my Spad and made a last flight over the silent battlefield. At 3,000 feet I hopped joyously through the clouds, glancing unconsciously about for non-existent hunters and imaginary enemies.

Beneath me were mere shells of former towns and villages. Havoc was evident. Shell holes joined shell holes. The ground seemed a great pitted crater, where a landing would have been only a crash.

Forests were mere jagged stumps. For the first time I could see what chaos the war had left. And the terrible destruction, so clearly evident from the air, seemed a fearful indictment of our 20th century "civilization."

A fifteen-minute "combat" with one of my comrades, just before I landed, ended for good and all my War in the Air. I came in to the office to end a perfect day—with official confirmation of my last three victories, bringing my total to ten.

This left me leading my own squadron, as Eddie Rickenbacker led his. But the way Eddie was getting them, he would have led *all* the aces in *all* the armies!

I took off my hat to him, as I do today. In about half a year he had brought down more Germans than most of the other Allied fliers had in over four years. Stamped all over him, in letters of red blood and fire, were the words: "Made in America."

God pity the nation which picks a war with the U. S. Army Air Corps of today!

The Aerodynamic Design Of The Model Plane

(*Continued from page* 16)

it is to substitute the numerical values in the formula for the symbols as follows:

(A_s) equals the area of the stabilizer in square inches. (A) equals the area of the wing in square inches. (M) equals the horizontal distance from the center of the wing to the center of the stabilizer. (C) equals the chord of the wing in inches. (N) equals the horizontal distance from the center of the wings to the propeller bearing, (front). (Q) equals the difference in angle between the wing chord and the chord of the stabilizer. (X) equals the vertical distance from the line of thrust to the center section of the wing. (This allows for the correct amount of dihedral also.)

Now, suppose we take an example to make sure you know how to use the formula.

We have designed a model plane, the correct stabilizer area, (A_s) of which we wish to determine. The wing area (A) is 100 square inches. The moment arm (M) is 12 inches. The chord (C) is 4 inches. The distance to the front of the propeller bearing to the center of the wing (N) is 6 inches. The difference in angle between the wing and stabilizer (Q) is 2 degrees, and the center section of the wing is approximately at the line of thrust, so (X) is zero. Then substituting these values in the formula, we have:

$$A_s = \left(\frac{100}{36}\right)\left(6+6\right)\left[1-\left(\frac{2+0-2}{5}\right)\right]$$

Simplifying, $A_s = (33.3)\quad (1) = 33.3$ square inches. The stabilizer should have (33.3) square inches of area.

In the case of biplanes, (C) equals the average chord of the two wings and (A) equals the total area of the two wings, upper and lower. Reduce the value of (A_s) obtained by this formula by 15% for this type of ship. In this case, if the model is a biplane, the stabilizer area should be 85% of (33.3) square inches, or (28.3) square inches. This is equivalent to about 5% of the wing area less than in the case of a monoplane.

IN THE example just given, the center of gravity was taken to be about at the line of thrust. However, though a low center of gravity may be used effectively to help the longitudinal stability of the ship, it is "dynamite" if not used correctly and will cause you plenty of trouble. The secret of success in its application lies in the fact that *the line of thrust must be located above the center of gravity*, when the center of gravity is low, or below the center of lift. Many model planes are failures as *consistent* flyers because the line of thrust lies *below* the center of gravity. The fact that the center of gravity is *low* makes absolutely no difference and does not produce appreciable stability unless it is below the line of thrust as well as below the center of lift. The failure to glide down at a gentle angle, at the end of a flight, is usually due to this fact: that the line of thrust is *below* the center of gravity. Fig. No. 67 shows the correct relative positions of the wing, line of thrust and center of gravity. Such a set up as shown will produce remarkable stability and a "flat" glide. The center of gravity being low, holds up the nose of the plane when gliding.

In order to calculate the stabilizing effect of the center of gravity the position of the line of thrust must be taken into account. It is the inter-relation of these two when the center of gravity is low, that produces the desired stabilizing effect. The C. of G. cannot be depended upon to create this tendency by itself. If the line of thrust is below the C. of G., it will usually neutralize any stabilizing effect produced by the low center of gravity, through its tendency to hold the nose of the model up while it is in a stall.

As you know, the opposite action should take place. When the plane stalls, the nose *must* drop immediately for a recovery to normal flight position. The center of gravity, when low, swings forward when the ship is in a stall and has this stabilizing effect. Thus you can see that the effect of the low thrust and low center of gravity, oppose each other. To have the greatest stabilizing effect, have the *line of thrust high* and the *center of gravity* low. Fig. No. 68 shows the wrong position of these factors.

A good illustration of the wrong set up is the type of duration model which has become a standard for builders who enter duration contests. These machines make remarkable flights, not because of the correct arrangements of factors, but in spite of this fundamentally wrong design.

In these ships, the wing is high, the center of gravity being located between the wing and the line of thrust, Fig. No. 70. Some readers will probably say at this point, "if the ships fly so well, why not build them?" The answer is, because far superior ships can be had if these present planes are changed slightly so that the center of gravity is located before the line of thrust.

MANY of you may have noticed that planes of this duration type can be made to climb up at an angle which is fairly steep but when the plane is adjusted to climb at an angle of a greater degree, the plane stalls, the tail drops and the whole combination of wood, wire and paper (or microfilm) takes a tail slide backward to terra firma.

There is just one cause for this proceeding in these cases: the center of gravity is above the line of thrust. Later, in the next chapter, I'll take great pleasure in showing you the exact mathematical or mechanical reasons for this.

Fig. No. 69 shows a diagram of a duration ship with its various parts arranged so as to embody all the factors of design in their correct relative positions. You will notice that the center of gravity is below the line of thrust. The line of thrust is *not* the motor stick. A plane of this type will outclimb any duration tractor built today, with equivalent power and will not stall within even extreme climbing angles.

In order to allow for the stabilizing action of a low center of gravity and the line of thrust in various positions relative to it, when calculating the correct stabilizer area, the formula for determining (A_s) should be multiplied by,

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"Whats" and "What Nots" Of Model Plane Building

(*Continued from page* 30)

model which flew at all well without it. Dihedral is the automatic pilot of our models and to try to get along without it, is hopeless, as the slightest air current will spoil a model's flight. Not only that but the prop torgue will ruin the flight anyway. Of course, by using a high wing on a monoplane and having the center of gravity very low, a fair amount of stability can be obtained but it is best to add a little dihedral anyway and have real stability.

A GREAT many beginners know little, or at least care little, about the science of launching a model correctly. They wind it up, heave it skyward and hope for a good flight. The principle and most important point in launching any model, be it glider or power type, is to let it go from your hand at its exact gliding or flying speed. This is a matter of practice, but at least an approximate speed should be determined. The direction of the wind and its velocity also must be considered. Thus, when flying down wind or with the wind, the model must be launched at its flying speed plus the wind velocity. Against the wind, the wind velocity is subtracted.

R.O.G. or R.O.W. flights may be started either with or against the wind, but, just as in large ship flying, a downwind take-off is usually bad business. Unless the model gets going very quickly and travels much faster than the wind, the latter will force the tail around and you will have a first-class ground loop. Even if the model makes a successful take-off, a great deal more power is used up tha nwould be, had the take-off been up wind.

The next factor to consider in launching the model is the attitude with which it is started off. By this is meant the position of it in the air, with nose up or down and whether the wings are level. A well adjusted model will make its best flights when launched just about level or perhaps in a gentle climb. Too steep a take-off will surely cause a stall, with a very erratic flight or a possible crash following. If launched downward, the ship is quite apt to fly into the ground, which is exceedingly disastrous. If it doesn't hit the ground, it will make a long swooping flight which usually ends in a stall Launching with the wings not level will cause a circular flight, at least until the dihedral has a chance to take hold. Hence, you can see how important a correct technique for launching is.

The best place to grasp the model is as nearly below the center of gravity as possible. In a biplane, this is often difficult, so that it is sometimes necessary to grasp the under carriage or wings. The propeller should be released a moment before the model is let go so that it can come up to speed and carry the model along properly. Only a very few turns are necessary for this, however, and the all too scant rubber power should not be wasted. When the motor is fully wound, it takes only a few turns to swing a light prop to full speed.

Several of the above precautions can be disregarded if you wish to get special results. For example, you can purposely make curved flights by launching the model in a banked position. Or, if you have a powerful fast climbing model, you can get a remarkable flight by launching into the wind and at a rather steep climb, when the model will go up like an elevator. Loops may be made quite easily, but usually require more rubber than normal flights and it is usually necessary to have the model rigged somewhat tail heavy. It is launched level with a rather hard push.

Plain take-offs are the best to practice on first and will be easy if you remember to launch the model level and at its own flying speed.

Flying Boats vs. The Atlantic

(*Continued from page* 5)

question of seaworthiness.

Seaworthiness in Case of Forced Landing

IT MAY be taken for granted that the flying qualities of large seaplanes are now thoroughly well understood. Ships are built which are very stable and steady in the air. At the same time with carefully balanced control surfaces, these huge boats are maneuverable, and pilots can fly them almost as readily as they do small land planes. Besides flying qualities, these boats have to have "seaworthiness," in case of forced landing. Seaworthiness is one of the reasons why we must go to very large flying boats. Just as an ocean liner behaves much better on the water than a small row-boat, by mere virtue of its size, so the flying boat hull must be huge if it is to have any chance of coping with the rough waters of the North Atlantic.

But mere size will not give seaworthiness; the flotation system should be designed with the greatest possible care. The hull must have an enormous excess buoyancy, or in other words, when the craft is afloat, it should be able to support at least twice the weight of the whole ship. The nose of the hull should contain a collision compartment, separated from the rest of the hull by a watertight compartment. Several other watertight bulkheads should divide the hull into separate compartments. All doors and windows in the cabin have to be made watertight and the hull must be able to float with even two adjacent watertight compartments damaged.

No matter how carefully the flotation system is designed wing construction of metal is desirable, so that the wing may also provide some measure of buoyancy. The hull has to be long, with plenty of flotation capacity spread out along its main line; in this way pitching up and down in the water is resisted. As the same time the hull must have what is termed "lateral stability," and floats placed far from the center of the machine must prevent the wing tips from dipping in and out of the sea.

Further, many authorities have suggested that it would be the best plan, were a flying boat helpless in the Atlantic, to be able to jettison the wings. The hull alone, if provided with an auxiliary engine, auxiliary water propeller and an auxiliary water

rudder might, once clear of its wings, make way slowly. On a Rohrbach flying boat in Germany, an auxiliary sail system with a telescopic jury mast was successfully tried out. Even with all fuel gone the ship would still be able to keep going, propelled by the old-fashioned sail.

While wireless equipment does not come strictly under the heading of seaworthiness, it forms an indispensible aid, both aloft and afloat. Airplane practice is to drive the wireless generator by a windmill or from the motor, and such practice is entirely satisfactory for land flying. In Atlantic service it would seem indispensible to provide an auxiliary engine for driving the generator, which might perhaps be a gas starter for the main engines. It would also be necessary to carry a small pole for the wireless, to replace the suspended antenna of flight. Rafts, lifeboats, navigation equipment, smoke producing equipment and the like have to be as carefully specified as is similar equipment on an ocean liner.

Europe Temporarily Ahead

FOR a time it appeared as though European designers, English, French and German, were ahead of America in flying boat design. The English are a maritime race and it was only natural that they should advance rapidly in the art of building large seagoing flying boats. The Germans had in Dornier and Rohrbach, men of great genius in construction and design. The French also built boats, far larger than any attempted in our own country. It is not amiss to glance at the photographs of the outstanding flying boats of European countries.

The first European boat we shall describe is the British "Short Reconnaissance," which is at present the world's second largest flying boat. The British are progressive in some respects and very conservative in others. Our readers will note that instead of going to the monoplane, for which greater efficiency may be claimed, the Short Reconnaissance is a biplane, (true with few struts and wires). It is powered with six Rolls Royce Buzzard engines of 825 h.p. each. If there is one point in which American practice lags a little, it is in large water-cooled engines, and the British at this time have larger and more reliable water-cooled engines.

The Short Reconnaissance carries a crew of ten, consisting of two pilots, navigators, bombers and gunners. The gunner, our readers may note, is carried at the extreme tail of the boat where he can protect the seaplane from attacks from the rear. The tail surfaces in British, as well as in American practice, are carried high out of the water, an essential protection against rough seas. In contradistinction to American practice, the British prefer to use but a single rudder. Tip floats for lateral stability are provided just as in the Sikorsky and Glenn L. Martin designs to be described later. It is interesting to note that in addition to other equipment, the Short flying boat carries collapsible dinghies and mooring equipment. The British are well aware of the necessity for providing every possible auxiliary when the boat is afloat without engine power.

The next design that we will draw attention to is the Richard Penhoet flying

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Foreign Activities

(*Continued from page* 28)

pioneer body for the sport in this country, having with the help of the Australian Broadcasting Commission, introduced model flying on an organized basis almost four years ago. As you will see from the letter head, we are affiliated with the Aero Club of N.S. Wales which makes us the official governing body in this state. The Hurstville "Falcons" have at present twenty-three active members, most of whom are very consistent fliers. We have concentrated on outdoor fuselage duration models with the result that this type of flying is at present only a matter of visibility. We have recently concluded a series of experiments to determine what coloured models would remain clear to the sight of the judges the longest possible time. It was found that black was by far the best colour for the purpose. The following is a list of records (Assn. and our clubs):

Type		H. "Falcons" Min.	Sec.	M.A. Assn. Min.	Sec.
Fuselage	H.L.	11	56	17	7½
	R.O.G.	7	20	4	58-2/5
	R.O.W.	1	24	1	12
Stick	H.L.	8	10	13	1-3/5
	R.O.G.	1	20	4	
	R.O.W.	1	23-3/5	4	37

Of course we have had flights around 20 and 30 minutes but, unless we give seven days notice for attempts on records, they cannot be recognized. As a matter of fact, a few weeks ago, an association member launched his model at 11:00 A.M., and is disappeared 7 minutes later into a cloud. At 4:15 P.M., the model came gliding down to a landing only a short distance from where it was launched, thus the total flying time was 5½ hours.

THIS last interesting incident of which Mr. Hopkins tells us, is certainly unusual. In fact, two or three of my friends thought I was joking when I told them about it. However, I finally managed to convince them of its authenticity.

In the middle of page 30 is shown a fuselage duration hydro built by Albert E. Hopkins. This model has made six flights, the average duration of each being 5 minutes 36 seconds. We would say that this is some ship.

In the lower right hand corner is a cabin fuselage model in flight. It has a 40 inch wing span and was made by Mr. Cross of the Hurstville "Falcons". This ship shown in the picture is in actual flight and is a very commendable piece of photography. Mr. Hopkins says that it is a very consistent flyer and noted for its steep angle of climb. I can quite understand why it is able to climb steeply with its exceedingly large stabilizer with which it is equipped. This would keep it from stalling when sufficient power is applied to the propeller. Mr. Hopkins requests that we send him a list of the world's records. At the present time, we are compiling this list and hope to be able to give him complete information upon this shortly.

At the present time model airplane building is so extensive throughout the United States and so unorganized that it is very difficult to determine what records are authentic and what records are not.

Until next month, happy landings.

Flying Boats vs. The Atlantic

(*Continued from page* 43)

boat, used on French air lines between South France and Northern Africa, with a span of 131 feet and a weight of over 19 tons. This five engined craft is perhaps the third largest flying boat to be built today.

FINALLY we come to the Dornier, which has been so frequently described in the press that it barely needs further description. Our photographs show the DO-X powered alternatively with ten Jupiter air-cooled engines and with ten Curtiss Conqueror engines, the latter having been finally adopted. The huge size of the craft is well illustrated by the appearance of the men at work on the boat.

The DO-X, undoubtedly the world's largest flying aircraft proved an inspiration to designers all over the world. It was perhaps too ambitious a project, but it paved the way for the construction of other giant seaplanes. Nothing gives as good an idea of the complexity of a large flying boat as the artist's cross-sectional drawing of this huge craft. While the DO-X was a splendid example of engineering design, the number of externally exposed engines increased head resistance considerably and the weight of the huge semi-cantilever wings detracted appreciably from the pay load capacity of the machine. Nevertheless the DO-X will always remain famous in aircraft history.

Next month part two of this interesting story will tell you how the new Sikorsky and Martin flying boats plan to solve the problem of ocean transportation by air plane.

Maneuver Contest

(*Continued from page* 31)

diving at lightning speed towards mother earth, the natural tendency is to glance expectantly at the frail-looking wings that stretch out from you on both sides.

When you first experience the power dive you will probably be cruising along at a high altitude with the motor lustily singing its song as the earth drifts slowly below. Your pilot will probably yell "power dive" and then down goes the nose, while your inertia tries to hurl your body against the ceiling of the cabin but doesn't succeed because your safety belt holds you to your seat.

Next, you are conscious of the following things all at once: you are falling, your stomach tells you so; you are scared and can't breath without an awful effort; the motor is running twice as fast as usual and the plane is pointing straight at a big, colored wall which has houses and trees and fields on it, and the rapidity with which these objects grow in size proves your 250 m.p.h. speed toward them. You think to yourself, "this dive is probably going to be my last." Just about the time you reach this conclusion, the pilot begins to flatten the ship out of the dive and during the process you sink into your seat with such force that you could not sit more heavily if you weighed 500 pounds. About three seconds of this and the dive is over and the plane is skimming along in level flight but still going very, very fast.

Now, in the excitement of the power dive, there were many things which missed your attention, so with the aid of the diagram I will tell you what happened.

Fig. 1 shows the plane as it starts the dive. Note the control diagram which shows that the engine is at full throttle and the control stick forward, lowering the elevators to nose the plane down.

Fig. 2 shows the plane power diving earthward, the controls being all neutral now with the exception of the control stick, which is just a fraction of an inch forward to hold the plane to its dive.

By this time, the engine is running at about twice its normal speed and the propeller has become a resonant instrument, due to its high speed, so that it produces a strange noise—wha-a-a-n-n-n-an-ing-in-in-ing. At this stage, the propeller makes more noise than the engine.

FIG. 3 shows recovery from the power dive. The throttle is retarded and in some airplanes it may be necessary to pull back a trifle on the control stick to bring the ship out of its dive. A normal plane though will come out of a power dive just by holding the control stick neutral. The most important thing to observe is to come out of the dive very gradually, for a sharp, quick "pull out" will be likely to snap off the wings.

At the Fig. 1 stage of the dive, there is a bad *downward*, or anti-lift strain on the wings. This is because the dead weight of the ship wants to continue on its original flight path, while the air firmly presses the tops of the wings, due to the angle given them by the new elevator setting. This used to break the wings off old-time pursuit planes which had weak landing wires (the wires which keep the wings from sagging downward when the plane is on the ground). However, this condition has been remedied.

"See you next month."

Who Developed The Airplane?

(*Continued from page* 17)

tracks for about 1,000 feet, developed such a lift that it crashed through the guard rails and rose to a higher altitude. The power was cut off and the machine crashed back to earth with disastrous consequences to the plane. It is greatly to be regretted that Sir Hiram could not continue his work, but he had expended a vast sum of money in this work and as no official encouragement was forthcoming, he found himself unable to continue his costly work. Also, as an inventor, his time was required along other lines.

THE science of aeronautics was enriched by the first practical work of one of its greatest and most successful students, Otto Lilienthal. He designed and constructed over 100 gliders of all types. The main feature of them all was their simplicity, for Lilienthal did not encumber himself with elaborate devices of control. He spent years in this work until he was killed in a fall in one of them. Lilienthal's work was priceless to the men following him who were interested in the problem of human flight. In fact practical aviation owes him a great deal.

A great friend of Lilienthal and the first Englishman to undertake experiments with man-carrying gliders, was Percy Sinclair Pilcher, who began his experiments in 1895. Pilcher built several gliders of the Lilienthal type and then gradually worked away until his design was quite original. To Pilcher we owe the idea of the wheeled under-curraige. He constructed one on his last glider and found it very successfully indeed.

The period of 1887-1895 is marked down in aviation's history with red letters. In this period the work of the men described in this article made a very sound basis for the science of aerodynamics to progress on. Next month we will tell of other pioneers.

The Aerodynamic Design Of The Model Plane

(*Continued from page 41*)

$$1-\frac{(G+2T)}{4C}$$

Here (G) equals the distance from the center section of the wing to the center of gravity, see Fig. No. 71. (C) equals the length of the wing chord. (T) equals the distance from the center of gravity to the line of thrust. If the line of thrust is *below* the C. of G., then (T) is a minus quantity and plus if above the C. of G.

For example, if (G) equals two inches, (C) equals 4 inches and the distance from the center of gravity down to the line of thrust, (line of thrust below C. of G.) is 2 inches, then T = —2 and

$$\left(1-\frac{(2-4)}{16}\right)=\left(1-\frac{G+2T}{4C}\right)$$

$$=\left(1-\frac{-2}{16}\right)=(1\tfrac{1}{8}).$$

The complete formula in final form by means of which you can calculate *required stabilizer area* correctly, is given below at the end of this article.

$$A_s=\frac{A}{3M}\left(\frac{3C}{2}+N\right)$$

$$\text{times}\left[1-\left(\frac{Q+\frac{2X}{M}-2}{5}\right)\right]$$

$$\text{times}\left(1-\frac{(G+2T)}{4C}\right)$$

A_s=Required Stabilizer Area in square inches.
A=Wing area in square inches.
M=Stabilizer moment arm.
C=Chord length of wing.
N=Distance from center of wing to fuselage nose.
Q=Difference in angle of stabilizer and wing.
X=Distance from line of thrust to wing center section.
T=Distance from center of gravity to line of thrust.

This formula applies to single propeller tractor monoplanes only. If you wish to find the required stabilizer of a twin tractor monoplane, first find the area required for a single tractor with the same values for the quantities represented by the letters in the formula, and then multiply the value of (A_s) obtained, by (6/5). ie:—

Twin Tractor A_s=Single Tractor $A_s \times 6/5$. For a biplane, the (A_s) may be (9/10) of the (A_s) given by the formula for a monoplane of any particular type, ie:—

Biplane (A_s) = Monoplane (A_s) × (0.9)

This is probably a large enough "dose" for you model builders for one month, so we will leave a few facts about cambered stabilizers and a complete summary of this last chapter for your pleasure next month. Until then, keep that youthful spring in your landing gear by getting out in the Spring air and chasing a few models with correctly designed stabilizers.

Air Ways—Here and There

(*Continued from page 32*)

CORRESPONDENTS

The following young men would like to have model builders write to them. They are interested in anything from wrist-pins to tail-skids.

Mr. Edward M. Brann, 21 Buffum Street, Salem, Mass., is very much interested in flying and detail scale models. The Thaw Racer about which he inquires, appears in this issue.

Ancil Z. Arseneau of Beaverville, Illinois, Box 154, would also like to correspond with other model builders.

Roy Gray of 35 Park Road, Fivedock, Sydney, N.S.W., Australia, provides a good opportunity for some readers to communicate with a pal in Australia.

Now we have a surprise for you. Here is a young lady, Miss Dorothy Doylend of Warrane, 16 Winburn Avenue, S. Kensington, Sydney, Australia, who is a member of the Model Flying Club of Australia, and who would like to have other girl model enthusiasts write to her. Miss Doylend at the present time is studying for a ground engineer's degree. She says that she promises to answer all letters. If any young men, in the interest of science, would care to write to Miss Doylend, I do not think she would object.

Kenneth H. Burtness of Oregon, Wisconsin, who is a designer and builder of model planes, wishes model enthusiasts from all other countries to write to him.

NOTICES

THE Chief of the Air Corps, Washington D. C., wishes us to announce the following: "The Air Corps cannot distribute blue prints, working drawings or other plans on its airplanes to the general public, and refers inquiries for such material to the various commercial concerns which make and supply them to prospective model builders."

R. H. Macy & Company will hold Macy Field Day in Central Park, New York City, on June 17, 1933. One of the features will be a model airplane meet. There will be also motor-boat and sailboat races, track and field events. The contestants may be 18 years or younger. For complete information, write to Mr. Franklin Lamb, R. H. Macy & Company, New York City.

Building A Flying Stinson "R."

(*Continued from page* 12)

THE correct size and shape of the tail wheel pant and its attachment to the rear bottom fairing block is shown on drawing 2. Do not install the wheel itself until you have completed the assembly. Cement a round balsa plug on the wheel pant as shown and bend a square hook in one end of a four inch piece of number 8 music wire. The plug should fit a hole in the pant so that its end can be seen from the inside. Run the wire piece through the plug from the inside, sinking and cementing the hooked end in place on the core of the wheel pant. Saw a slot in the fairing block and bend the wire to the desired shape so that the shock absorbing loop projects well above the block. Then make your T bend in the wire and cement in place on the block, cutting away surplus wire. Install the wheel and cement the fairing block on the fuselage.

The fin and rudder layout appears in drawing 2. These should be made in one piece, using two strips of one-sixteenth by one-eighth inch balsa cemented together at the top for the rudder post. The front outline piece should be cut from one-eighth inch sheet balsa and the two rear pieces of slightly thinner material. Install the various cross members as shown and sand the edges to shape only after they have dried thoroughly, giving the front edge a half-round shape and the rear part the regular trailing edge taper. The front top should gradually taper from the half-round to the flat tapered section. A small triangular block reinforces the joint in the trailing edge, and another provides a place to mount the control horns at the bottom.

It will be readily seen how the rudder is cut away from the fin after completion and the method of hinging these together is shown in the angular views. After cementing wire pins on the fine post as shown, make a hole for the top pin in the rudder post. Bend a tiny loop in one end of a short piece of fine music wire and curve the wire to conform to the shape of the rudder at the bottom, bending an L shaped hook at the other end. With fin and rudder fitted together, place your small loop over the bottom pin and cement the wire to the edge of the rudder, forcing the hook into the balsa and cementing only at the extreme end. Then cut the bottom pin away flush with the wire loop, and you have a detachable rudder that solves the mounting problem and will turn through about forty degrees if the edges are slightly beveled. Notice the notch cut in the top rear fairing block to receive fin, drawing 4. It is purposely offset as shown, thus giving your fin a slight left hand pull that assists the wing dihedral in resisting propeller torque.

ONE-HALF of the stabilizer layout is given in plate 4. A convenient cross section shows the employment of bows instead of ribs. The short front spar shown is of round bamboo and slides freely in holes drilled in the leading edge and inside outline pieces, passing through the lift block of the control referred to previously. It is wise to inlay a short piece of bamboo in the rear or main stabilizer spar at the center and cut the balsa away at this point, as the stabilizer is required to tilt back and forth in the small notch shown in drawing 2. No hinge is necessary as the fin and rudder hold it in place when the model is assembled.

A layout for the right wing is given in drawings 5 and 6, which of course can be reversed for the other. Spars should be of a size to fit the holes shown in the wing rib pattern. Use the two remaining heavy ribs for the inside ends next the center section. Nose ribs are omitted to lend clarity to the layout and may be installed after the rest of the wing is completed. A front view shows the method of providing a solid anchor for the wing struts, the pieces M and N being shown in full size and made of any small gauge of music wire. After covering the bottom surface of each wing, cement the pieces N to each wing spar at the point shown so that the small loop extends through the cover. The hooks M go through these eyelets and into the ends of the struts, with the longer end cemented to the front of each strut. The struts are secured on the landing gear with short wire hooks running through the shoulders of the wing stub. These spars are made of balsa strips one-eighth by three-eighths inches and sanded to a suitable streamline section. Their length is determined by the amount of dihedral you give the model and also by the amount of shaping done on the wing stub.

Wing tips should be at least an inch higher than the center section. Lace the wing with number 20 cotton thread as shown, so that it will resist various longitudinal shocks that might otherwise crack the wing covering. It will be seen that the spars do not touch the cover at any point, thus insuring a true airfoil section throughout the entire length of the wing and increasing its efficiency as such. An end view of the right wing is shown in drawing six. The small holes fit bamboo strips that extend entirely through the center section at these points, and the four hooks K which are shown in full size are employed as shown to secure the wings, one end being cemented to the spars.

A MODEL behaves differently according to the altitude of the place where it is flown and in most cases a different propeller is required in the high altitudes where a greater flying speed is essential. You are advised to stick to accepted formulas combined with your own experience in this matter, although a very good prop of the helix type is shown in drawing 6. Draw a center line on your prop block and locate the pattern on same with a small pin at the center, marking a point on the pattern at the tip just over the line. Trace the blade on the block and rotate the pattern to the other end, being very sure to get the same tip point on the center line. Center drill the block and saw out the blank, using the side view pattern after the planform of the prop has been cut. Employ the conventional carving methods to the blank thus formed, giving your prop a slight camber on the front blade surface and flattening the back.

Three loops of one-eighth inch flat rubber on a fifteen inch motor stick will give nice results. Method of mounting the motor stick to the nose block on a piece of hardwood dowell is also shown in drawing 6. The rear mounting should be placed between the uprights Q, drawing 2, and should be made of one-sixteenth inch balsa with a hole cut in same for the end of the stick.

The covering and assembling of this model is a little involved and should be done in the following manner. First cover the triangular rounded corners of the fuselage next the nose block with thin sheet balsa. Then cover the sides with black tissue and apply the red Stinson striping to fuselage, nose block and cowel as well as wheel pants. Paint all exposed wood parts with black dope or lacquer, well thinned. At this point it is wise to install the motor stick and hook up the automatic control, after which you may cover the top and bottom of the fuselage using plenty of separate sections of tissue to insure a smooth job at the shoulders.

Cement the landing gear in place and fit a suitable curved leading edge block to same, painting with lacquer. The exact shape of this piece can only be determined after the landing gear is in place. It is largely a cut-and-try process, unless the builder cares to go into a lot of involved descriptive geometry. The wing cover is of the triangular black and red design, with the red section tapering backward from the wing tips. Determine the angle of this line so that it runs just beyond the end rib of the wing, and cut two rectangles of black tissue and two of red. Then take one of each and lay them on a flat surface, cutting both together with a sharp razor blade.

In joining these pieces, overlap about an eighth of an inch and make the seam with banana oil, using a small soft brush. By placing the dark paper underneath you can see what you are doing at all times, and a weighted straight edge of some sort will be found very helpful in holding the paper. Work on a flat surface with a piece of waxed paper under the seam. The black paper should be outside the seam for a neat-looking job. This involves making two right and two left hand wing covers. In covering the wing, cover the bottom of each one first and secure the wire strut anchors afterward. Then cover the top, using separate pieces of tissue for the tips in each case. The covering should be cemented to leading and trailing edge and each rib, top and bottom, for their entire length. Unless this procedure is followed the ribs, which are very light, may tend to collapse or buckle when the cover is drawn tight with a water spray. Thin cement or heavy banana oil is equally good for this job of applying the wing covers, and a little cement should be spread around the entire edge of the wing afterward to lend strength and smoothness to the job.

WINDSHIELD and windows are next installed, being made of clear sheet celluloid. Using the pattern in drawing 1, make two outline masks of black tissue. Secure them on the celluloid and cut out around the outer edge, which will fit the window frames. The finished wings, with the hooks K installed, are next attached to the center section. Force the wire pieces through knife cuts in the center section and press the hooked ends into the cross members of the fuselage, cementing well. Hook up the wing struts and cement in place, set the covered stabilizer in place and run the bamboo front spar through the lift block of the control. It is understood that the stabilizer is first to be covered with red tissue and a black stripe painted around its edge.

Cover the fin and rudder with black tissue, painting a red stripe around the edge of this piece. Cement the top rear fairing block in place after making sure that the control is right, and secure the fin in its place in the same way. Put a small pair of horns on the rudder near the bottom, and run a thread through the fuselage just ahead of the last pair of uprights, glueing the ends to the rudder horns. The rudder can then be set in any desired position. The stabilizer is braced with a single thread running through its sides at the rear spar and just outside the middle bows on each half, over the middle cross member of the fin and attached at the bottom of the tail post. This holds the stabilizer in line without interfering with its action.

Directions for the installation and adjustment of the automatic control need not be repeated here. (See February 1933 issue.) This model is correctly proportioned so that it will fly without this feature in case the builder does not desire to install it, but he will have to make his model decidedly nose-heavy and attach the stabilizer at a negative angle, best determined by trial flights. In any event this will be a worthwhile model and one that will keep its builder busy for several days. The fineness of any model depends entirely upon the amount of time and energy its builder is willing to expend in its making, and satisfactory short-cuts are few and far between.

The Barrel Sprouts Wings

(*Continued from page* 19)

looks as though there would be little torque, the right wing is longer than the left to counteract this force. The spars are 1/16"x 1/8" balsa. Note that the ribs are not all evenly spaced and since the dimensions would confuse one on such a small drawing, you may triple the measurements of the drawing to obtain the actual dimensions. The leading edge is shaped from a strip of 1/8" sq. balsa and the trailing edge of 1/16"x1/8" stock. Make the tips of 1/32" sq. bamboo. Cover the wings with superfine and dope. Scrape the paper from the formers B, C and D at the wing position and cement the wing in place. The "bracing wires" may be made of thread, although I have great success with 1/64"x 1/32" bamboo. If your bamboo is not too dry you will meet with equal success with these fine strips.

Flying

By removing the nosepiece from the motor block, one may dig out balsa or add little weights to the nose to balance the model properly. Because of the low ground angle your model will not take off too abruptly and stall. I am sure your efforts will be well rewarded.

Aviation Advisory Board

(*Continued from page* 21)

in some cases which has resulted in no advancement on the part of these persons. The amount of experience which you gain and the ability which you show is dependent upon the amount of thought given to the problems.

Question: Does negative stagger in the wings of a plane, improve the stability in any way? How?

Answer: Yes, negative stagger does improve the stability of a plane. A plane with negative stagger will not stall as quickly or as easily as a ship without negative stagger. The normal ship stalls at an angle of attack of about 15 degrees. If a negative stagger is incorporated in the design, the stalling point will not be reached until the angle of attack has assumed a value of 20 to 25 degrees, possibly more. This is dependent upon the amount of negative stagger. The reason for this is that the upper wing, being placed rearward from the lower wing, deflects the air flow over the top of the lower wing at high angles of attack in such a way as to reduce the burbling (boiling) of the air over the upper surface. A wing will not stall until this burbling condition becomes excessive.

QUESTION: Is a tapered wing capable of gaining more altitude than one with ordinary wings? Why?

Answer: Provided that the weight of the machine is the same in both cases, a machine with tapered wings should gain more altitude than a plane wits straight wings. This is due to the fact that a tapered wing gives more lift than a straight wing for the amount of resistance that it creates. The reason for this is that a large quantity of air is spilled out of the end of a straight wing while in the case of a tapered wing, the end is very narrow. The air passes straight across the wing without spilling out of the end. This gives a greater amount of lift.

Question: Is it posible to give the wings of a model too much dihedral?

Answer: Yes. A dihedral greater than 12 or 15 degrees is very inefficient, reducing the lift of the wing without securing additional stabiltiy. In fact, in windy weather machines with excessively large dihedral have a tendency to rock and act in a very erratic fashion, especially when making turns.

Mike Mayberry of Whitter, California, Route 2, Box. 324, wishes me to answer the following questions. Here they are.

Questions Do you think that a model constructed of music wire and liquid solder or cement, covered with silk or tissue and powered with rubber, would be successful?

Answer: The answer to this question depends entirely upon what you mean by "successful." As a contest model it would be a washout. As a model for short flights with great resisting qualities as far as breakage is concerned, it would be extremely successful, provided the model was designed correctly from an aerodynamic standpoint.

Question: When designing a model or large plane, how does a designer know hat shape to make the wings, fuselage and tail surfaces? For instance, why did Anthony Fokker put a round rudder on his triplane instead of the kind used on a Boeing?

Answer: The only way that a designer can know what shape and proportion to give to an airplane and its parts is by a long and careful study of the forces involved in flight. This includes such studies as physics, chemistry, fluid motion, mechanics, algebra, geometry and calculus. All these subjects may be applied by the intelligent designer to models as well as large planes. Thus we see that model building is no child's play but a real science which prepares young men for successful careers in aviation.

Anthony Fokker used a round rudder on his triplane probably because of structural reasons. A round rudder in the case of the type of structure he was using was stronger and more effective. Also, you will notice that no fin is used on the Fokker. The rudder comprises the total vertical tail surface. Because of this fact, larger stresses are involved upon the rudder and the rudder post. Also in the case in question, it was more convenient to make the rudder this shape. Aairplane design must necessarily always be a compromise between necessity and cost, the latter including convenience.

The National Model Airplane Championships

(*Continued from page* 20)

ready well known names at the top too. When the country's best gather at a national meet, new records are sure to be made.

After the indoor flying has been completed, you will go back to your headquarters and prepare for the banquet. Every contestant is invited. It will be attended by the leaders in commercial and military aviation. At the banquet you will hear the announcements of the winners and see the 78 prizes awarded, 42 of which are cups or trophies. You will see the new TEXACO trophy awarded to the owner and flyer of the gasoline motored model which makes the longest duration flight. You will see the new Rear Admiral William A. Moffett Memorial Trophy awarded. You will hear the announcement of the winner of a two weeks' camping award given by Charles H. Grant at West Wind Lodge near Peru, Vermont. You will learn who is the winner of the UNIVERSAL MODEL AIRPLANE NEWS Trophy in the Exhibition Scale Model Contest. You will see and hear countless other items of intense interest. This banquet will prove to be a thrilling climax to a wonderful three days in New York.

Space does not permit us to tell you all that there is in store for you at the 1933 Model Airplane Championship meet. The only way to find out is to write to Charles H. Grant, Contest Director, 125 West 45th Street, New York City, for entry blanks and additional information. Send a large stamped envelope; there is too much to send you in a small one. The contest rules are in the May issue of UNIVERSAL MODEL AIRPLANE NEWS. Study them, build your models, and come to New York. There will be surprises that will not be announced until you are on the scene.

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The Wonder of the World

Japanese Rose Bushes **bloom all the year round.** Just think of it. Six weeks after planting the seed, the plants will be in **full bloom.** It may not seem possible, but we positively **guarantee it to be so.** They will **bloom every ten weeks,** Summer or Winter, and when three years old the bush will be a **mass of roses,** bearing from five hundred to a thousand roses on each bush. The flowers are in three shades—white, pink, and crimson. The plants will do well both in and out doors. **Price 10c, packet, 3 pkts. for 25c postpd.**

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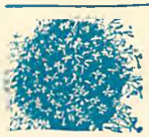
Fills the Atmosphere with Fragrant Aroma

One of the most rapid growing vines known. Under favorable conditions this vine has been known to grow OVER 25 FEET IN A SINGLE WEEK. In a very short space of time indeed the Vine has climbed to a great height, and is covered with IMMENSE FLOWERS, from 5 to 7 inches in diameter. It is, indeed, a great novelty, for, unlike other plants, the flowers OPEN IN THE EVENING, and remain open until about noon the following day. In dull weather they will remain open all day. It is a most INTERESTING SIGHT to watch the opening and closing of the flowers as the clouds appear and disperse. As the flowers open they give forth the most DELIGHTFUL AROMA and the whole atmosphere around is full of scented fragrance. It is always the object of favorable comment, and much curiosity is aroused by people passing at night time as to the cause of the charming aroma, frequently stopping in an endeavor to satisfy their curiosity. **PRICE, 19 CTS. packet, two packets for 35 CENTS. POSTPAID.**



Perfume Plant

Blooms only at night, giving forth the most delightful scented fragrance for quite a distance. Causes much comment. For house or garden. Also valuable because of rare perfume made from it. **Seeds, 10c pkt., 3 for 25c**

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BOYS! A private Electric Telegraph Set of your own for **15c.** Lots of fun sending messages to your friends. Better still get two sets, hook them up as shown in the directions, for TWO-WAY MESSAGES (sending and receiving). No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 3 in., first class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in neat box with full illustrated instructions — **ALL FOR 15c** (without battery) **postpaid.** *(Canada and Foreign 20c.)*

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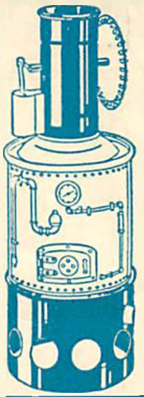

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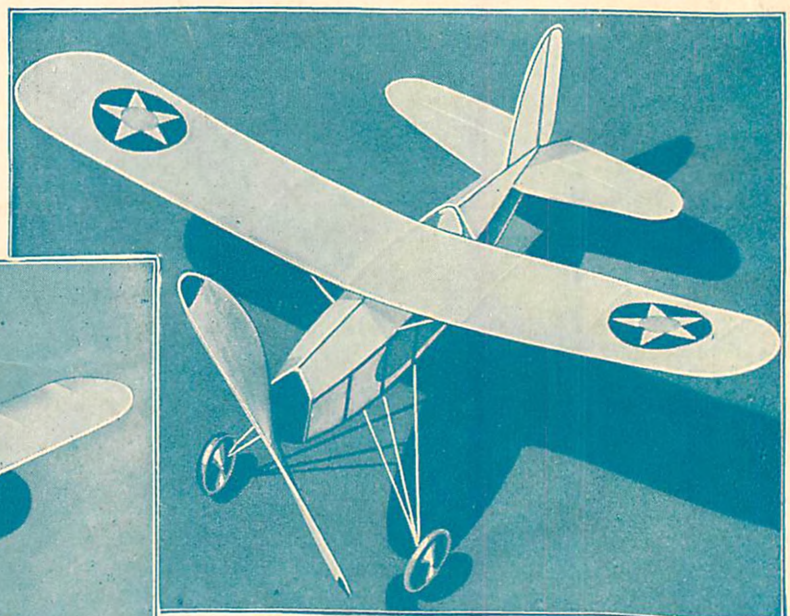

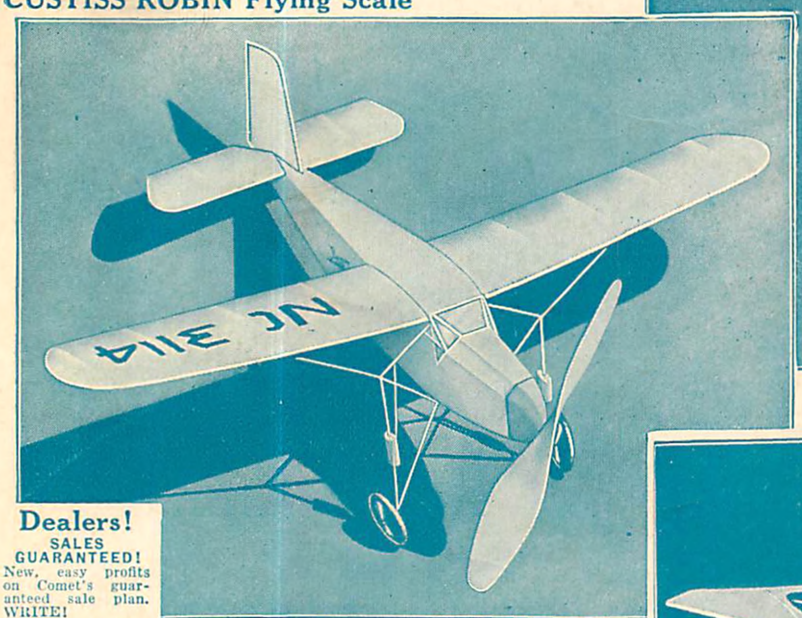

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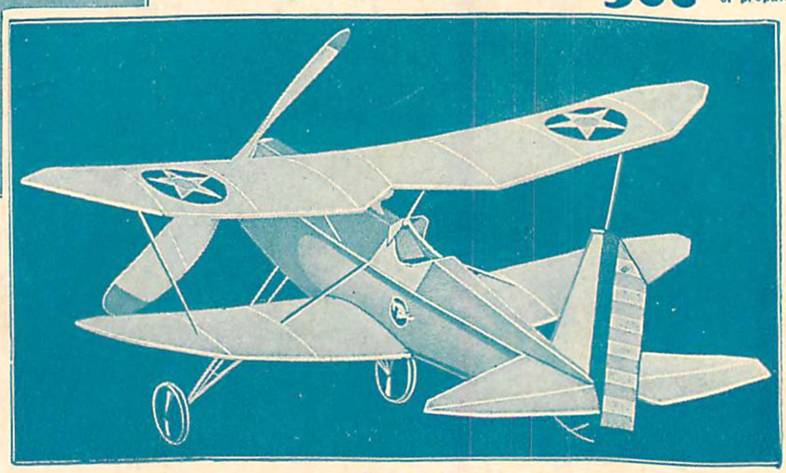

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