1933

UNIVERSAL MODEL AIRPLANE NEWS

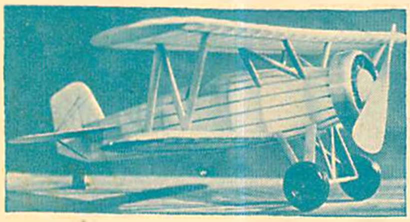
OCT. 20¢

"THE ONLY MAGAZINE DEVOTED EXCLUSIVELY TO EXPERIMENTAL AVIATION"

CONSTRUCT - A - PLANE CO.

VALUE - QUALITY - SERVICE

TAKE A LOOK AT THESE QUALITY KITS!



Boeing P-12C
20" FLYING MODEL
Kit includes printed ribs and formers, full size plans. Instructions, turned balsa cowl, turned balsa wheels, two sheets colored tissue, large bottle cement, dope, rubber, wire, insignias, liberal supply of strips, etc. **$1.10 P.P.**

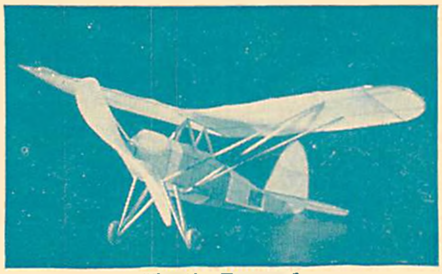
AERO SPORTSTER — GEE BEE MODEL D — P. T. TRAINER — MONOCOUP

12" FLYING MODELS 20c Each POSTPAID

All four models are 75c post paid.

Beautiful flying models you will enjoy building and flying. Full size plans, instructions, tissue, wire, wheels, bamboo, balsa strips, printed balsa sheet, cement, washers, etc.

Bellanca Skyrocket
20" FLYING MODEL
Kit includes printed ribs and formers, two colors of jap tissue, cement, dope, rubber wire, full size plans, instructions, strips, turned nose block, balsa wheels, etc. **85c P.P.**



Heath Parasol
20" FLYING MODEL
Kit contains full size plans and instructions, printed Balsa ribs, dope, cement, colored tissue, wire, rubber, wheels, strips, etc. **60c P.P.**

Commander
20" FLYING MODEL
Kit contains printed ribs and formers, dope, cement, colored tissue, wire, rubber, wheels, strips, etc. **60c P.P.**

CONSTRUCT-A-PLANE High Quality Supplies

SHEET BALSA 36" lengths

1/32 x 2 ... 3c
1/16 x 2 ... 3c
3/32 x 2 ... 4c
1/8 x 2 ... 2 for 9c
3/16 x 2 ... 6c
1/4 x 2 ... 7c
1/32 x 3 ... 6c
1/16 x 3 ... 6c
3/32 x 3 ... 8c
1/8 x 3 ... 8c
3/16 x 3 ... 10c
1/4 x 3 ... 12c

36" Strips

1/16 x 1/16 ... 5 for 2c
1/16 x 3/32 ... 5 for 2c
1/16 x 1/8 ... 5 for 2c
1/16 x 3/16 ... 2 for 1c
1/16 x 1/4 ... 2 for 1c
3/32 x 3/32 ... 2 for 1c
3/32 x 1/8 ... 2 for 1c
1/8 x 1/8 ... 2 for 1c
1/8 x 3/16 ... 3 for 2c
1/8 x 1/4 ... 2 for 3c
1/8 x 3/8 ... 2 for 3c
3/16 x 3/16 ... 2 for 3c
3/16 x 1/4 ... 2 for 3c
1/4 x 1/4 ... 2 for 5c
1/4 x 3/8 ... 2 for 5c
1/4 x 1/2 ... 3c
3/8 x 3/8 ... 3c
3/8 x 1/2 ... 4c
1/2 x 1/2 ... 6c
1 x 1 ... 11c

PLANK BALSA

1 x 3 x 36 ... 25c
1 x 6 x 36 ... 40c
2 x 6 x 36 ... 70c

¾ FINISHED BALSA WHEEL PANTS

Wheel pants shaped ready for sanding, for
½" ¾" 1" wheels, ea. per pr. 10c
1⅜" 1⅞" wheels ea. per pr. 15c

TURNED BALSA WHEELS

Machine cut Balsa wheels, very light and strong.
Bushings with every pair.
½" and ¾" ... per pr. 4c
1" ... per pr. 5c
1⅜" ... per pr. 7c
1⅞" ... per pr. 11c

BALSA PROPELLER BLOCKS

½ x ¾ x 5 ... 3 for 2c
½ x ¾ x 6 ... 3 for 2c
¾ x 1 x 7 ... 3 for 5c
⅝ x 1 x 8 ... 3 for 5c
¾ x 1 x 8 ... 2 for 5c
¾ x 1⅛ x 9 ... 2 for 5c
¾ x 1¼ x 10 ... 2 for 7c
¾ x 1⅛ x 11 ... 2 for 7c
1 x 1¼ x 11 ... 4c
1 x 1½ x 12 ... 5c
1 x 1½ x 14 ... 7c

Formed propeller blanks 2c each extra.

BAMBOO

Straight grained Tonkin no-knot bamboo.
1/16 x 1/4 x 15 ... 1c
1/32 x 1/4 x 8 ... 2 for 1c
1/16 x 1/16 x 10½, Per doz. 1c

REED

1/32 1/16 1/8 Round, 5 ft. 2c

SAND PAPER

Five Assorted Sheets
Package ... 5c

STREAMLINE CELLULOID WHEEL PANTS

Small for ¾ and 1 in. wheels ... 13c
Large for 1⅜ and 1⅞ in. wheels ... 23c

ALUMINUM DRAG RINGS

1½" ... 15c
2" ... 17c
2½" ... 20c
3" ... 25c

READY CUT OUT INSIGNIAS

American, French and British
¾" and 1" ... per pr. 1c
1½" and 2" ... per pr. 2c
3" ... per pr. 3c

BIRCH DOWELS

36 in. long
1/8, 3/16 in. Diam ... 1c
1/4 in. Diam. ... 2c

CONSTRUCT-A-LOID CEMENT

1 oz. ... 7c
2 oz. ... 12c
1 pt. ... 60c
1 qt. ... $1.00

CLEAR DOPE

2 ozs. ... 10c
1 pt. ... 50c
1 qt. ... 90c

DOPE BRUSHES

Small ... each 5c

COLORED DOPE

2 oz. ... 10c
1 pt. ... 50c
1 qt. ... 90c

MODELS PINS

Pkg. of 100 ... 4c

TISSUE

Sheet 20¼ x 24¼ ... 3 for 5c

COLORED TISSUE

Sheet 20¼ x 24¼ ... 2 for 5c

WOOD VENEER PAPER

Sheet 20 x 30 ... 12c

CELLULOID WHEELS

Bushings with every pair
¾" ... per pr. 5c
1" ... per pr. 6c
1⅜" ... per pr. 8c
1⅞" ... per pr. 12c

OPEN FACED COWLINGS

1½" ... 15c
2" ... 17c
2½" ... 20c
3" ... 25c

GERMAN CROSSES

Can be had in the following sizes.
½" and 1" ... per pr. 1c
1½" ... per pr. 2c

N.A.C.A. COWLINGS

1½" ... 15c
2" ... 17c
2½" ... 22c

MOTOR RUBBER

Guaranteed absolutely fresh stock.
1/16 and 1/8 Flat ... 3 ft. 1c
.045 and 1/16 Sq. ... 3 ft. 1c
3/16 Flat ... 5 ft. 2c

THRUST BEARINGS

Small .025 hole ... 1c
Large .035 hole ... 1c

BRASS EYELETS

1/16" O. D. ... 4 for 1c

STRAIGHT MUSIC WIRE

Sizes: .014, .020, .028, .034
2 ft., any size ... 1c

WASHERS

¼ O.D. Brass ... per doz. 1c
¼ O.D. Copper ... per doz. 1c

ALUMINUM TUBING

1/16 O.D. ... per ft. 7c
1/8 O.D. ... per ft. 7c
3/16 O.D. ... per ft. 10c
1/4 O.D. ... per ft. 12c

SHEET ALUMINUM

.005 ... per sq. ft. 12c
.010 ... per sq. ft. 18c

ALUMINUM LEAF

.0003 of an inch in thickness, 3½" wide
5 ft. ... 3c

SHEET INSIGNIAS

21 insignias, 4 different countries, with rudder stripes.
Per sheet ... 5c

CELLULOID COWLINGS

2½" diam. ... 15c
3" diam. ... 20c

DUMMY RADIAL ENGINES

1½" diam. ... 14c
2" diam. ... 21c
3" diam. ... 27c

Ordering Instructions

Orders under 50c not accepted
On all orders up to $1.50 add 15c, $1.51 and over add 10%. Orders west of the Mississippi add 10c extra. Canada 25c extra up to $1.50. $1.51 and over add 15% extra. Stamps and foreign coin will not be accepted.

BOAT KITS

6" and 7" size
MAYFLOWER — TEXAS
WANDERER — LEARY

ONLY **15c** EACH p.p.

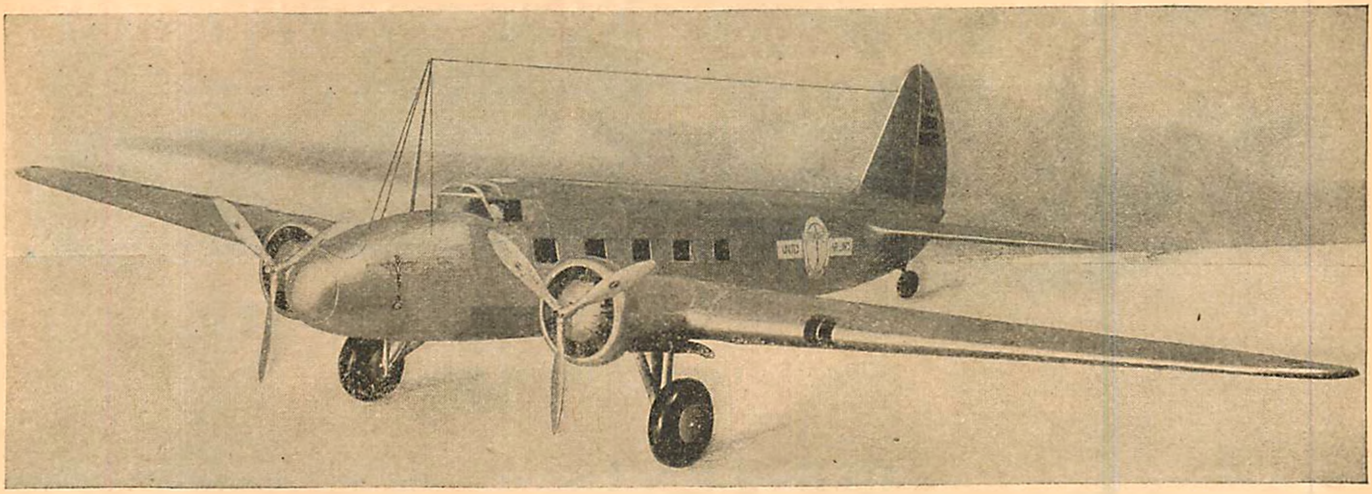
DEALERS — — CLUBS

Don't be a back number. Get in on our great line of flying kits, solids, 12" Flyers, balsa ship kits and supplies. Profitable and fast moving. Write at once for our price list.

CONSTRUCT-A-PLANE CO.

158 GRAHAM AVENUE — BROOKLYN, N. Y.

Authentic Cee Dee Model of the World's Most Outstanding Commercial Airplane . . • BOEING 247



Here are two realistic views of the new ¾" scale Cleveland-Designed model of the already world famous Boeing 247 type commercial plane which cruises at 180 m.p.h. over many air-lines throughout the United States. (The one above is a model of one in the Boeing division of the United Air Lines. Information may be gathered by any builder for making the particular line insignia in which he is most interested. They are not supplied with the Kit.)

This beautiful model is capable of exceptionally good flights, for flights of over 250 feet were quite easily obtained with the same model pictured here. We were about as surprised after testing this ship as we were after the Laird Super-Solution was designed. Honestly, we did not think much about its flying ability, although we did know it would make some flights, but after testing it, it flew beyond all expectation. In many cases it reached an altitude of 40 feet, looking just like the big ship itself, only for the fact that the wheels do not retract (which is impossible because of the motors being so low in the wing). Span is 55⅝", length 38⅝", weight 16 oz. Colored all silver.

Powered with rubber strands, and made in the orthodox C-D manner except for the larger structural members such as wing beams which are of the girder type and generally of balsa, paper, music wire, and furnished with standard Cleveland dopes and cements. Motor sticks are removable so when displayed, it looks like an exhibition model.

The Kit comes complete, all materials necessary, including partly finished nose block, ready furnished cowls, completed wheels, stout axle material to withstand the severe shocks (the model weighs approximately 16 oz. ready for flying, you know), all the dopes necessary and extra strong covering paper.

Complete Kit SF-35, as described above and including two sheets of drawings (4 panels 17" x 44"), containing every bit of information necessary for building the model, shipped anywhere in the U. S. by express in a strong wooden box 4 x 7¼ x 40". (prohibited by mail because of the large quantity of inflammable liquids, dope, cements, etc.), **shipping charges collect** (wt. not over 10 lbs.) — for only **$6.50**

This photo shows model as in flight with motor sticks in place. The one above as a ground view of exhibition model—both are the same plane.

(Drawings alone not sold. Foreign customers inquire of steamship companies rates of delivery to your city — we are not responsible for expenses of mis-shipping and must act accordingly.)

BARGAINS

you may never see again

(Good only until October 1, 1933)

Here are some close-out prices, in full conformity with our NRA membership. Some of the values are amazing. The SF-2, for instance, is the same Kit that originally sold for $5.50. These prices are good only as long as present supply lasts. First come, first served!

All descriptive matter on these Kits will be found in the Midsummer Sale Price List. If you haven't a copy, or the new No. 12 folder, send 5c for one at once.

Three Quarter Inch Scale Kits

KIT SF-6 (originally $2.95)
KIT SF-7 (originally $3.50)
KIT SF-8 (originally $2.95)

NOW EACH $1.75 Postfree

KIT SF-1 (originally $5.50)
KIT SF-2 (originally $5.50)
KIT SF-13 (originally $4.00)
KIT SF-15 (originally $4.00)

NOW EACH $1.50 Postfree

Three Eighth Inch Scale Kits

KIT JSF-1005 (originally $2.50)

NOW EACH $1.25 Postfree

Three Eighth Inch Scale Semi-Profile

KIT FL-302, 303, and 304 (originally $3.30 each)

NOW EACH $1.00 Postfree

Three Eighth Inch Scale Profile

KITS FL-101 to 112 (except 106 and 109)
originally $1.10 each

NOW EACH 50c Postfree

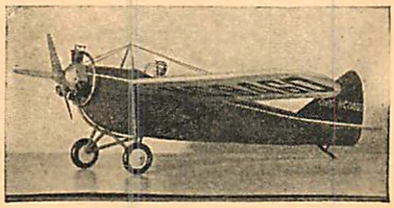
Famous C-D DRAWINGS

All FL-100 line drawings (except 106 and 109), only 15c each. All FL-200 line and FL-300 line (except 301), only 25c each. Drawings for original SF-8, Boeing P12B; the old SF-12, Nieuport Biplane; and old SF-14, Fokker Triplane; the undersize DH-4, and JN-4, only 25c each. Drawings for SF-2 Travel Air Mystery Ship (four very large sheets with plenty of photos); SF-13, the Spad; and SF-15, Fokker D-7; only 40c each.

DEALERS: These items subject to regular discount, according to minimum quantities usually specified. CASH MUST ACCOMPANY ORDER—but no cash discount allowed.

4 MORE NEW ONES (2 of 'm great favorites re-designed)

THE FOLLOWING KITS ALL HAVE PRINTED-OUT WOOD IN THEM



LINCOLN Sport Plane

The dream ship of many light plane enthusiasts. ¾" scale, and flies beautifully. Span 15", length 12⅛", weight 1 oz. Colored cream and black tail, details and trimming. Complete Kit SF-36 (with everything including printed out wood parts. No pilot included, but you can easily carve one out of balsa) at dealers, or postfree, Only **$1.50**

Buhl BULL-PUP

A neat ¾" scale model—looks far better than its picture. Keen flights. Colored standard yellow wings and tail, balance blue, details black. Span 22½", length 15", weight 1.9 oz. Complete Kit SF-38 (with everything needed, including printed out wood parts—but without pilot) at dealers, or postfree, Only **$1.75**

Re-Designed 1931 GEE-BEE

We've re-designed this authentic ¾" scale model that thousands over the world have built. Pictures were not ready at press time—but it's a peach. Colored yellow and black. Span 17½", length 12", weight 1.8 oz. Complete Kit SF-17 (with everything including printed out balsa) at dealers, or postfree, Only **$1.75**

RE-Designed HOWARD

A famous C-D Kit liked by beginners as well as old timers—now re-designed. Pictures were not ready at press time—but she's prettier, and simpler to build. Colored all white, black details. Span 15", length 13¼", weight 1.4 oz. Complete Kit SF-18 (everything including printed out balsa) at dealers, or postfree, Only **$1.50**

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CLEVELAND MODELMAKING NEWS

Thousands have already subscribed—and they're sending such compliments as "It's the modelbuilder's Bible," "Best thing yet on modelbuilding," "Can hardly wait for next issue," etc., etc. Filled with authentic scale drawings, suggestions, ideas every modelbuilder needs. 25c per issue. Issue No. 4 now ready. Send $1.00 for 6 issues (all subscriptions begin with No. 1) or $1.75 for 12-issue subscription (to same address only). Foreign customers, add 5c per issue to above prices. NOW while you're thinking about it—SUBSCRIBE!

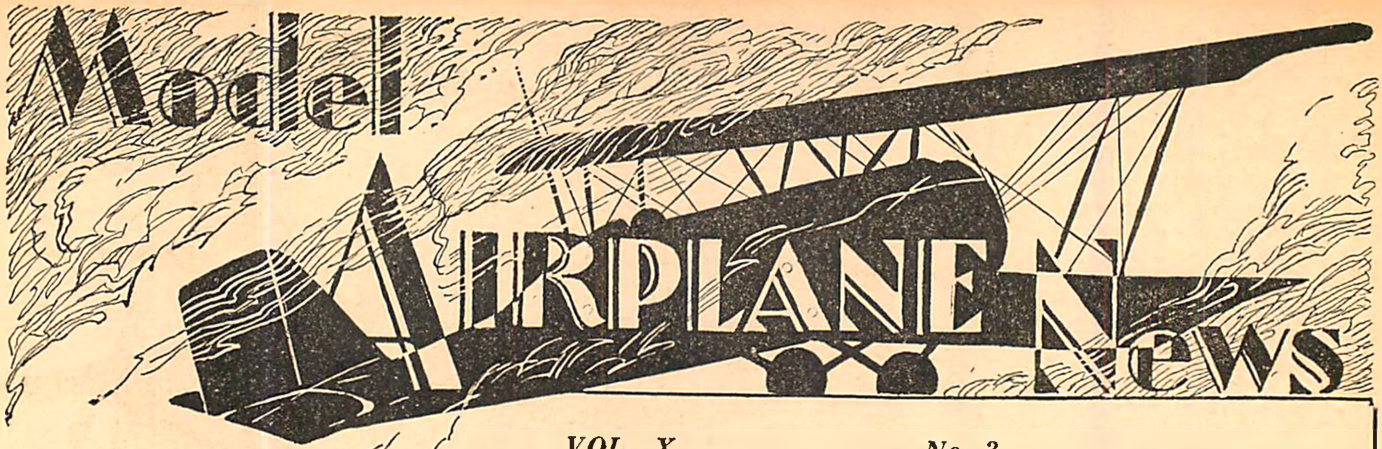
NRA MEMBER U.S. WE DO OUR PART

Ask Your Dealer for these and other authentic Cleveland-Designed Flying Model Kits. If he hasn't what you want, order direct, giving dealer's name.

Cleveland Model & Supply Co., Inc.

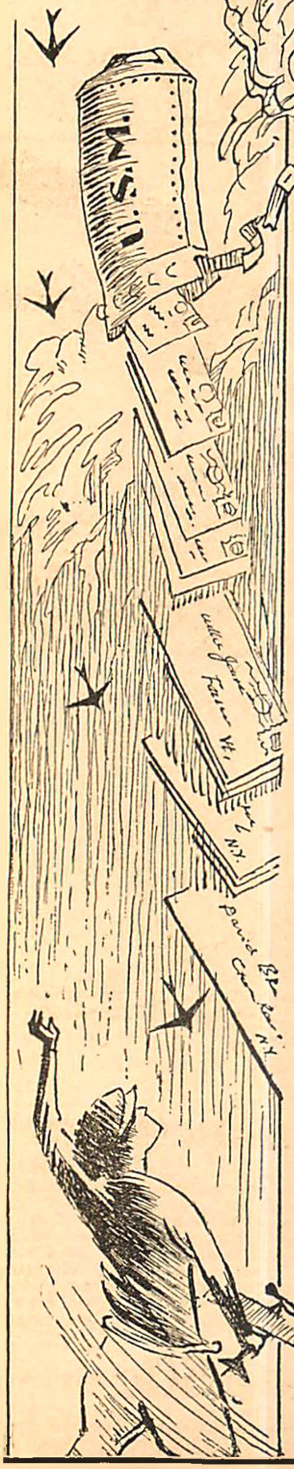
1866-NK West 57th St., Cleveland, Ohio, U.S.A.

UNIVERSAL



VOL. X *No. 3*

Edited by Charles Hampson Grant



CONTENTS

OCTOBER — 1933

In Our Next Issue

In Wings of the Navy, Mr. H. Latane Lewis II tells you all about the planes used with Uncle Sam's fleets.

Complete detail plans for war-time Pfalz Scout D.12 by Barnett Feinberg, from which you can build a scale or flying model.

Robert C. Hare continues to tell us more about the Development of the Fokker Fighters.

You will see the final results of the Maneuver Contest.

Build A Flying Scale Model of Wiley Post's Lockheed Vega, by J. D. Bunch.

Burton Kemp gives you complete plans and instructions to build a Solid Scale Douglas Dolphin Amphibian.

Also, many other interesting and instructive articles such as The Aerodynamic Design of the Model Plane, a War Ace story, Air Ways, Three View Drawings, etc.

Order your copy of UNIVERSAL MODEL AIRPLANE NEWS from your newsdealer now, or send $1.65 for your year's subscription to this office, 125 West 45th Street, New York City. Canadian subscriptions, $2.00 per year, all other countries, $2.50.

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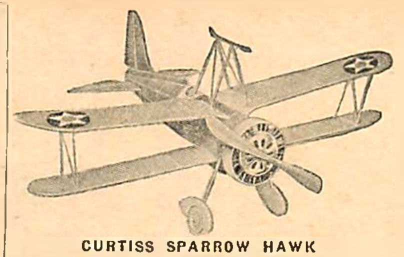
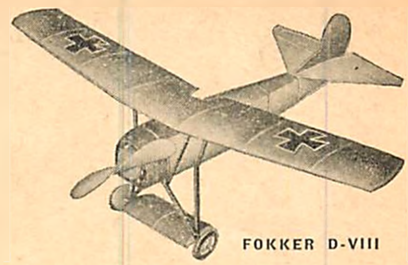
Are You Flying these fine Models?

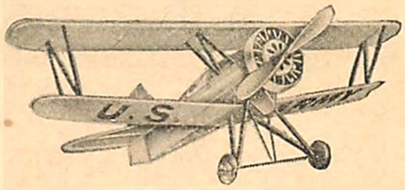
These are the neatest jobs you've seen in a long time. Every Model is full-fuselage type, with constructed body, cambered wings, shock-proof landing gear, carved balsa propeller, stamped motor plate and other features usually found only in more expensive Kits. They fly, too,—and how! If you haven't built any of these Ideal-O-Plane Ships, you have a surprise coming to you! With all their fine detail, they're easy to build because these new style Kits go together in a hurry. You build two or three of these Models in less time than it takes to work out a more complicated one. Look them over — all ten of them — and get going now!



CURTISS SPARROW HAWK



FOKKER D-VIII



BOEING FIGHTER

HEATH PARASOL

Your Choice of 10 Different 12 and 15 inch

FLYING MODELS 25c EACH

Plus 5c for Postage (See Below)

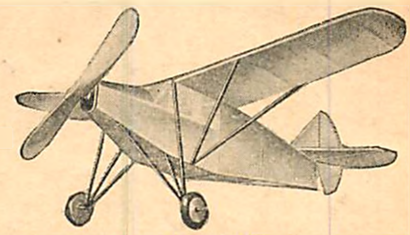
(No Orders Accepted for less than 2 Kits)

(West of Denver, 5c Extra for Long Distance Postage)

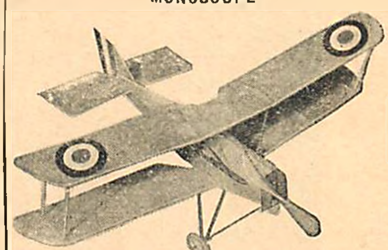
(No Stamps Please)

These Kits are complete in every detail. Carefully finished parts of finest quality, accurately printed balsa ready to cut, wire parts formed and ready to use, colored Jap tissue, balsa strips, bamboo cut to size, smooth, hardwood wheels, live rubber, cement, and everything needed to build the Model is included. All details are shown on the full-size three-view Plan and careful instructions for intricate parts are given separately. These Kits have always offered superior value, and now they give you more for the money than ever. Send along your order now for two or more of these fine Models and then your fun will begin.

MONOCOUPE



PUSS MOTH



BRITISH S. E. 5

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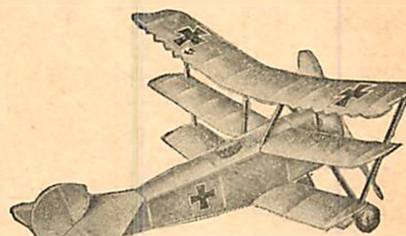
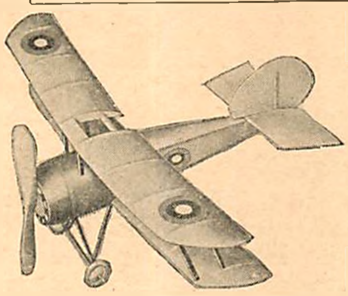
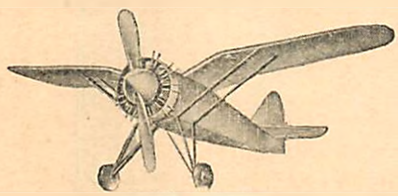


FOKKER TRIPLANE



SOPWITH CAMEL



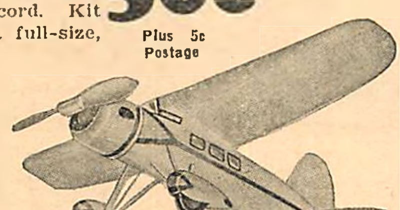
POLISH FIGHTER

SPECIAL - -

15-inch Lockheed Vega Kit

A special DeLuxe Kit of the celebrated "WINNIE MAE" which Wiley Post flew around the world for a new record. Kit contains every item, including a full-size, 15 inch Plan with simplified building instructions. Guaranteed to fly, and a fine looking, easily constructed Model with accurate details. Complete Kit only 50c (5c extra for postage). No stamps, please.

50c Plus 5c Postage



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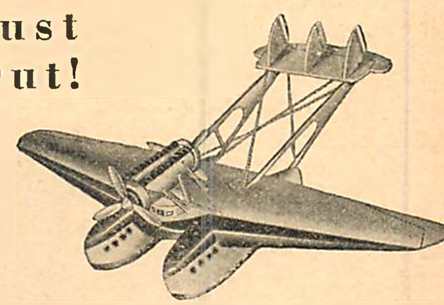
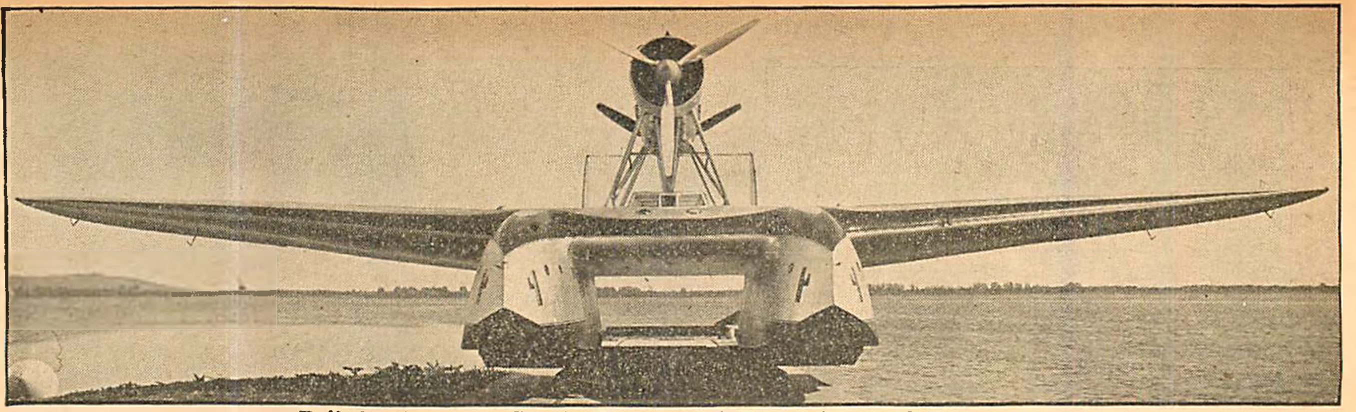


The Italian
SAVOIA MARCHETTI

Be the first to make a Model of the famous Ships of the Italian Armada which General Balbo flew across the Atlantic. Here's a perfect 12 inch reproduction of these beautiful Ships, carved from solid balsa with every little detail copied accurately. You can make one easily, and color and decorate it like the real ships. Kit contains everything needed, including a full-size Plan showing the Model in top, front and side views. Get this Kit now and finish your Model right away.

12 inch Model 60c POSTPAID



Balbo's plane, the Savoia Marchetti S 55 X being hauled ashore.

Balbo--The Modern Columbus

The Story of the Preparations and Scientific Research That Made Possible the Greatest Flight in Aviation History

By FLETCHER PRATT

Plans for a model of Balbo's ship on page No. 7.

"THERE have been enough daring flights."

It was engineer Guido Schiatti speaking, amid the gold and black of the palatial St. Moritz Hotel in New York. He had just returned from Jamaica Bay where he had been inspecting the twenty-four Savoia Marchetti planes that hurled themselves through 6,100 miles of air, half-way across two continents and the peaks of the Alps, all the way across the stormy North Atlantic, in one of the most colossal enterprises in the history of aviation. He had gone over all twenty-four of them, microscopically and had pronounced every one fit and ready for the return journey; and had just been told that it was a daring enterprise.

"There has been enough of daring!" was his astonishing reply. "In aviation now we do not need daring; we need caution and preparation. Look you! In all this flight there was nozzzing daring, not one bit, no more than in Christopher Columbus; his voyage! Not ever so much."

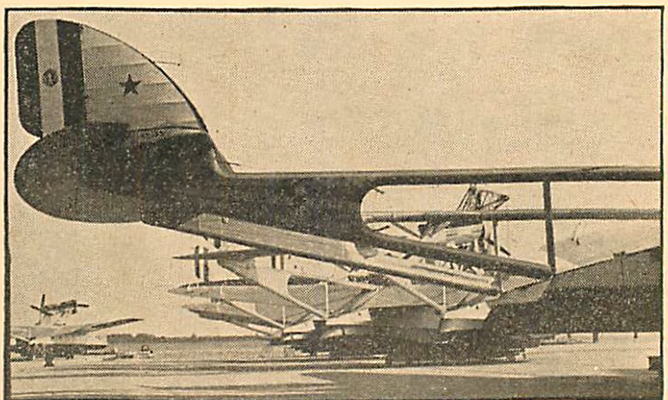
General Italo Balbo, commander of the flight.

And that was more astonishing. We said so and Engineer Schiatti went on to explain, helped out from time to time by interjections from Dr. Orlando, the motor expert from the Isotta-Fraschini Company and Colonel Infante who had charge of the weather and wireless arrangements.

The whole great flight was patterned on that of the Italian navigator who first saw the shores of America. Balbo started from Orbetello, Columbus from Genoa; a couple of hundred miles apart but in the same longitude, the distance almost exactly the same.

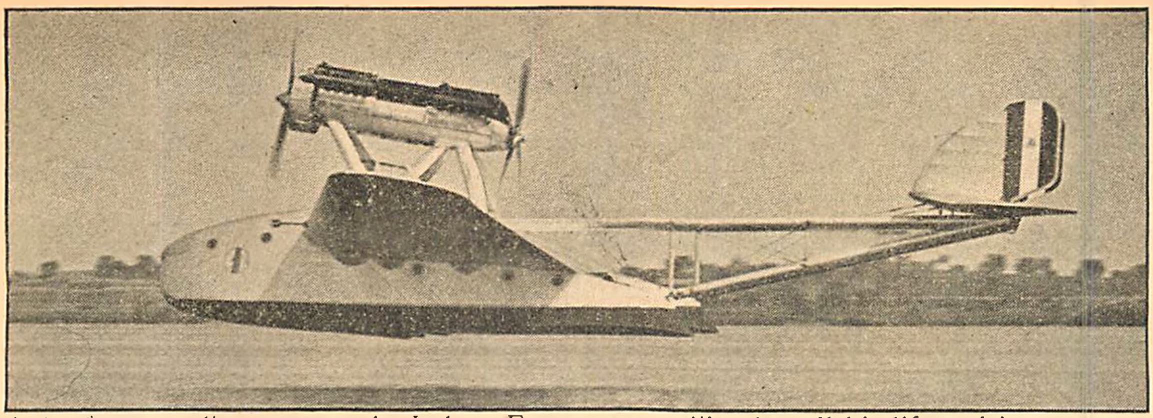
Balbo sat in his office at Orbetello and worked out the distance to Chicago with a pair of parallel-rulers. Columbus sat in a tavern at Genoa and worked out the distance to Japan with a pair of dividers. Balbo was absolutely certain that when he set his black-star plane I-BALB down into a glide, Lake Michigan would be at the end of the long slant. Christopher Columbus, in spite of the scoffers around him, was not less sure that when he shook out his topsails, Japan would be under his lee. In both cases it was an absolute mathematical certainty, but there the resemblance ends, for while Balbo was right Columbus was magnificently wrong. The North American continent happened to be in the way.

But the two great Italian navigators resembled each other in other ways. Both of them spent a preparatory period of several years, during which nobody heard about them. Columbus passed his preparatory years in trudging from court to court about southern Europe, wearing out the seat of his trousers on benches in bankers' offices. General Balbo spent his in hard work, testing and preparation.



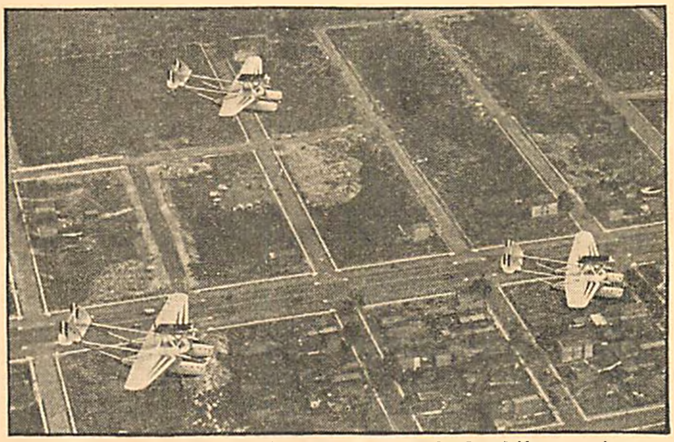
Looking through a network of tails as planes prepared for the great flight.

COLUMBUS took any men he could get, but Balbo was four years choosing the best pilots, the most expert mechanics



One of the fleet getting under way after leaving the water.

and the fastest radio operators in Italy. Every man of the ninety-six who maneuvred the Italian planes across the Atlantic had at least five hundred hours of flying in ships exactly similar to those that crossed the Atlantic. By the time the flight actually took place they knew every detail of them by heart; they could have flown them blind, drunk or in their sleep, and they were the cream of the Italian aviation corps. When it was known that Balbo intended to make the flight, every flier in Italy naturally wanted to be in it. Every man had his chance. There were exacting ground tests for physical and mental altitude, and then longer and more exacting flight tests. The 96 aviators who made the flight were selected from over three thousand at the end of four years of flying.



Three of the Savoias as they looked while nearing New York, on their way from Chicago.

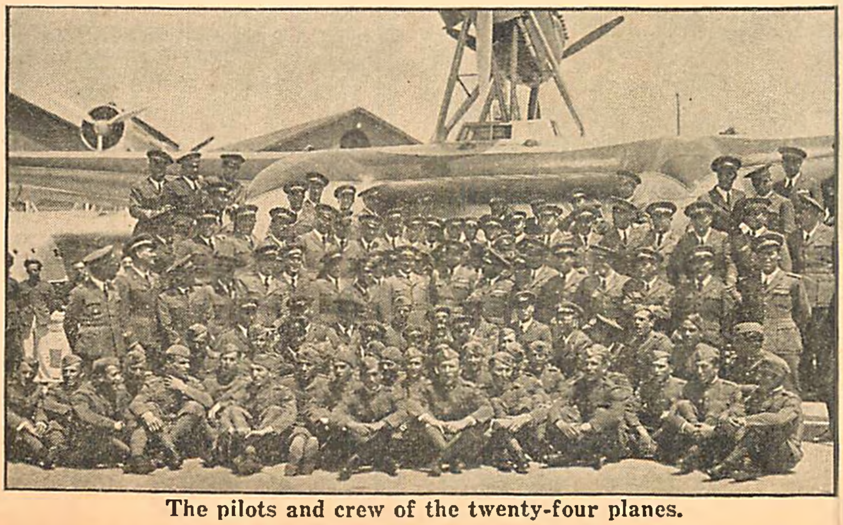
They are all officers with one exception — Marescal (or as we would say, top-sergeant) Maretti, who distinguished himself for gallantry and the brilliant handling of his machine in a storm and heavy sea during the flight from Africa to South America made by General Balbo three years ago. It won him a gold medal and the honor of being the only enlisted man accepted as a pilot for the Chicago flight. That flight, by the way, made by twelve planes, was part of the preparation for the Chicago venture. As long ago as 1930, motors, men and machines had gone through an exhaustive series of tests, but there is no test like that of experience and General Balbo took his dozen machines across the South Atlantic (which is much easier to cross than the North Atlantic), to see if they would work. Two of them cracked up and he decided that three years more of trials would be needed before the really big flight could be attempted.

Columbus had no such difficulties. He knew to a fraction of an inch and in a minute what the ships he sailed could do. He had handled ships like that all his life and it was as certain as anything can be, that if he merely kept them pointed in the right direction they would stay afloat and get there.

The *Nina, Pinta* and *Santa Maria* were tiny vessels, not much bigger than Balbo's ships of the air. but they were as good as any ships then sailing. Their admiral saw to it that they were well-calked and watertight, more than stout enough to breast any seas he ever saw. Fleets of ships no bigger than that had sailed from England to Egypt and back—a voyage as long as Columbus' own.

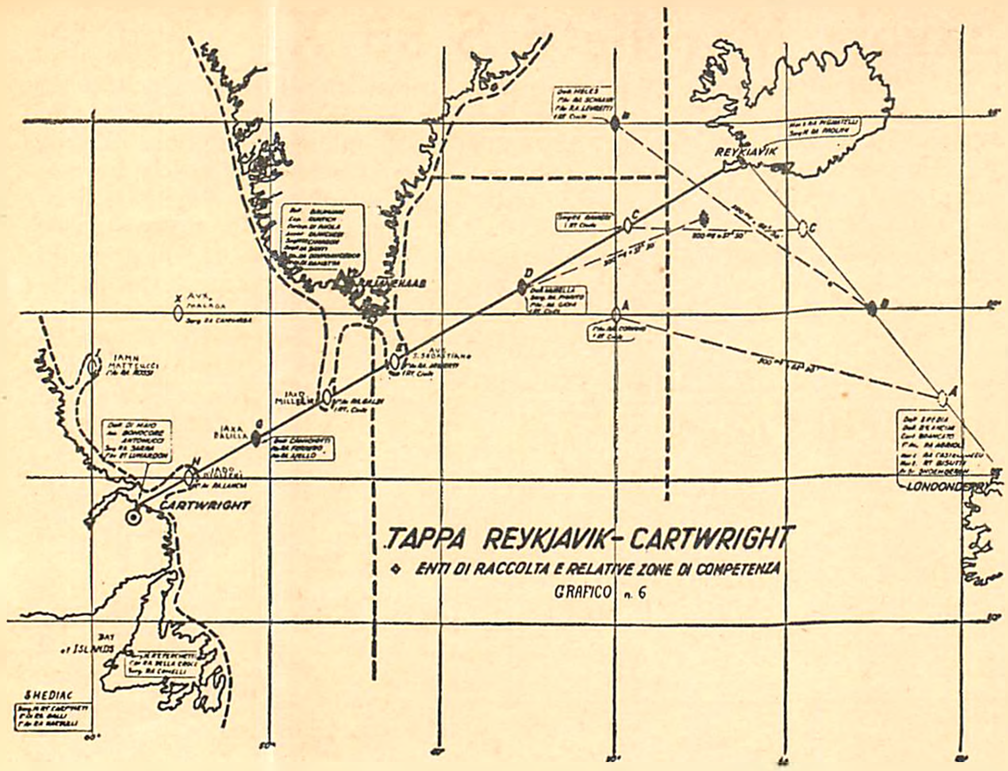
But When Balbo tempted the Atlantic, he had no such experience of others to go on. Only a few gallant aviators had crossed the Atlantic, always alone and there had been as many failures as successes. This was chance, guesswork, daring. He wanted to take the daring out of it, to show that it was possible to take up 24 (or any other number) airplanes from a spot in Italy and set them down in a spot in America, without accidents. To do this, he had to be as certain as Columbus was that his ships would be safe from weather, leaks or any other accidents except human mishandling.

Thus engineer Marchetti was commissioned to design a type of machine that would do the job. Marchetti, who began designing hydroplanes during the war, knew a good deal about them already but discovered that he had a lot to learn as the tests went on.



The pilots and crew of the twenty-four planes.

THE first question was that of the general design of the planes. The "flying wing" was adapted as the basic idea because of its efficiency and as with all flying wings, the machine was made a cantilever monoplane of very thick wing section. (Where they join the floats, the wings are three feet, six inches thick.) But for trans-atlan-



tic use, the machines would have to have floats, so engineer Marchetti conceived the idea of making the floats and cabins and running them right up to the wings. This preserved the flying wing form as much as possible with a hydroplane and still gave very commodious quarters for the crew.

Then came the question of the tail. Should the new plane be tailless? They tried it but the flexible wing tips one has to use for control on tailless machines corroded in the salt sea spray and failed to work. Then the ordinary type of tail was tried with a big, roomy fuselage running back from the cabin-floats. It flew all right but the tail dragged in the water, especially on landings and there was corrosion again; besides the parasite resistance ate up all the advantage gained from the flying wing shape. So the tail was put on an outrigger and hoisted high above the water level.

At the same time it became evident that something unusual in the line of tail surfaces was necessary. A single rudder swung the ship all right but the plane was too big, flat and narrow; the tests showed that it was only five times as strong as necessary instead of the ten General Balbo demanded. The fin was therefore split into three small fins, each braced internally and set abreast.

In the earliest models the pilot sat in one of the float-cabins, which were connected by a narrow tunnel through the center of the wing. But a psychological difficulty was noticed about this which you can experience for yourself by standing at the side of a ship up near the prow. If you are on the right side the ship seems to be turning to the left and vice versa. It was the same with the aviators; they had a tendency to twist the ships in putting them down. So engineer Marchetti boldly located the controls in the center of the wing itself, then put the gas reservoir behind the pilot to give the ship good weight balance, and while he was about it, extended the communication tunnel between the hulls right out to the wing tips. The net result is that the mechanic of a Savoia S-55 can follow all the control wires of the machine right down this tunnel and effect any emergency repairs necessary from inside the wing.

You must not imagine that each of these improvements was made up out of Signor Marchetti's head right off the bat. On the contrary, every one of these details meant months of experiment. When something didn't work, Marchetti tried a new idea. The plane with the new piece of design or equipment was taken out and flown for a hundred hours or more and the results compared with the old design. Only when the new proved itself, was it adopted.

FINALLY came the motors. Marchetti knew from previous experience that the deadliest danger faced by seaplane motors and propellers comes from the element over which they fly. Spray gums the motor; flying drops of water at the tremendous speed at which propellers revolve, cut long gouges in them.

From the start, he mounted the motor of the transatlantic ships high up. But various arrangements had to be tried before the best was found. They were tried out as two pushers. This was good but the parasite resistance was heavy and there was trouble with the oil lines. They were tried as two tractors with the same trouble and the ship was slow in taking off beside. Finally, they were tried as a tandem with the oil tank mounted between, and this was the solution finally adopted although it was a long time before

(*Continued on page* 40)

ROSTER OF BALBO'S SHIPS

Black Squadron
Flagship—Black-star I-BALB
General Italo Balbo; Col. Dagna.
I-BISE—Capt. Biseo; I-QUES—Capt. Questa
Flagship—second division (black rosette) I-PELL; General Pellegrini
I-BORG—Captain Borghetti; I-MIGL—Captain Miglia

Red Squadron
Flagship—I-NANN (red star)—Capt. Nannini
I-ROVI—Capt. Rovis; I-LIPP—Capt. Lippi
Flagship, second division (red rosette) I-DINI—Capt. Baldini
I-TEUC—Capt. Teucci; I-LEON—Capt. Leone

White Squadron
Flagship (white star)—I-GIOR—Capt. Giordano
I-VERC—Capt. Vercelloni; I-NAPO—Capt. Napoli
Flagship, second division (white rosette) I-RECA—Capt. Recagno
I-ABBR Capt. Abbriata; I-GALL—Capt. Gallo

Green Squadron
Flagship (green star)—I-BIAN—Capt. Bianchi
I-ARAM—Capt. Aramu; I-RANI—Capt. Ranieri
Flagship, second division (green rosette)—I-LONG—Colonel Longo
I-CALO—Capt. Calo; I-CANN—Capt. Cannistracci

Here are Plans of Balbo's Seaplane

The Savoia Marchetti S 55 X

AFTER the remarkable flight made by a fleet of 24 of these planes, this type of ship will take a prominent place in aeronautic history. Therefore, without question, you will want to build a model of it. However, no information has been given out concerning its details of design by the manufacturers and it has been difficult to get authentic plans. Many of you probably know this from experience and will welcome the plans on these pages, which are accurate but .not in great detail.

A very beautiful scale model may be made from them with a little care. Note that the drawings are laid out on a squared background which allows the model builder to double or triple the size of the drawings conveniently, merely by making a layout with larger squares (2 or 3 times as large) and marking the points on the lines of the corresponding larger squares, where the lines of the drawings cross them. Or you may obtain larger drawings by having a photostat print made to a larger scale.

In building this model, it is suggested you make it of solid balsa or white pine. First make the wing in one piece, shaping it in outline and cross section to the shapes given on the drawing. Next make the two pontoons, cutting out the slot through which the wing passes, after the outside of the pontoon has been shaped to the proper outline and cross sections shown in the drawing. The fillets at the joints may be made by applying plastic wood at the joints, rounding the surfaces carefully into one another.

Proceed to make each of the separate units as engine nacelle, tail surfaces, outriggers, struts, etc., and join them neatly together in (*Continued on page* 45)

Details of Savoia Marchetti Planes S55X

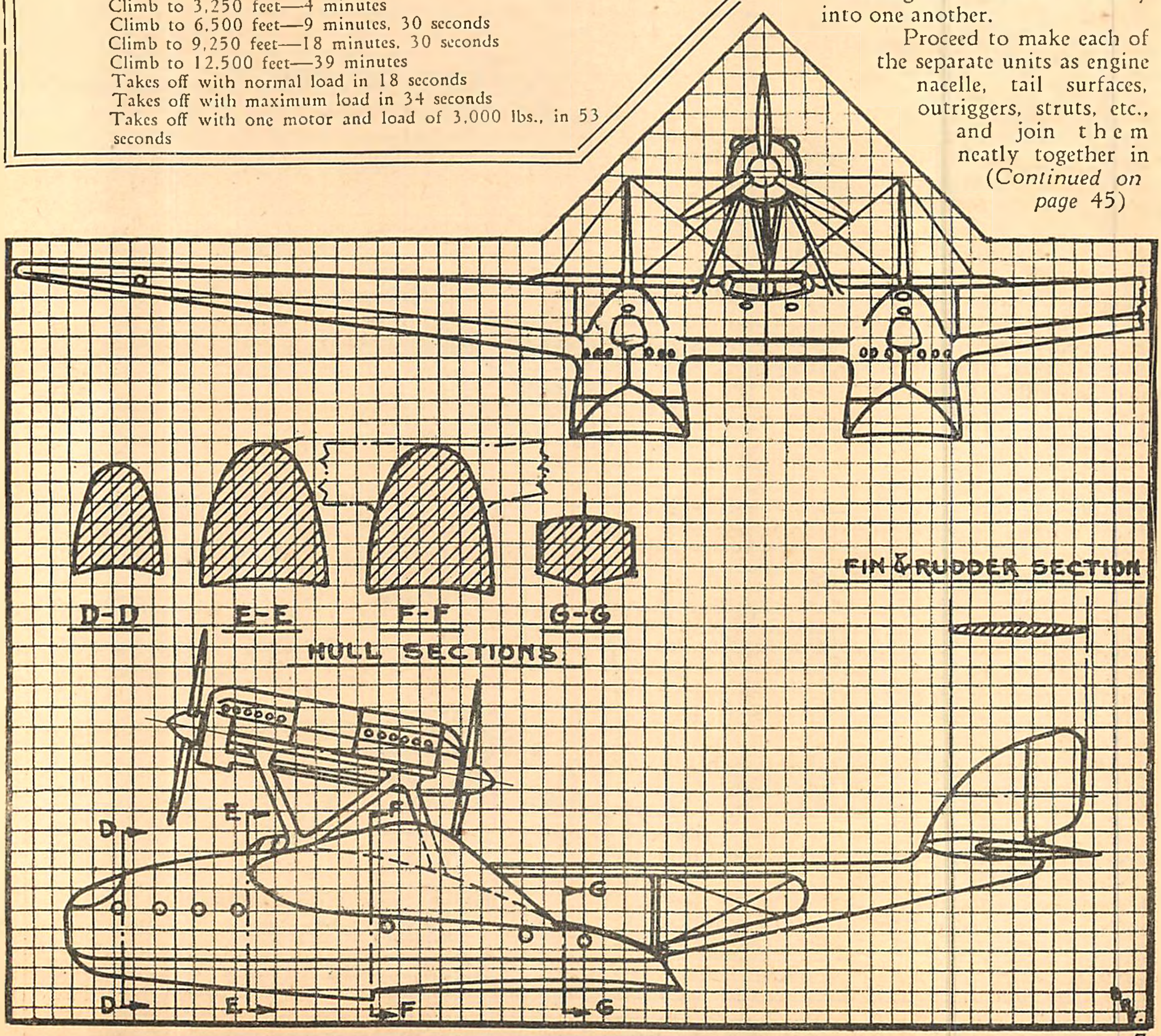
Wing Spread—79 feet 1 inch
Length—60 feet 7 inches
Height—16 feet 5 inches

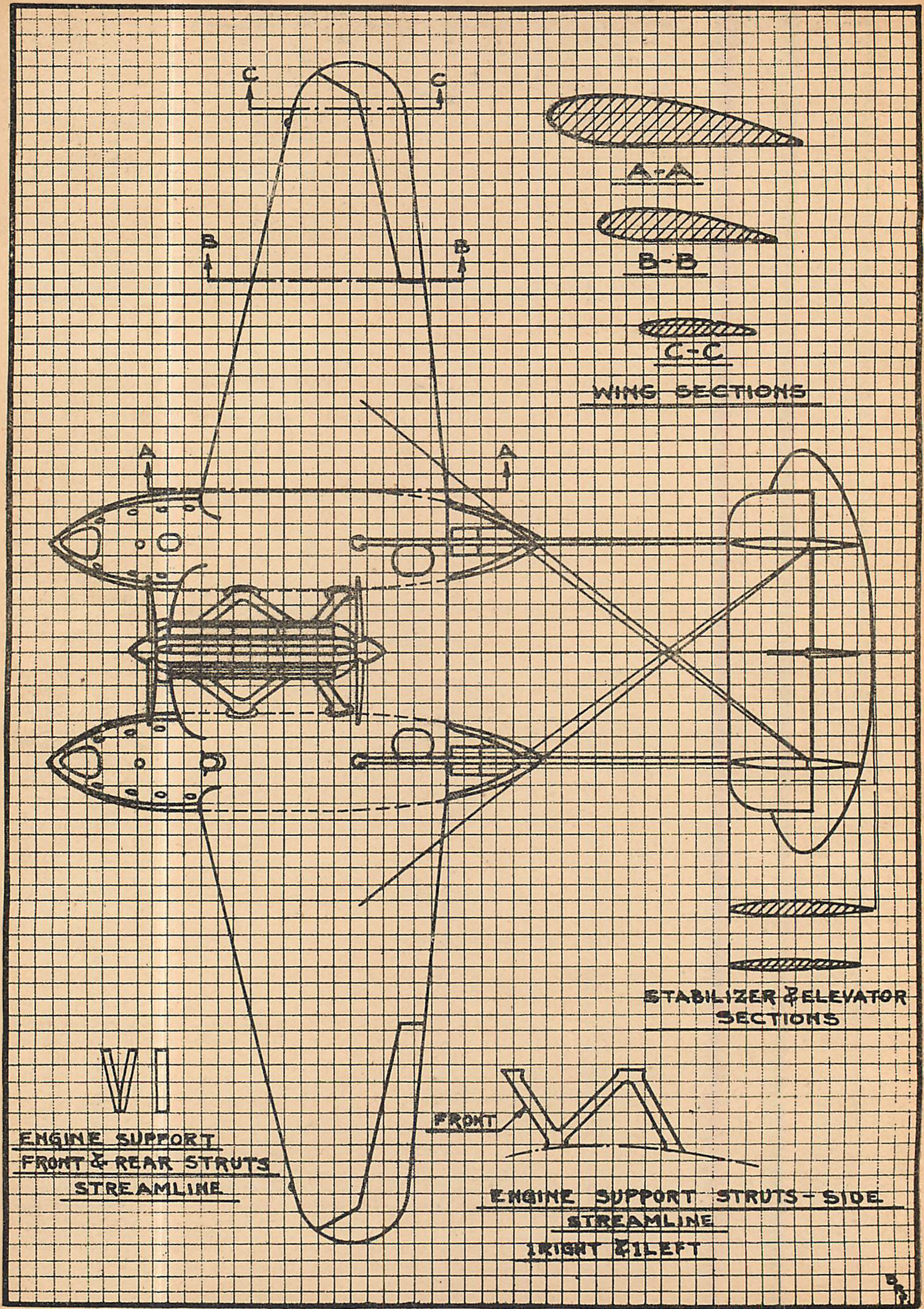
Weights

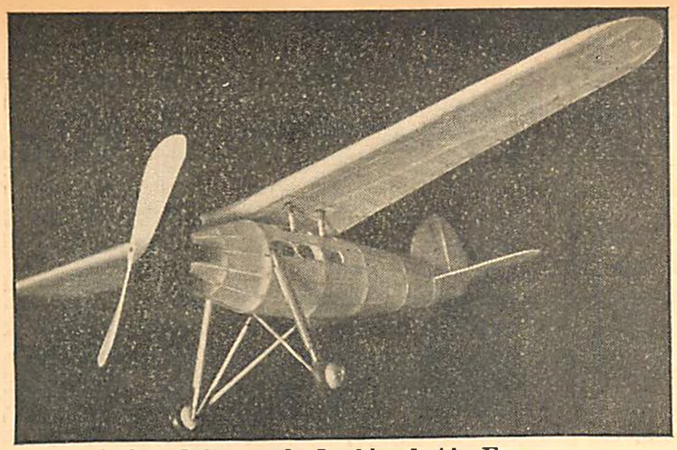
Weight empty—12,122 lbs.
Useful load, normal—5,518 lbs.; Useful load, maximum—8,816 lbs.
Total weight, normal—17,632 lbs.; Total weight, maximum—20,938 lbs.
Weight per HP—11 lbs. (about)

Performance with normal load—

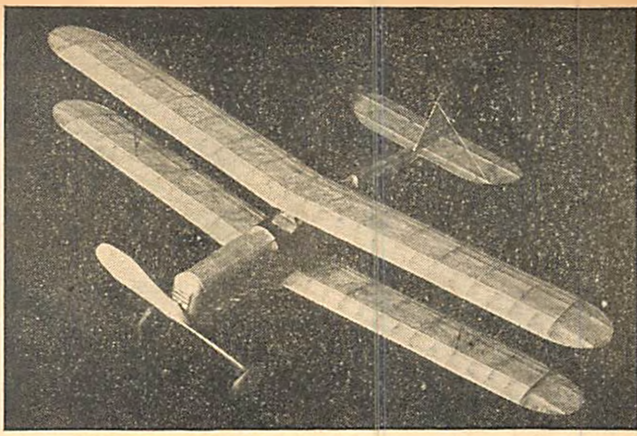
Maximum speed—164½ m.p.h.; Minimum speed—69½ m.p.h.
Cruising speed—136¾ m.p.h.
Climb to 3,250 feet—4 minutes
Climb to 6,500 feet—9 minutes, 30 seconds
Climb to 9,250 feet—18 minutes, 30 seconds
Climb to 12,500 feet—39 minutes
Takes off with normal load in 18 seconds
Takes off with maximum load in 34 seconds
Takes off with one motor and load of 3,000 lbs., in 53 seconds




C
C
A-A
B
B
B-B
C-C
WING SECTIONS
A
A
STABILIZER & ELEVATOR
SECTIONS
VI
ENGINE SUPPORT
FRONT & REAR STRUTS
STREAMLINE
FRONT
ENGINE SUPPORT STRUTS - SIDE
STREAMLINE
1 RIGHT & 1 LEFT



A fine flying scale Lockheed Air Express.



A biplane of original design that flies well.

High Lights of Model Types

Why We Have Many Types of Model Planes and Features that make them Distinctive — Tractors — Hydros

By JACK CLARK

PART TWO

IN the first article last month, we described some types of pusher models. In this issue we conclude our discussion with a consideration of other forms of proved rubber-driven planes. The drawings are not to scale but give the general proportions of the model types. D. S. and S. S. denote respectively that the usual practice is to use double surface or single surface wings for the particular design so marked.

Reference to Fig. 2 will acquaint the reader with various types of cut-down tractor models, commonly called "tractors". The proportions are very close and the average wing span used on each particular type is given.

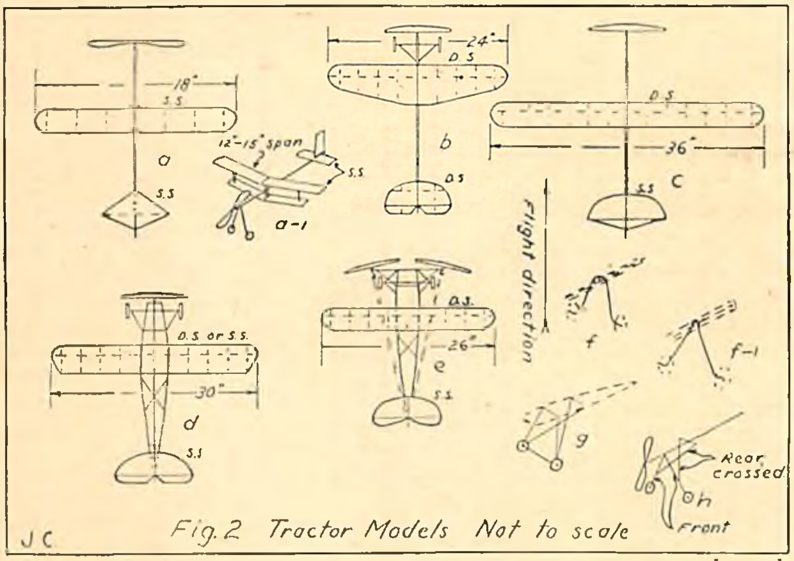


Fig. 2 Tractor Models Not to scale

At (a) we have a general form of the standard indoor endurance tractor. This design employs a large diameter, slowly revolving "prop" of rather low pitch. Such an air screw provides the maximum duration and thrust with least upsetting torque effect. They can be used, however, on only very light machines. The ship at (a) is extremely light and has just enough strength to fly with reasonable safety in calm, indoor air such as would be encountered in halls, auditoriums, etc.

By using a smaller diameter, higher speed propeller, adding a landing gear and making a few other changes, the lightweight design at (a) becomes an efficient indoor R. O. G. type. See (a-1). Such ships are often made in either monoplane, biplane or triplane form and as such they are very graceful flyers in roomy indoor "airdromes".

The biplane that is shown above in full flight.

In sharp contrast to the machines described above, is the high-speed outdoor stunting tractor shown at (b). This type of model is built rather heavy but with great strength. It has a small diameter, low pitch propeller driven at a high rate of speed by more rubber strands than necessary for level flight, and therefore it is a fast climber. It is well to note here that the more power an airplane has in proportion to the power needed for level flight, the faster will its climb be, other factors such as total resistance and weight remaining the same. The type at (b), then, has high speed and overpower, which is needed for the snap and punch of a good stunt flight. As a further aid to stunting ability, the machine has a rather short wing span and small tail surfaces to enable it to roll easily. It also has a rather long, heavy landing gear, giving it a low center of gravity to make it swing out of a maneuver into normal position quickly. Better stunt flights can be secured, incidentally, with this type, if the machine is flown into the

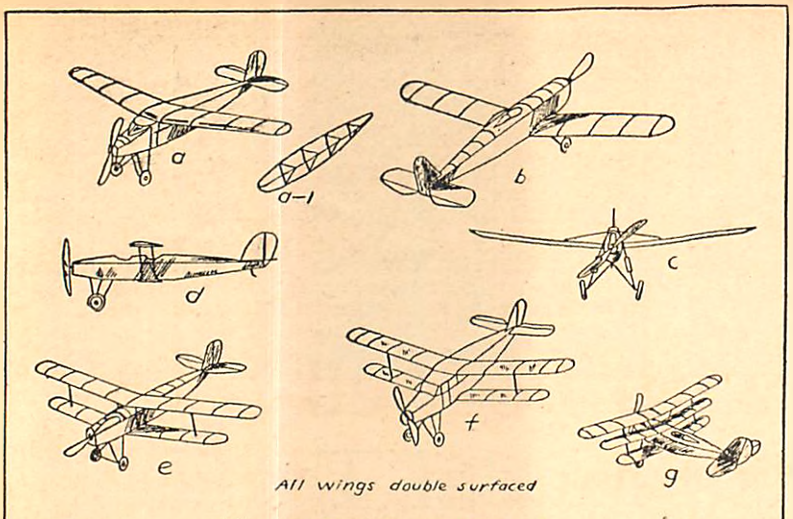
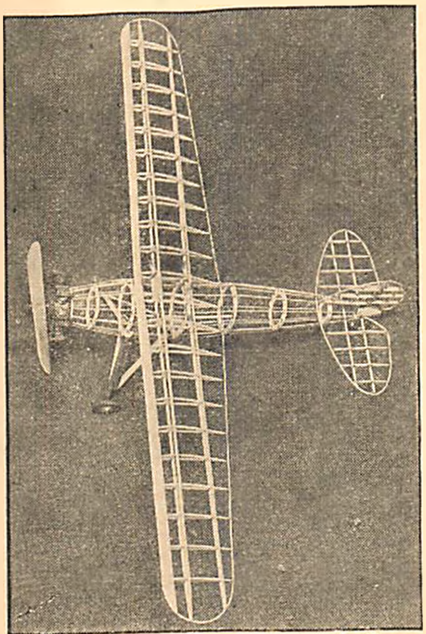


Fig 3 Fuselage Models

wind. The motor-stick in this type must be strong and rigid to resist the twist or torque of the heavy, tightly wound rubber.

AT (c) is shown a form of outdoor tractor sometimes called a "gooseneck" because the screw and portion of the motor-stick in front of the wing have to extend quite a bit ahead of the lifting surface for good balance. Note the high aspect ratio wing (ratio of span to width or "chord"), which makes for efficiency in climbing, to gain good altitude and hence long duration. The reason why a long, narrow wing is better than a short, wide one, within certain limits, is because an effect produced, known as "tip vortexes" that reduce efficiency, is less in proportion to the lift on a wing with the former shape. The suction at the top of the wing combined with the pressure on the bottom of the wing causes the air to spiral off at the tips, thus creating the undesired "vortexes".



Here is neatly constructed the framework of the Lockheed.

The type at (c) very closely resembles the indoor tractor at (a), but it is usually made larger and also a good deal heavier in proportion to its size in order to better withstand the stresses caused by sudden outdoor air currents.

For the benefit of those readers who may be unacquainted with it, it is well to explain at this point the difference between the meaning of the word stress and the word strain as these terms are used by engineers in design discussions. Stress means the force or forces acting, as, for instance, a gust of wind striking a wing tip; whereas, strain means the effect produced in the wing tip by the stress, such as bowing or bending resulting, perhaps, in the cracking of the wing's spars because they were too weak to withstand the gust of wind, or the stress.

A machine that is properly designed will have such strength that the stresses met with in normal service will produce only slight strains. If a plane is said to have a factor of safety of eight, it means that the machine will be able to withstand up to eight times the maximum stress or combination of stresses expected when the machine is in flight. The weight of a trout on a fishing rod is the stress that causes the strain or bow in the rod. If a spar of a model plane's wing is made strongly enough the slight temporary strains produced by the many stresses met with in ordinary flight will nowhere near result in a permanent crack or break in the spar. The model aircraft builder's biggest problem is to combine the greatest possible strength with the least weight; and this problem, likewise, is one of major concern with the designers of our great modern air liners.

The design at (c) may also be modified and fitted with a landing gear to convert it into an R. O. G. single-stick duration type. Such changes would include a smaller propeller, a shorter, wider wing of greater strength to handle the extra load of the increased weight, a stiffer motor-stick and a stronger tail construction.

(d) Fig. 2, shows a form of outdoor tractor for all-around flying, having a two-stick frame or fuselage in addition to the motor-stick. This type is nearly always built with a landing gear. One decided advantage of this machine over the gooseneck shown at (c) is that the tail will not be warped out of line from the twist of the motor-stick when the rubber motor is fully wound, since the stick can be left free at the rear end, from the frame carrying the tail unit. It is prevented from bowing down by a rubber loop around the body. The tractor model at (d), however, is heavier than the other types that have been considered except, possibly, the stunting type.

(e) shows a speedy twin-tractor racer R. O. G. model that has been developed with success. This machine is very stable laterally due to the opposing torques with the twin propellers. It is a speedy type of flyer.

(f) shows a general form of landing gear made

(*Continued on page* 44)

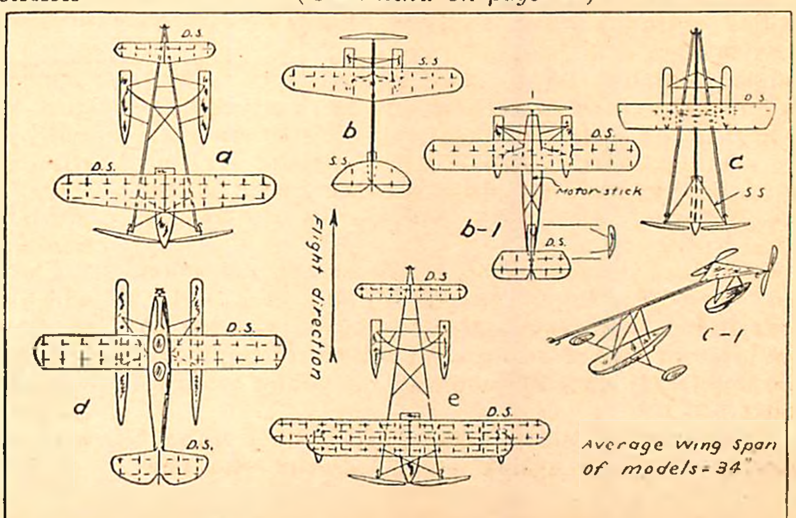
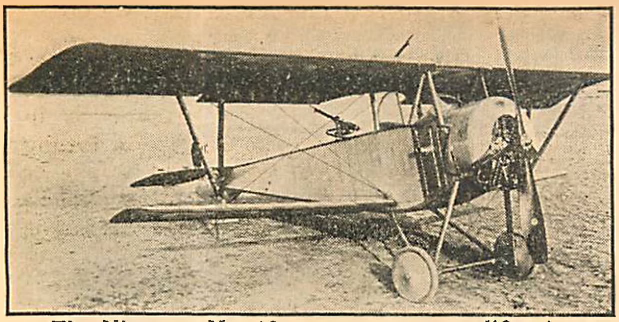
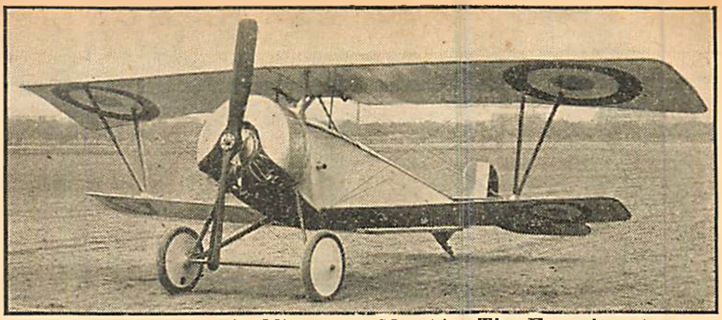


Fig. 4 Seaplane Models Not to scale



The Nieuport No. 12, a two seater modification of the model No. 11.



One of the early Nieuports No. 11. The French put great dependence in this plane early in the war.

Over the Lines with Pegoud

How Adolph Pegoud, One of the Greatest Pre-War Stunt Fliers, Served His Country in the World War

By F. CONDE OTT

AS THE last of the German anti-aircraft shells popped harmlessly, yards back of his fast flying Scout ship, Adolph Pegoud heaved a sigh of sincere satisfaction. He had just flown through a particularly thick enemy barrage on his return from a bombing expedition, the purpose of which was to initiate the young newcomer, Jean Michel, into the arts of the trade.

The mission had been satisfactorily accomplished with a goodly share of damage to an obnoxious nest of Boche heavy field pieces and the men were on their way home. Pegoud was bringing up the rear of the two ship expedition, one watchful eye on his young charge and another ever on the alert for surprise attacks from enemy ships.

They were winging along at about three thousand meters with scattered clouds floating lazily along just overhead when suddenly a German Fokker fell upon them from above.

All Pegoud's concise precautions had been unavailing. The German's trick was perfectly executed and he had opened a murderous fire with a brace of machine-guns at the very instant that he had commenced his swoop.

Poor Michel, leading the homeward bound caravan, bore the brunt of the vicious onslaught and so deadly was the German's fire that the tricolor ship succumbed without ever a chance to level its own gun on the attacker for a single return shot.

Pegoud, off several hundreds yards to the rear when the opening of the battle occurred, stepped his ship up to her top speed but still his battle-scarred Voisin was no match for the swift Fokker which quickly ducked from sight.

The German was evidently content to rest upon his laurels of a single conquest without even a shot fired at him in defense and poor Pegoud was left to the bereaved task of a sorrowful homeward flight and the unpleasant duty of reporting his young companion's loss.

Pegoud carried out the latter detail but not without vowing vengeance against every German who flew or walked in war regalia. It was a vow that he carried out to the bitter end and the high lights of his career suffice to evidence the sincerity of his purpose.

Pegoud had had considerable flying experience before the outbreak of hostilities in 1914. Some of it had been with the military service in Morocco where he had survived rather arduous campaigns. Thus he was a seasoned military flyer when he turned his attention to a defense of native soil against the German invasion.

He already had some great accomplishments in aviation to his credit, having been the first man to loop the loop in an airplane as well as the first individual on record to drop by parachute from a heavier-than-air ship in flight.

BOTH of these achievements, soon much imitated and now most common occurrences worthy of notice, were nevertheless, feats of rarest skill and bravery for a man to attempt for the first time. They adequately bespeak the courageous heart of the daring Frenchman.

GEORGES GUYNEMER disappeared September 11th, 1917, after shooting down 54 German planes. Dr. Eric Knauss, director of the German-Lufthansa Airlines, delivered to Georges Brun, director of the French Farman Lines, Guynemer's pilot card along with a letter explaining that a big German scouting plane felled Guynemer at Poel Chapelle, north of Ypres.

German soldiers obtained Guynemer's identification papers before his body and plane were pulverized by shellfire.

Pegoud carried these same death-defying tactics to the battle front with him. His earliest efforts were mostly confined to reconnaisance work and bombing in both of which fields of endeavor he excelled.

His rare ability to fly to a given destination from home and strike it exactly, combined with his unusual penchant for extremely low flying on bombing trips, made him a deadly emissary to send on important flights.

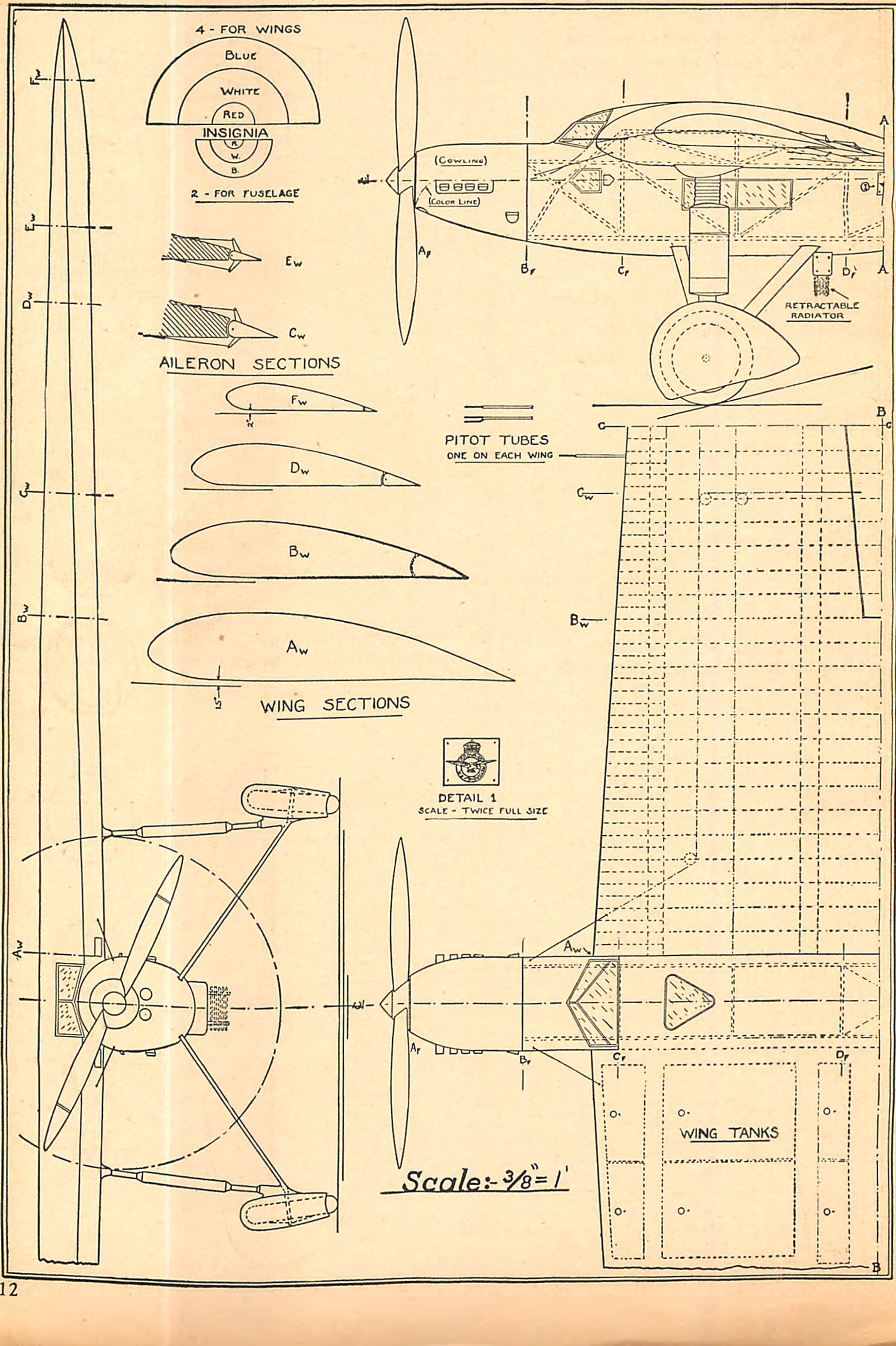
One particular occasion typifies the disdain in which he held both death and the foe who tried to administer it. He had bombed the railroad center of an important junction to the German front. His unerring aim had placed four huge bombs precisely upon points of greatest vulnerability and in just ten minutes time, a highly strategic German position was in utter ruin.

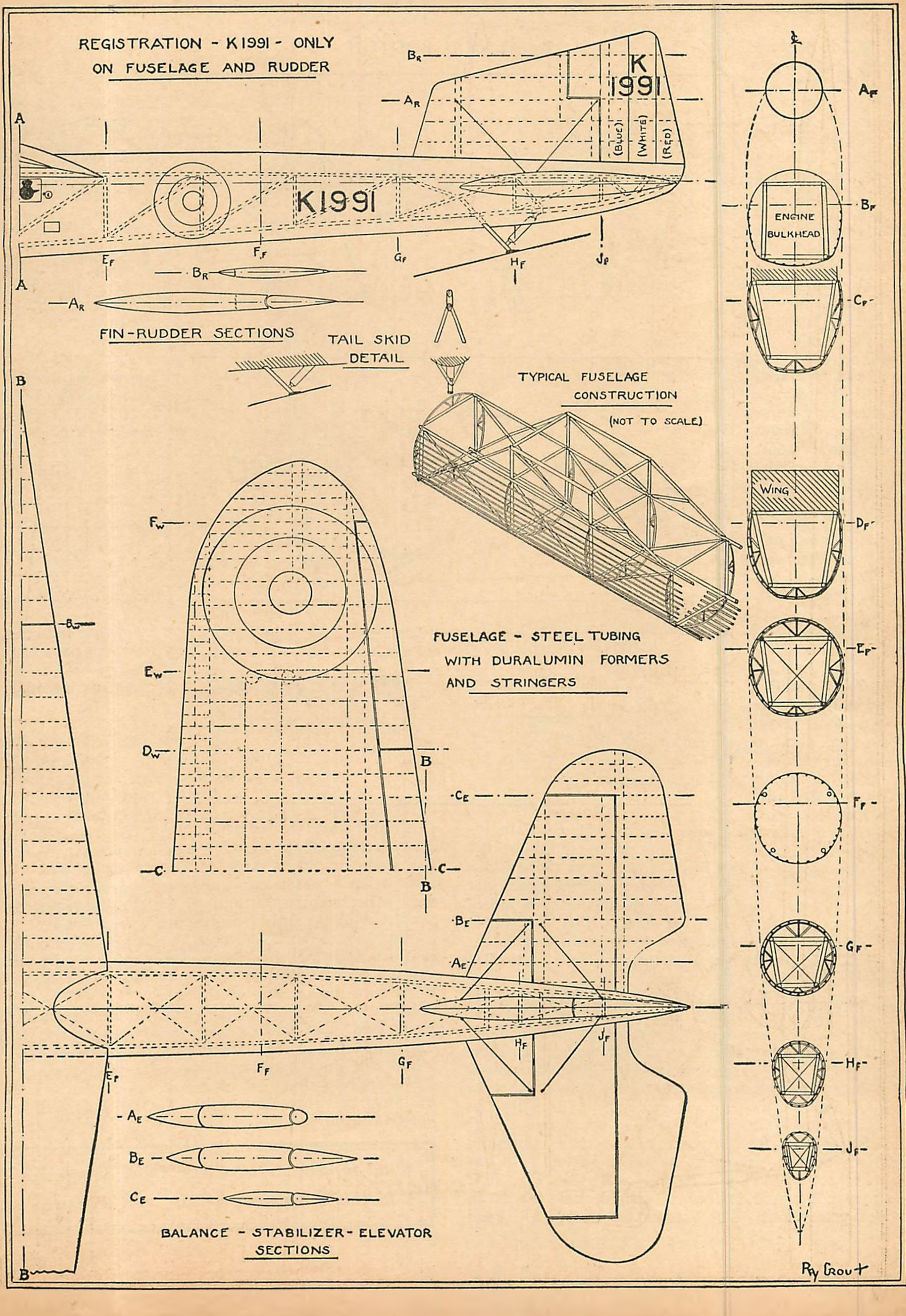
Close by the railroad center was an airport from which two German ships had tried to rise to ward off the French invader. Both of these he destroyed, the first of them before it even got off the ground.

He literally flung himself upon this ship as it was taxiing along the ground for the take-off, coming within fifty feet of the ground entirely oblivious of

(*Continued on page* 38)

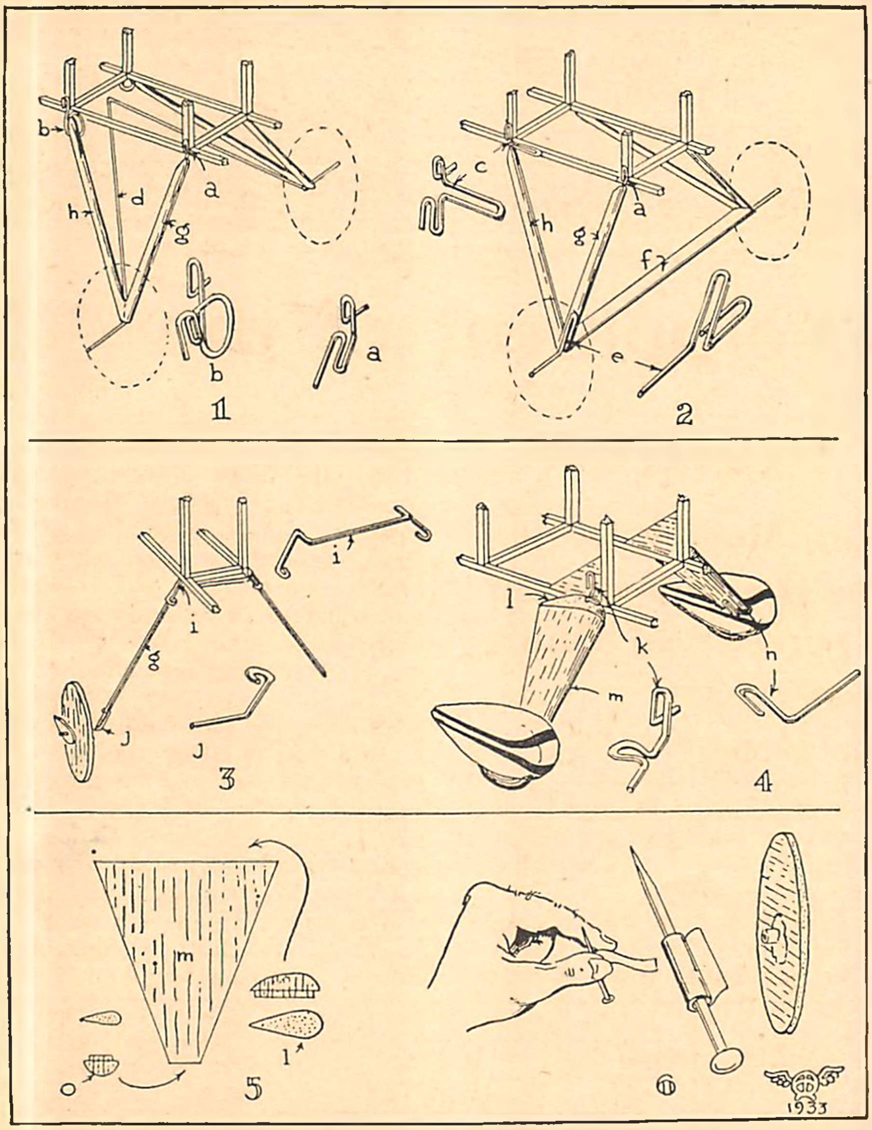
The Fairey Long Range Monoplane




REGISTRATION - K1991 - ONLY ON FUSELAGE AND RUDDER
K 1991
(BLUE) (WHITE) (RED)
K1991
FIN-RUDDER SECTIONS
TAIL SKID DETAIL
TYPICAL FUSELAGE CONSTRUCTION
(NOT TO SCALE)
ENGINE BULKHEAD
WING
FUSELAGE - STEEL TUBING WITH DURALUMIN FORMERS AND STRINGERS
BALANCE - STABILIZER - ELEVATOR SECTIONS
Ry Grout

Helpful Hints for the Model Builder

By ALAN D. BOOTON



HERE are some more hints on landing gears. These are sturdy, flexible shock absorbing landing gears that prolong the life of models.

Fig. (1) is a split type gear used on larger semi-scale flying models. No size or dimensions are given because the type shown could be used on a 15″ as well as a 36″ model, provided the builder uses some judgment about the sizes of wire and hard balsa selected.

The unique part about the gear is that it is stiff enough to support the model, but absorbs most of the shock during hard landings, owing to the flexible connections designated by (a) and (b) in detail, and the music wire struts (d). The detail of (a) shows clearly how the wire is bent. Starting at the top, the short length is to be pushed into the fuselage, then the inverted "U" is made. The right side is longer making the fitting stiffly flexible. Then two more "U"s are bent; the left one is inverted and perpendicular to the right one, and the end of the left "U" is pushed in the upper end of the balsa strut. The "U" bends are essential and are designed to be cemented to the fuselage and landing gear strut. They are called "cement spots."

Connection (b) in Fig. (1) is made as (d) except for a single coil of wire instead of the short stiff section. The rear connections receive more shock and are designed to absorb most of it without damage.

Fig. (2) is an axle type used on large planes years ago and still used to some extent. When this type gear is rigidly attached to the fuselage, it does not last long without constant repairs, but when music wire connections are used, repairs are cut to a minimum. Connection (a) is the same as (a) in Fig. (1). Connection (c) is only a variation of (b) in Fig. (1). (b) may be used instead if desired, but (e) is an added precaution. The "cement spot" or "U" bend is under the streamlined balsa axle and the other inverted "U" or shock absorber fits snugly against the balsa strut (g) and is not cemented, only the one under the axle.

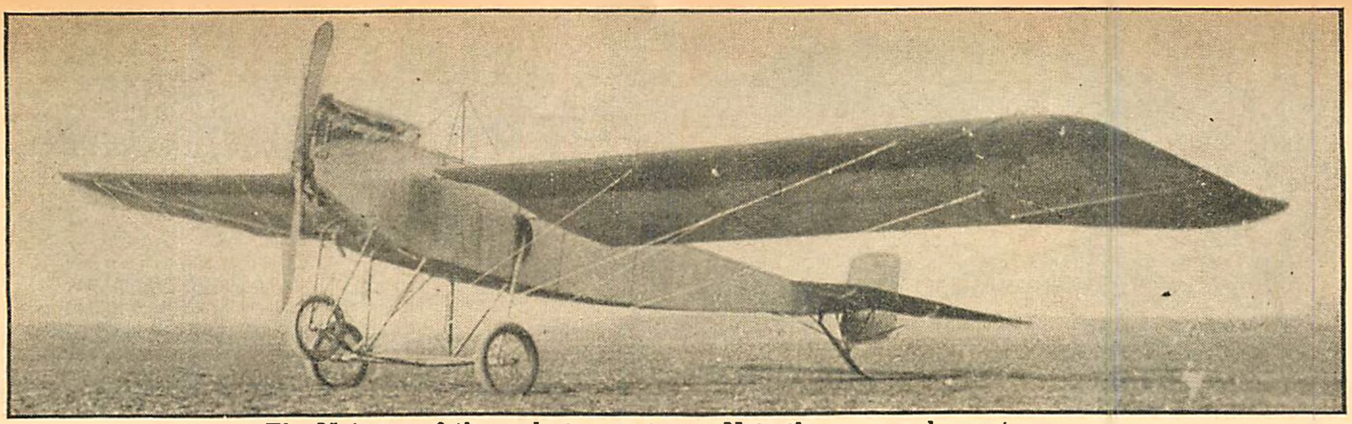
IN Fig. (3) a single bamboo strut for smaller models is shown with the two types of wire fittings. Fitting (i) is shown in detail as in the axle (j).

In Fig. (4) a hollow balsa strut connection is shown. The connection (k) is cemented to the brace block and then to (i) the top end plug. The axle (n) has a "cement spot" or "U" and the axle is long enough to pass through the spot.

Fig. (5) is the suggested manner to make hollow struts. (m) is the approximate pattern, (o) and (l) are the streamlined end plugs. 1/32″ sheet balsa is sanded thinner and two patterns are cut like (m). They are rolled into shape in a dry state and cemented along the seam. Fold a piece of waxed paper over the seam of each and clamp in the end of a book or by some other means. Fit and cement the end plugs and sand to a glossy finish, using your own color scheme.

Fig. (6) shows the method of making paper bushings for light wheels, bearings for nose blocks, etc. Cut a strip of typewriter paper and roll it about two turns on a pin or wire of the size you wish. Unroll it half way, cut it off so the strip still on the pin will make two laps, put on a drop of cement and roll until the lap adheres. Insert in wheel or nose block, while still on the pin and push off with fingernail. Then apply a thin coat of cement around it. These bushings will increase the life of small thin celluloid wheels indefinitely.

What type of Articles would you Like to see in this magazine? Write and Tell us.



The M-4, one of the early two seaters. Note the cross under motor.

The Development of the Fokker Fighters

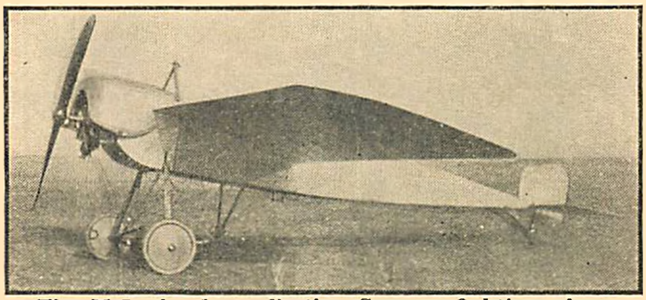
How One of the Most Effective War Planes Was Developed from the Early Experimental Ships

By ROBERT C. HARE

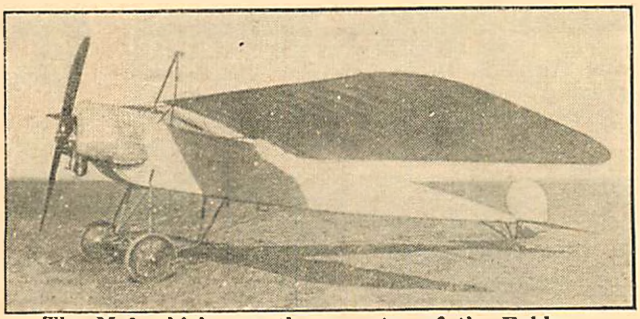
PART TWO

AS IS the case with new aeroplane designers, Fokker followed a successful contemporary design in this case the "Taube" (dove) type machine of Rumpler, Etrich, Ago and Albatross. Althougl these types were drawn upon for ideas, Fokker used considerably modified wing and tail assembly shapes

After having found the rectangular cross-sectioned fuselage better adapted to his building facilities, Fokker used this type of fuselage in the M-4. A Mercedes engine of 120 hp was fitted in the business end of the machine swinging quite a small propeller for the size of the plane. Although probably not visible in the photograph accompanying this article, the M-4 carried a Maltese cross on the underside of the nose, directly behind the propeller. It is said to have been a custom of the early German flyers to paint such crosses on the noses of machines that had been victorious in combat. Since records and data of these experimental machines are almost non-existent, the reason for the cross here is not known, for probably the M-4 did not serve in the capacity of a fighting aeroplane.



The M-5, the first effective German fighting plane, a fast single seater.



The M-6 which was the ancestor of the Fokker Eindecker Pursuit Planes of 1914-15.

The three wheeled landing carriage is very reminiscent of the type used on the American Standard and Martin training planes that were used by our Air Service in its infancy. This landing gear consisted of three "V" shaped pieces of tubing with their apexes connected to a master tube running from the front wheel to a point behind the rear wheel axles. To absorb the shock of landing, two side struts were provided running into openings in the side of the fuselage. These struts had at their ends, a set of shock absorbers so arranged that the weight of the machine on the rear wheels would cause the whole undercarriage to slide toward the body. The openings, visible in the photo on the fuselage side, caused considerable wind resistance.

TO complete the landing assembly, a tripod tail skid was fitted on the end of the fuselage. This type of tail skid was later to find its way into the design of the Bristol Fighter.

A somewhat modified Etrich stabilizer design was used on the M-4. Instead of having a long sweeping chord, the M-4 stabilizer had a rounded leading edge in plan view. There was no elevator on this plane, the action for climb or descent being obtained by bending the trailing edge up or down. A trapezoidally shaped rudder of the balanced type completed the empennage. The entire assembly in this case was braced with steel wire.

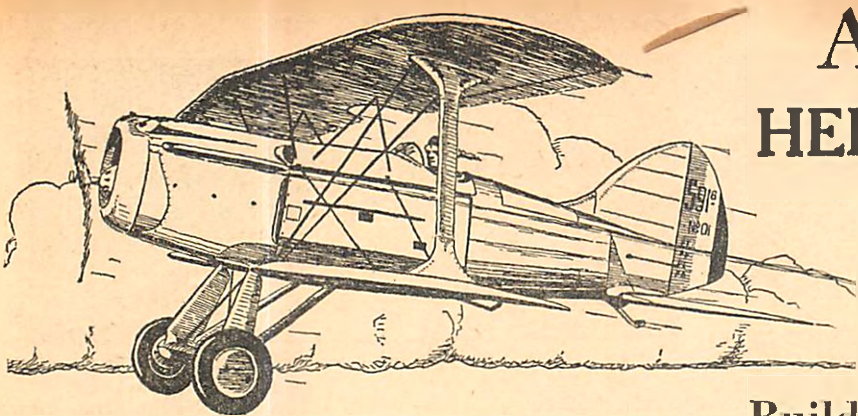
To complete the "Taube" like design, the wing of the M-4 was built on the order of this familiar bird shape, believed to contain inherent stability.

In the conventional construction of the wing, two spars and thirty-six ribs made up the main wing skeleton. The front rib was located about three inches from the landing edge with the rear spar about two-thirds of the chord's distance from the leading edge. A covering of plywood was fitted from the front spar on the lower surface of the wings over the leading edge, and over the upper surface of the wing

(Continued on page 39)

AIR WAYS
HERE AND THERE

What Our Readers Are Doing to Increase Their Knowledge of Aviation. "Air Your Ways" of Building and Flying Model Planes Also



A Spad No. 91 by Harland C. Wood. The plane which appeared here last month was erroneously called a Lockheed Air Express. It was a Fleetster.

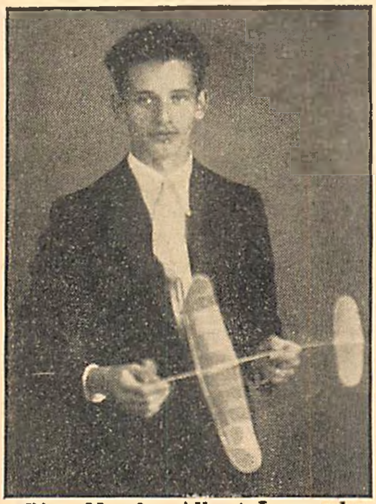
LAST month we gave full details of the National Championship Contest held at Roosevelt Field. However, we were unable to get several pictures of interest which we had planned to publish. Fortunately, they have arrived so that we can present them here.

Picture No. 1 is of special interest. It shows the winning scale model built by Joseph Geigan of 22 T Street N.W., Washington, D. C. This is a Curtiss Falcon. Every detail has been carefully carried out. The framework is all built up of steel tubing. The picture also shows on the left, the Universal Model Airplane News trophy which Geigan keeps for a year and on the right, the small trophy which he keeps permanently. It is evident that the art of scale model building has progressed considerably in the last few years.

Picture No. 2 shows Albert Levy of 1036 Bloor Street West, Toronto, Canada, who won the Bloomingdale trophy for indoor fuselage models, endurance, with a time of 8 min. 56 sec. The model which Levy is holding is not the one with which he won the prize but one of his many other endurance tractors. It is a microfilm job.

John A. Bartol of 7 Codman Hill Avenue, Roxbury, Mass., who walked away with the Stout indoor endurance contest is shown in picture No. 3 with one of his outdoor twin pushers. Bartol made the exceptional time of 17 min. 47-3/5 sec. with his endurance tractor.

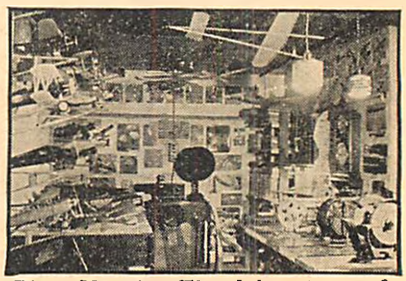
Carl Goldberg was unfortunate enough to make a practice flight of



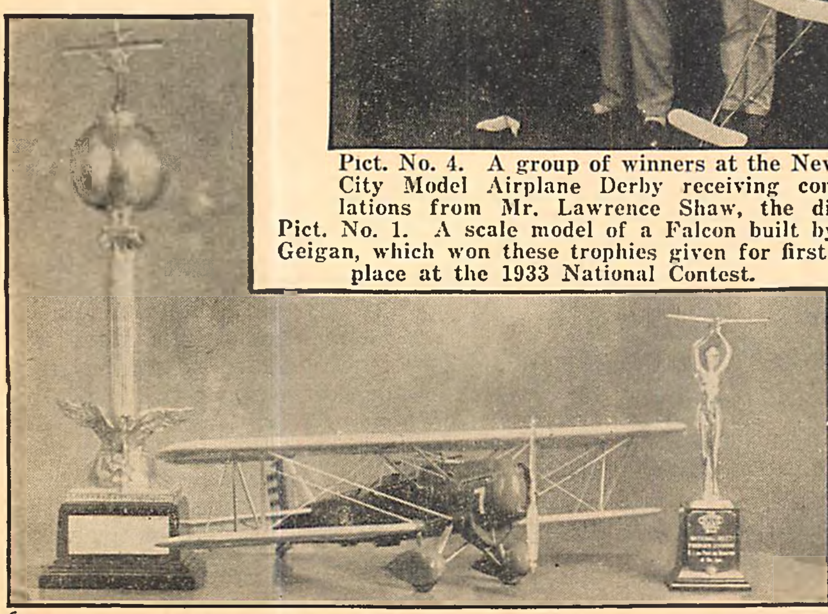
Pict. No. 2. Albert Levy who won the Bloomingdale Trophy by placing first in the indoor endurance fuselage event in the National Contest.

Pict. No. 3. John A. Bartol who won the Stout Indoor endurance contest at the National Contest.

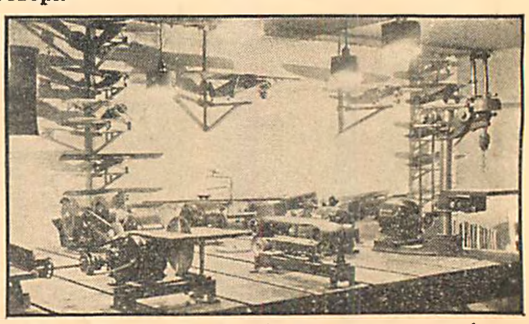
Pict. No. 4. A group of winners at the New York City Model Airplane Derby receiving congratulations from Mr. Lawrence Shaw, the director.



Pict. No. 6. The laboratory of Duane Sheckler, showing an array of his planes.



Pict. No. 1. A scale model of a Falcon built by Joseph Geigan, which won these trophies given for first place at the 1933 National Contest.

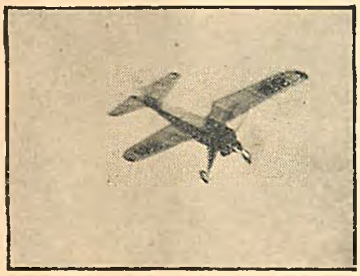


Pict. No. 7. Sheckler's laboratory contains many useful machines.

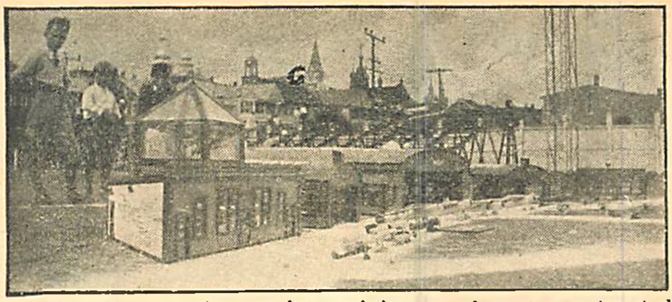
Pict. No. 5. A group of autogiro builders at the New York City Derby. They proved to be fine fliers.

19 minutes but was unable to duplicate this time when he had an official trial. However, Carl claims that he will do 30 minutes before the end of the year. More power to him. We are all watching with great expectation for such a flight.

A large group of model builders attended the New York Model Airplane Derby held in Central Park, New York City, July 15th. Picture No. 4 shows a group of the contestants and winners. On the left is Lawrence Smithline, 301 W. 109th St., N. Y. C., who won the all-balsa glider contest. Beside him is Stephen Faynor of 66 Congress Street, Newark, N. J., who won the commercial fuselage model contest. He is shaking hands with Mr. Lawrence Shaw, the director of the contest. Mr. Irwin S. Polk, one of the officials, is examining Faynor's fuselage model intently. He is probably getting a few ideas for his club, the Bamberger Aero Club. Alton Du Flon of 561 Prospect Avenue, Ridgefield, N. J., staged a very creditable performance



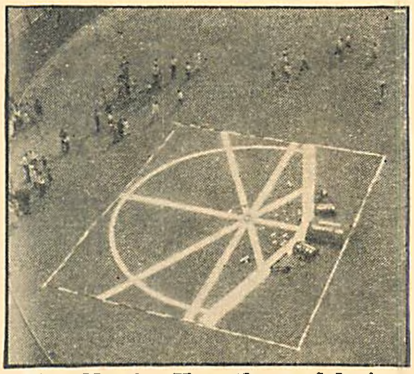
Pict. No. 15. A Polish Fighter in full flight, by Ralph Hammann.



Pict. No. 9. A complete miniature airport constructed by the Junior Mechanics Club of Mt. Carmel, Pa.

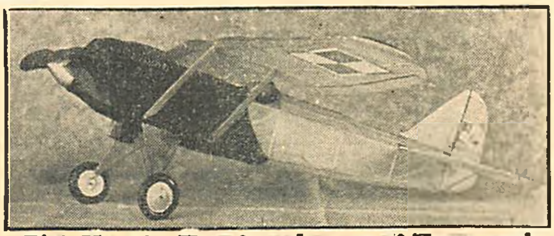
with his autogiro with which he won first place. August Ruggeri of 77 East 4th Street, New York City, is evidently enjoying the remarks that Director Shaw is making concerning Faynor's flight. August won the twin pusher contest.

THIS contest was outstanding for the number of entrants in the autogiro contest. It stimulated many original and unique ideas in this line. Picture No. 5 shows a group of builders who tried their hand at this new type of machine. This event we believe is of special value to model builders as it stimulates originality and thought along new lines.

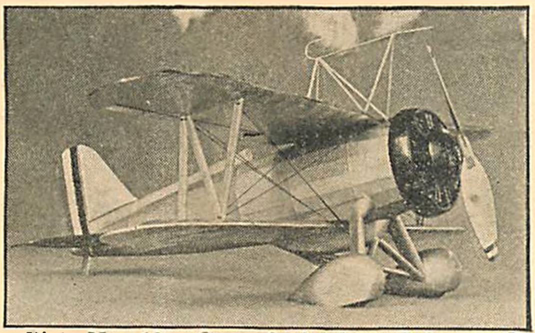


Pict. No. 8. How the model airport looks from the air. Fine work!

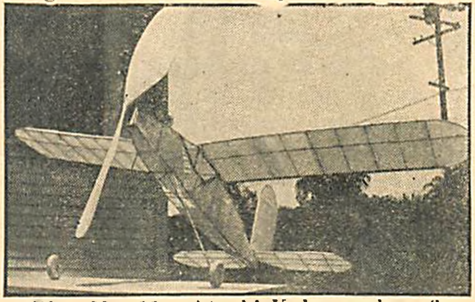
We wish to call the especial attention of those who are connected with commercial aviation to pictures No. 6 and No. 7. These pictures will give them some idea of the interest and progress of one of our excellent model builders, Duane Sheckler of 15744 Auburn Avenue, Detroit, Mich. Heretofore, adults have failed to treat model building in a serious manner. They have had the idea that it was "playing with toys." On the contrary, it has developed



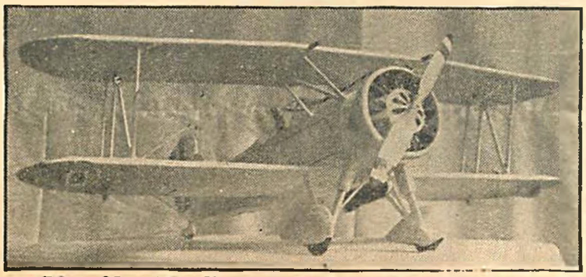
Pict. No. 16. Here is a close up of Hammann's Polish Fighter. It is carefully built to scale.



Pict. No. 12. One of the best flying scale models of an F9C2 we have seen, by J. E. Schafer.



Pict. No. 11. Atushi Koby made a fine job of this Gordon Light Wakefield tractor.



Pict. No. 10. A neat scale model Curtiss Hell Diver built by Jack H. Berry, Jr.

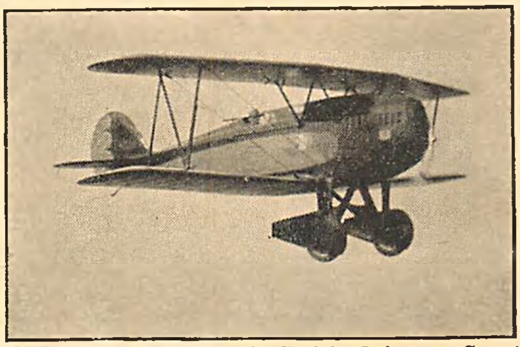
Pict. No. 14. A model "Hawk" flying in Central Park, N.Y.C. Built by Hy Loschin.

Pict. No. 13. Holt Farley Jr. and an endurance tractor of his own design.

Pict. No. 22. Winners of St. Louis All Scouts contest, Billy Pascoe, Leland Schubert, Edward Levey and Dick Courtial.

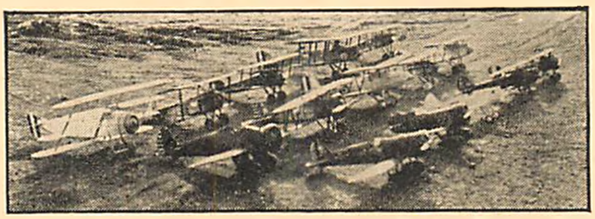
into an essential branch of aviation: that of educating the young men of the country along aeronautical lines. It is providing a means of experiment of which many of the present designers have failed to make use. Because of this, they lack experience in many of the essential principles of flight, mainly in the field of stability.

These pictures show Sheckler's workshop and some of the models which he has constructed. As you can see, he has an exceptional layout for making any parts that may be required. Sheckler's model building career has led him into the field of aeronautics and he is now studying aeronautical engineering at the University of Detroit.



Pict. No. 21. Chuck Smith flying a Great Lakes Trainer at the East Cleveland Exchange Club's model contest.

Our airport engineers seem to have been quite active this summer. Picture No. 8 shows a plane's eye view of the miniature airport constructed by the members of the Junior Mechanics Club of Mt. Carmel, Pa. Joseph Kuklinski, the secretary of the club, tells us that he believes it to be the most complete model airport in the country. It required a great amount of research and compilation of data before actual construction could be started.



Pict. No. 19. This fleet was built by Harry Van Kirk of the Columbus Society of Model Engineers, Columbus, O.

It was constructed entirely by four boys, with the co-operation of Mr. T. D. Laurenson who is supervisor of the manual training department of Mt. Carmel High School. The builders are Ignatius Dempnoch, Joseph Kuklinski, Constance Mysiewich and Theodore Gawinowich. It required nine months of spare time to complete the airport and its complement of 17 planes. The largest building is 6′ by 4′. The two smaller ones are 3½′ by 2′. They are patterned after Army and Navy reserve hangars. The other buildings consist of general offices and passenger terminal.

The lighting equipment has not been neglected. It includes a rotating beacon, three flood lights, a ceiling light, hangar lights inside and out. It is further equipped with lookout tower, first aid station, restaurant in the passenger terminal, six kinds of gasoline in underground service pits and two lighted signs on the sides of the triangular buildings advertising air line service to the midwest and a flying school. The models which populate the airport are complete in all details.

Picture No. 9 shows a close up of the buildings with the planes lined up on the tarmac.

Pict. No. 17. A fine picture of a Monocoupe model going somewhere. Built by Francis Lambiaso. Picture by Duncan Morrison.

JACK H. BERRY, Jr., of 29 Main Street, South Boston, Va., has sent us picture No. 10. It is an excellent model of a Curtiss Hell Diver F8C2. The engine shows exceptional ingenuity. It is very cleverly constructed.

Picture No. 11 shows an endurance model built by Atushi Koby of Van Nuys, Calif., P. O. Box 706. It was built from plans of Gordon Light's endurance tractor which appeared in the magazine. He tells us that last month it made a flight of 36 minutes and 58 seconds, disappearing from sight right overhead without a cloud in the sky.

A very excellent model of a F9C2 built by J. E. Schafer of 734 Albemarle Avenue, Cuyahoga Falls, Ohio, is shown in Picture No. 12. The ship weighs only 2⅜ ounces and it balances perfectly. Schafer has made flights with it of 100 feet or more.

Holt A. Farley Jr., of 41 Farley Avenue, Fanwood, N. J., favors us with a picture of himself, No. 13. He is holding an endurance tractor of his own design which he says flies exceedingly well. It has a span of 33 inches.

Many unusual pictures of models in flight have come to us this month. Here is one picture, No. 14, of a 16 inch Curtiss Hawk flying in Central Park, New York City. The blurred landscape indicates the speed at which this model is travelling. This was built by Hy Loschin of 2847 West 23rd Street, Brooklyn, N. Y.

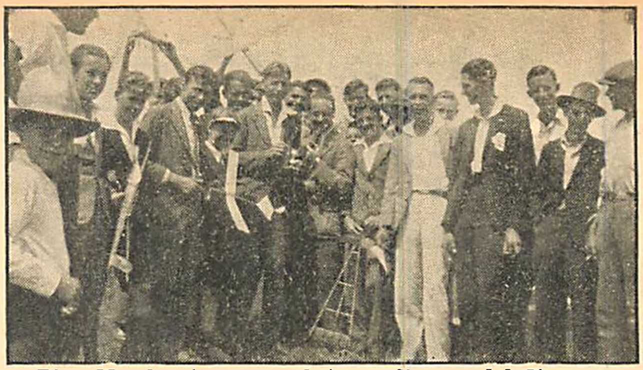
Pict. No. 18. Cedric Galloway built and flies this Capt. Page Navy Racer to improve his knowledge of aeronautics.

Ralph Hammann of 1441 West Hopkins Street, Milwaukee, Wisc., sends us pictures No. 15 of his PZL-1 Polish

(Continued on page 37)

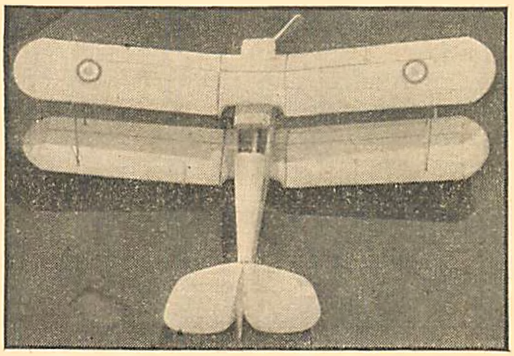
Pict. No. 20. Members of the Collinwood High School glider and model club, Collinwood, O., and some of their handiwork.

Model News From Other Countries



Pict. No. 2. A group of Australian model fliers at one of their weekly contests.

THE boys in Australia have been living up to their well-earned reputations as model fliers during the last six months. Mr. Ivor Freshman sends us some information concerning the activities of the Model Flying Club of Australia. It seems that the members of this club have turned to flying scale models, following the example of the young men of this country.



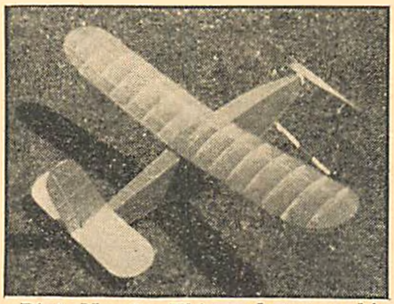
Pict. No. 1. A scale S.E.5 that makes flights of 56 sec. R.O.G., by C. Piggot.

Picture No. 1 shows a flying scale S.E.5 which makes flights of 56 seconds R.O.G. Up to the date of June 20th, this ship was leading in the Model Flying Club of Australia contest for flying scale models. It was built by C. Piggot of Willoughby, Australia.

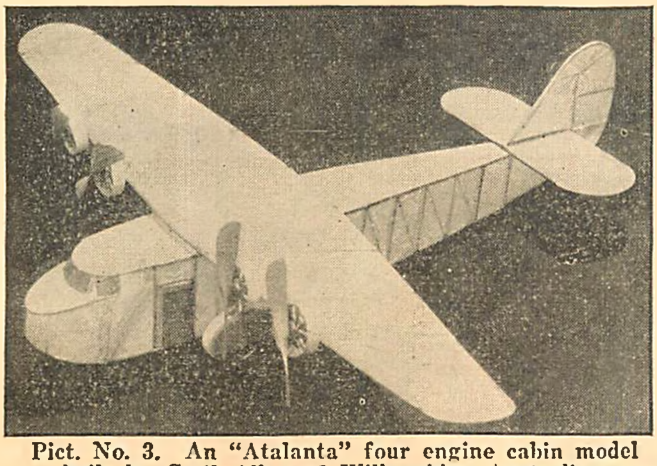
Picture No. 2 shows a group of enthusiasts with Mr. Freshman in the center, at one of their weekly contests. It is pleasing to note that the ages of the contestants vary and do not consist of merely older fellows.

Picture No. 3 is an Atalanta, four engine cabin plane which was built by Cecil Allen of Willoughby. Mr. Freshman has failed to give us any definite information concerning this ship. However, it looks like quite an ambitious undertaking.

A contest was held on June 25th at 9:00 A.M., in Centennial Park at Sydney. The contestants flew for the Angus & Coote Cup and the Percy Marks Cup. The event for the Angus & Coote Cup is open to all comers with all types and sizes of model planes, hand-launched.



Pict. No. 4. This endurance ship holds the record for New Zealand time, 5 min. 53 sec. By W. B. Mackley of the Auckland Model Club.



Pict. No. 3. An "Atalanta" four engine cabin model built by Cecil Allen of Willoughby, Australia.

The Percy Marks Cup is open to all fuselage models which must rise off the ground under their own power. The span of the wing must not be less than 24 inches.

There are several towns which have model airplane clubs in the neighborhood of Sydney. They are Gosford, Newcastle and Orange.

Every Saturday evening, "Wings" gives model airplane news and instruction over the National station 2FC, operated by the Australian Broadcasting Commission. It happens that "Wings" is another name for one of our very well known friends in Australia whom we have talked about in the magazine but who wishes his name kept secret. Perhaps you can guess who this air-minded person might be.

We hope our American readers will write to our Australian friends and tell them what they are doing in this country.

MR. W. B. MACKLEY of the Auckland Model Club of Auckland, New Zealand, sends us picture No. 4 of a very fine fuselage endurance ship. With this ship, he gained the New Zealand hand-launched record of 5 minutes, 53 seconds. Readers will note that this ship is similar in design to Gordon Light's 1932 prize-winning model. Mackley has changed the shape of the body slightly. The performance of Mackley's ship speaks well for this type of design. He had also hoped to enter this model in the Wakefield Cup Contest to be held in America. However, it developed that the holding of this contest was transferred to England.

As Gordon Light's first place was not allowed by the English in the 1932 Wakefield Contest, Light sent one of his ships to England to compete in the same contest this year. Pelly Fry of England flew his ship which placed third with a flight of 2 minutes, 23-3/10 seconds. The young man who won second place, won it with a flight of 2 minutes, 23-5/10 seconds, just 2/10ths more than the flight made by Light's ship . This is about as small a margin of difference in time as is possible to imagine.

Below are the results of the 1933 Wakefield Inter-

(Continued on page 37)

Airplane Maneuver Contest

WE HOPE that our readers have had great pleasure and have gained considerable knowledge while trying to solve the maneuver problems which we have presented in the past six months. Though you may not have won one of our pictures or may not win one of the cash prizes which will be given in the near future, we hope that everyone who has entered this contest, has gained much useful knowledge concerning Aviation and the problems of a pilot.

The contest was concluded with the picture on the cover of our August issue. However, we have not yet told you the name of the winner and those who placed near the head of the list.

Special care has ben taken in choosing the winner of this last contest. More fine answers have been sent in for the sixth picture than for any other one.

We have selected as the winner, Cedric E. Galloway of 610 South 4th Street, Austin, Minn. We wish to congratulate Mr. Galloway for the very fine answer which he submitted. We judge it to be the finest answer that has been submitted so far. It is complete in every detail including a concise explanation covering all phases of the loop, with diagrams. His presentation of the maneuver was extremely neat and cleverly arranged.

One of our old winners, David H. Setzer of Lakeland, Florida, placed second in this particular contest . Those who placed close to the winners are as

(Continued on page 36)

THE BOEING F3B

This shipboard combat plane was developed shortly after the completion of the Boeing type F2B, in response to a demand for a plane that was stronger and could carry a heavier military load.

It has the usual welded steel tubing fuselage and wooden wings with a very rugged landing gear for airplane carrier use. It was the first plane to engage in "dive bombing" with military load. Light bombs were used for this purpose and from this, airplane lessons incorporated in the later and more modern type of dive bombers now employed by the Navy.

This plane was among the first of the military planes to employ such dural tail surfaces.

A squadron of these airplanes won the celebrated

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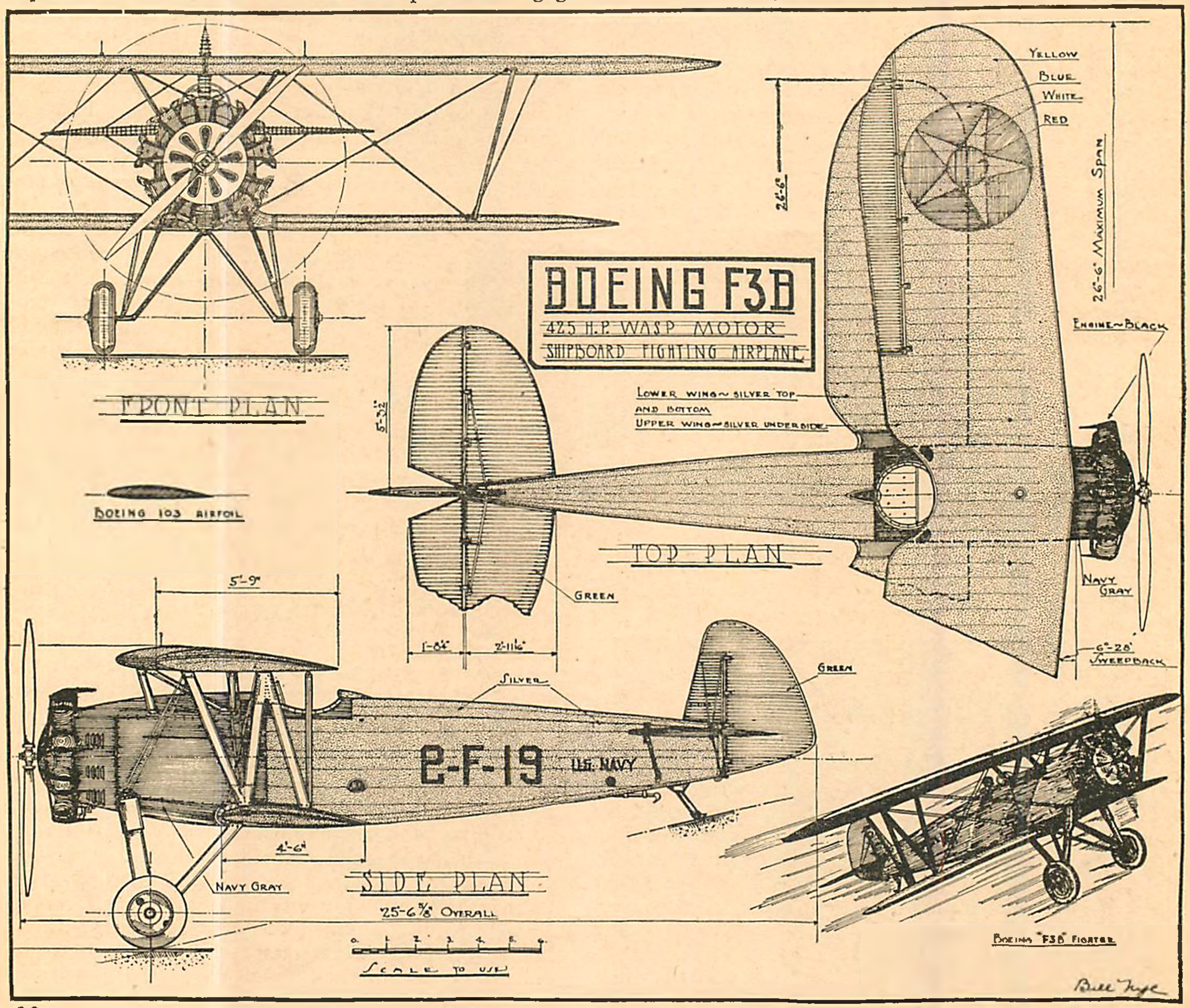
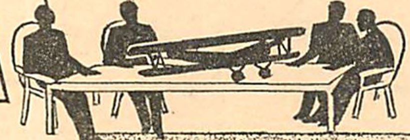


Aviation Advisory Board



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

ONE question regarding airplane design seems to be troubling our model builders more than any other. Many of our readers have written to me asking, "How do I find the center of gravity before I build my model?"

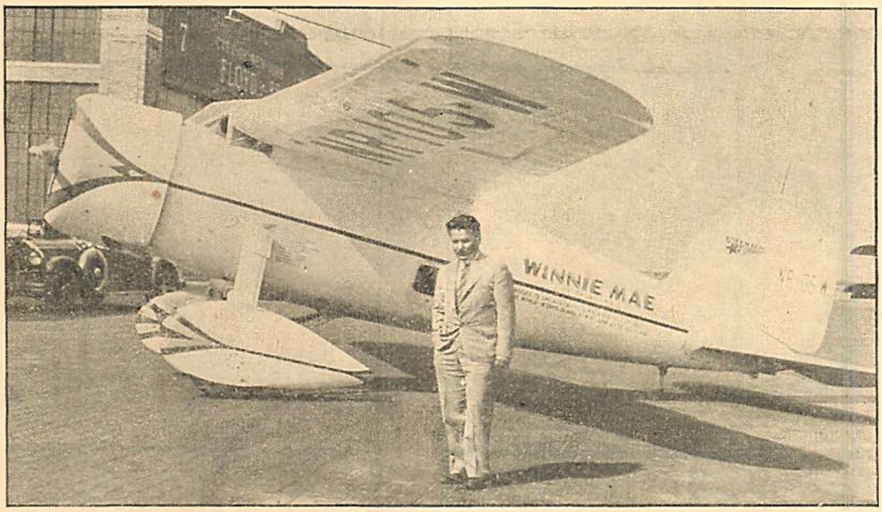
They have asked a question worthy of the skill of the most expert builder. In fact, this is the problem which puzzles large airplane designers more than any other.

Let me state that the center of gravity cannot be determined absolutely accurately for any particular machine. However, it can be located accurately enough for practical purposes.

First, what is the center of gravity? You may say that the center of gravity is the center of weight of the airplane or that point at which the airplane would balance if its entire weight were concentrated at it.

When the average model builder wishes to determine the center of gravity, he usually lays out his drawing on a board and guesses approximately where the center of gravity will be. How accurate he guesses depends upon his experience in building models.

If you do not wish to go into laborious calculation, estimate the center of gravity to be one-third back from the nose of the fuselage and approximately on the line of thrust or three-fifths up from the lower longeron. This holds true for the average fuselage flying model built to scale or to resemble a large, full scale plane.



Wiley Post and the Winnie Mae, the Lockheed Vega which he flew around the world in eight days. The purpose of the flight was to test new scientific instruments that have been designed to aid air navigation.

If you use this system, it is then necessary to check the position of the center of gravity after you have built the model. Then, if the center of gravity does not actually come at the predetermined point, it will be necessary to move the wing to such a position that it will be correct for the actual position of the center of gravity, which has been determined through testing or balancing.

This system makes it necessary for you to allow the position of the wing to be changed if need be. If you do not wish to change the wing, the only method to follow is to add small weights either to the nose or to the tail in order to make the machine balance at the point which you have previously determined as the center of gravity. If you are careful in estimating and have had a little experience in doing this, the position of the actual center of gravity after you have built the machine, should not be very far from the calculated center of gravity.

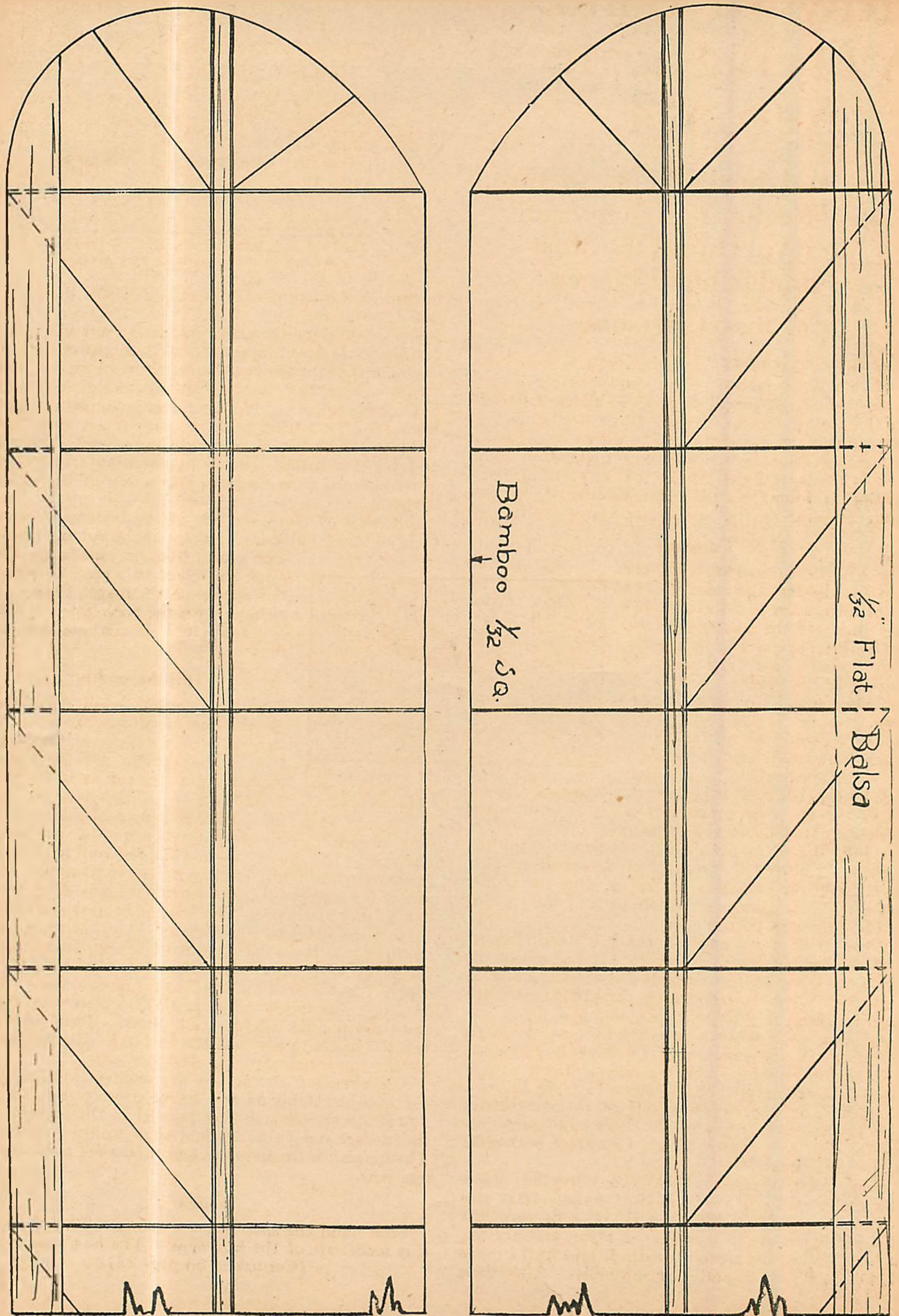
A MORE accurate method but one which requires great patience and a little work is as follows: after you have completed a rough estimate of the position of the center of gravity, calculate the weight of each part of the model. This may be done roughly or in detail. For instance, you may calculate the weight of the stabilizer or you may calculate the weight of each part of the stabilizer. List these weights in a vertical column on a sheet of paper, giving a letter or number to each part.

Now it is our job to determine the moments of each one of these weights about a fixed point, which may be taken at the front end of the propeller bearing. The moments are found in this manner. Measure the horizontal distance from the front of the propeller bearing to the center of each part or "the center of gravity of each part." In the next vertical column, list all these distances after their respective parts.

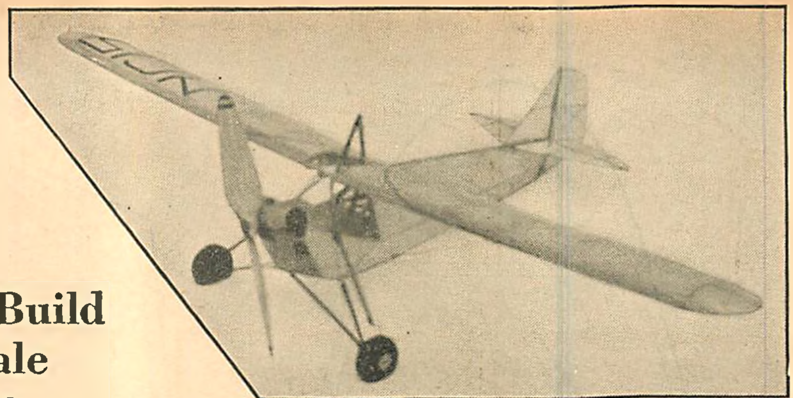
Now to find the moment of any part around this fixed point at the front end of the propeller bearing, we multiply the distance of the part from the fixed point by its particular weight. This gives you the moment of any particular part about the fixed point, which should be listed in the third and next column after each particular part.

In calculating moments in this way, all moments will be tending to turn the machine in one direction about the fixed point, except the weight of the propeller. Thus, all these moments are positive and the propeller moment which tends to turn the ship in the

(*Continued on page* 36)


Bamboo 1/32 SQ.
1/32" Flat Balsa

How to Build A Flying Scale Aeronca



The finished model faithfully portrays its full scale big brother in looks and performance.

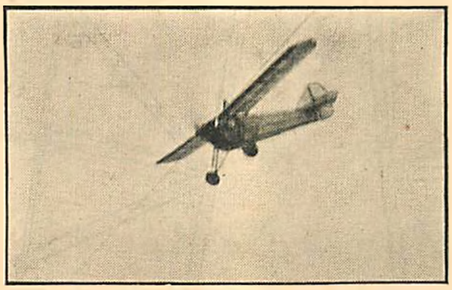
Plans and Instructions to Build an Excellent Flying Scale Model of One of the Most Popular Light Planes

By CHARLES EFINGER

HERE is a model of one of America's most popular light planes. This model makes a very good flying model due to the glider characteristic following which the real plane was designed. Even though the Aeronca closely follows a glider, its performance causes it to rank very high when compared with other light planes. A very strong construction is found in this plane because of the triangular structure of the fuselage, and large depth.

Fuselage

It will be noticed that in the plans for the fuselage there are two sets of lines, solid and dotted. The solid lines are the correct sizes for the fuselage braces and longerons. The dotted lines represent the position of the fuselage when it has been completed. It must be remembered that the fuselage back of the pilot's cockpit is of triangular construction and therefore when it has been constructed, it will only be as high as the dotted lines show.



The model in full flight coming in to a landing. It is not strung upon a wire as it appears in the picture.

Lay the plans on a flat surface, cover with wax paper and hammer pins into the plans in order to form a jig for the fuselage. Cut the longerons and diagonals to size. Place the lower longerons in the jig, glue the rudder post and the diagonals, which are back of the cockpit, in their respective positions.

When these parts have thoroughly dried, remove from the jig and place in a jig for the bottom of the fuselage. Glue all the cross and diagonal braces in position. When this has been completed, hold the upper longeron in place with pins and glue.

As soon as these parts have dried remove from jig and start the construction of the cockpit and nose. This section of the plane is the most difficult part of the plane to construct and care must be taken in order to assemble it correctly. It will be found necessary to hold the braces in place with thread and pins during the course of construction. Construct both sides at the same time.

First, cut all braces to their correct lengths. Now glue the braces G, G', I, I', in their places. Next glue the cross brace X in and then H' H'. Be sure that all these braces are in their correct places and not out of line. When his section has dried, glue in the pieces D, D', F, F', E, E' and Y, respectively. After these in turn have dried, glue in R, R', C, C', B, B', A, A' and Z, respectively.

Before allowing the glue to set, make sure that none of the braces have slipped from their places. Now the bulkheads for the nose can be cut to shape. These are traced directly from the drawings and glue in their positions as shown. Now cut the cowlings to shape from 1/32" flat balsa held into their places with pins and glue. The seat, if you wish to make one, is made of 1/32" flat balsa. The triangular wing brace, made of streamlined balsa, is glued to the top of the upper longeron.

The stringer along the side of the fuselage is made of 1/32"x1/8" balsa, cut to shape and glued as shown. The motor hook is bent as on the plans and glued to a piece of wood also shown on the plans. This piece of balsa with the hook glued to it is in turn glued in its position as shown.

Tail Assembly

THE rudder fin, stabilizer and the elevators are all made in a jig the same as were the sides of the fuselage. The upright for the fin is made from a strip of balsa 1/16"x 3/32"x2¾". The base for the fin is made of a strip of balsa of the same dimensions, the leading edge and braces being made of 1/32" square bamboo and the rib being made from a piece of 1/16" square balsa cut to size. The rudder is constructed in the same way, pins being used to hold the bamboo in place which the glue is setting.

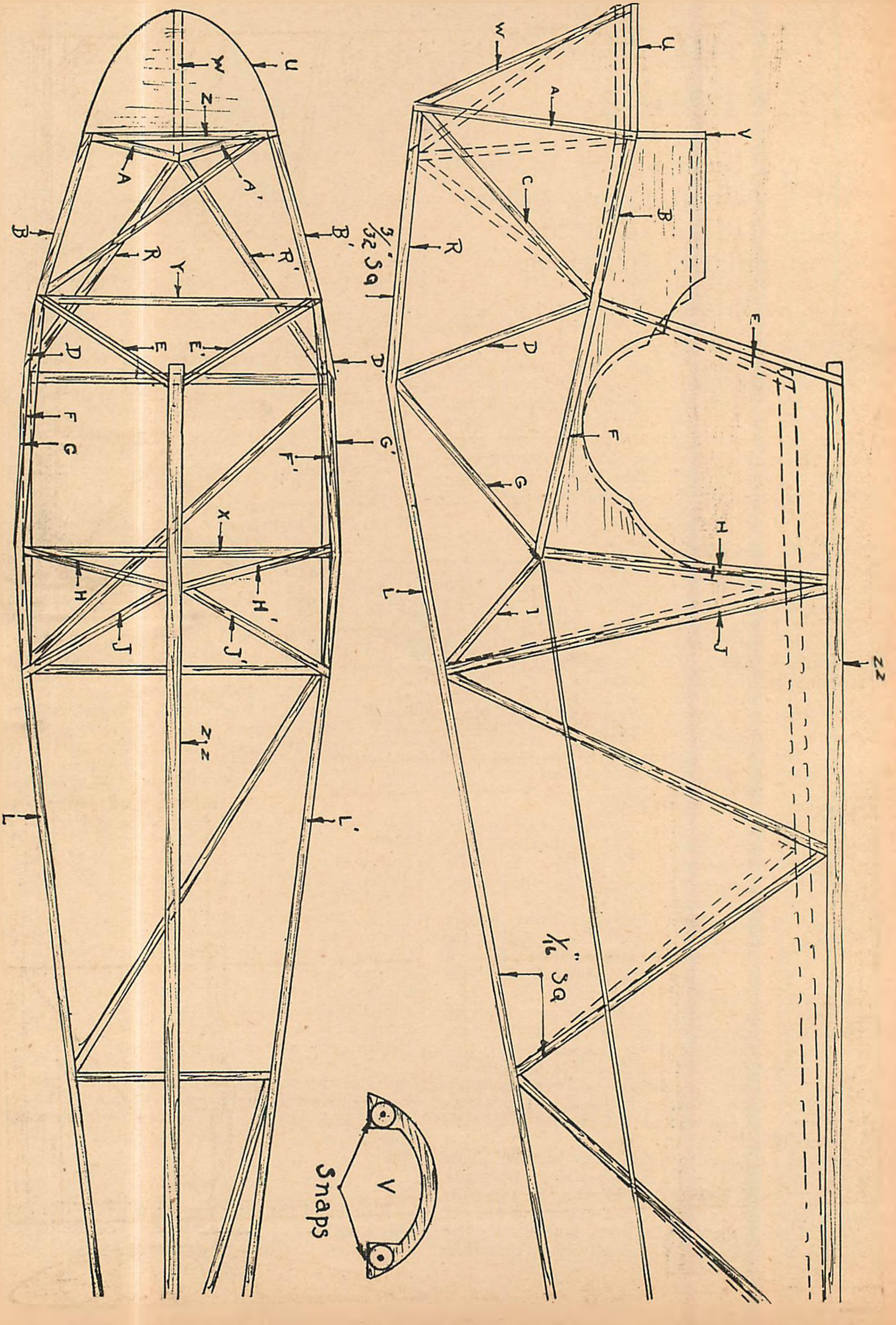
Now the stabilizer and elevator. Cut the spars and ribs to size. Hold the spar in its correct position on the plans with pins. Cut strips of bamboo 1/32" square for the leading edge and braces. Bend the bamboo to its correct position; hold in place with pins and then glue the ribs in their places. Then cut the bamboo braces to size and glue in place. Do the same for the construction of the elevators.

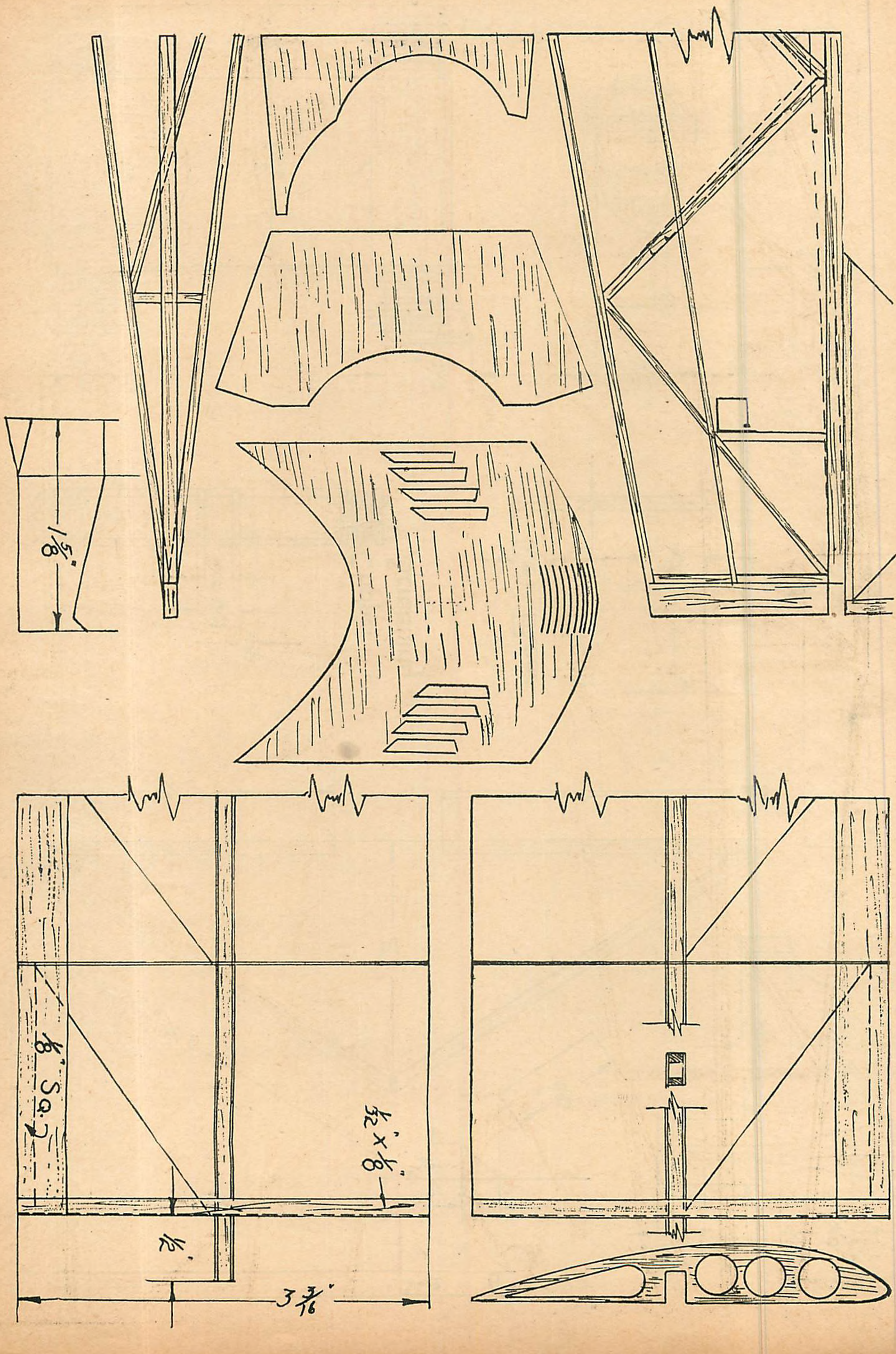
When the tail assembly is dry remove from the jig and glue the stabilizer and fin in their correct places. Be sure to get the stabilizer parallel to the bottom of the fuselage and the fin at right angles to the stabilizer. The hinges for the elevators and rudder are made from fine wire.

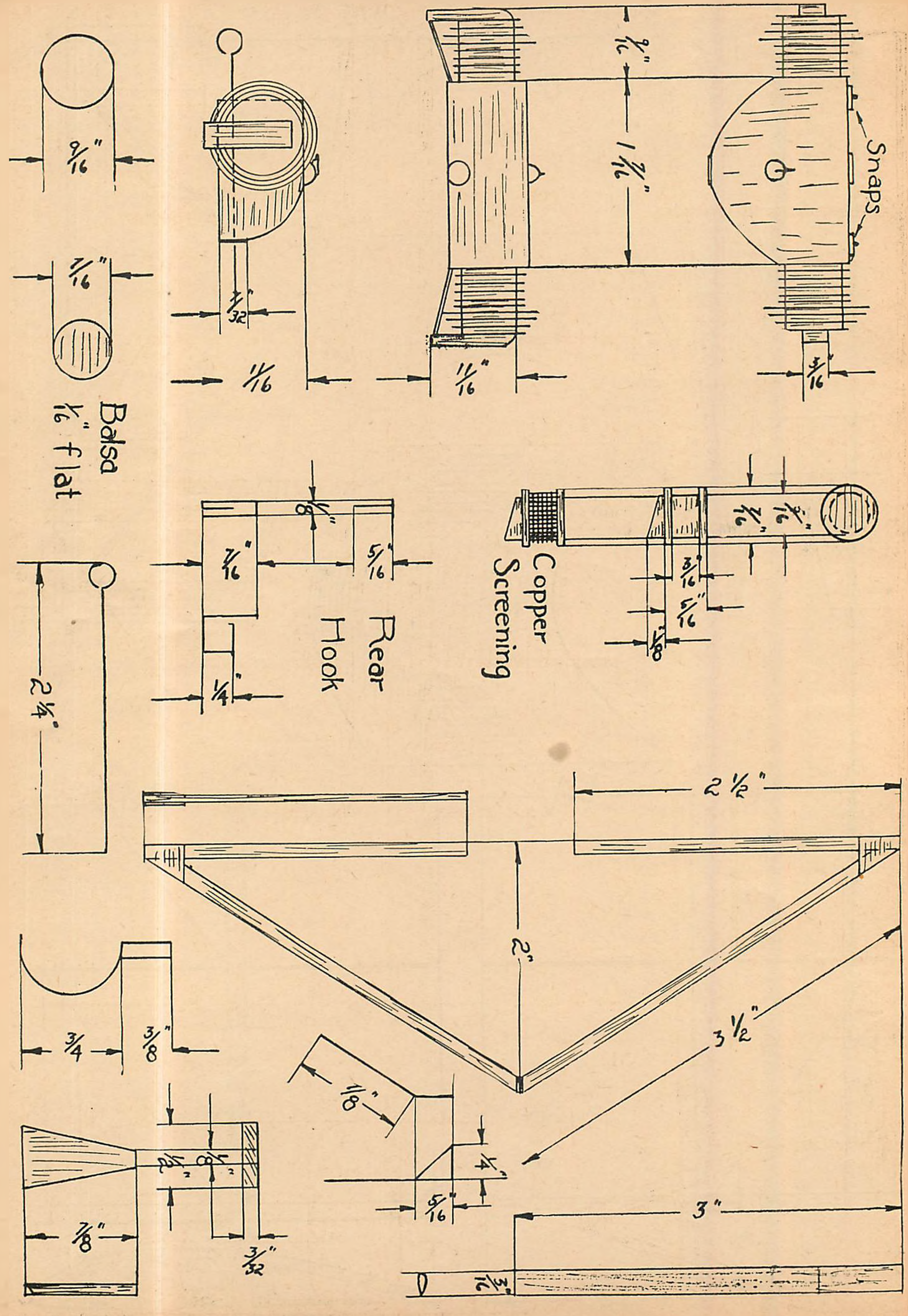
Wings

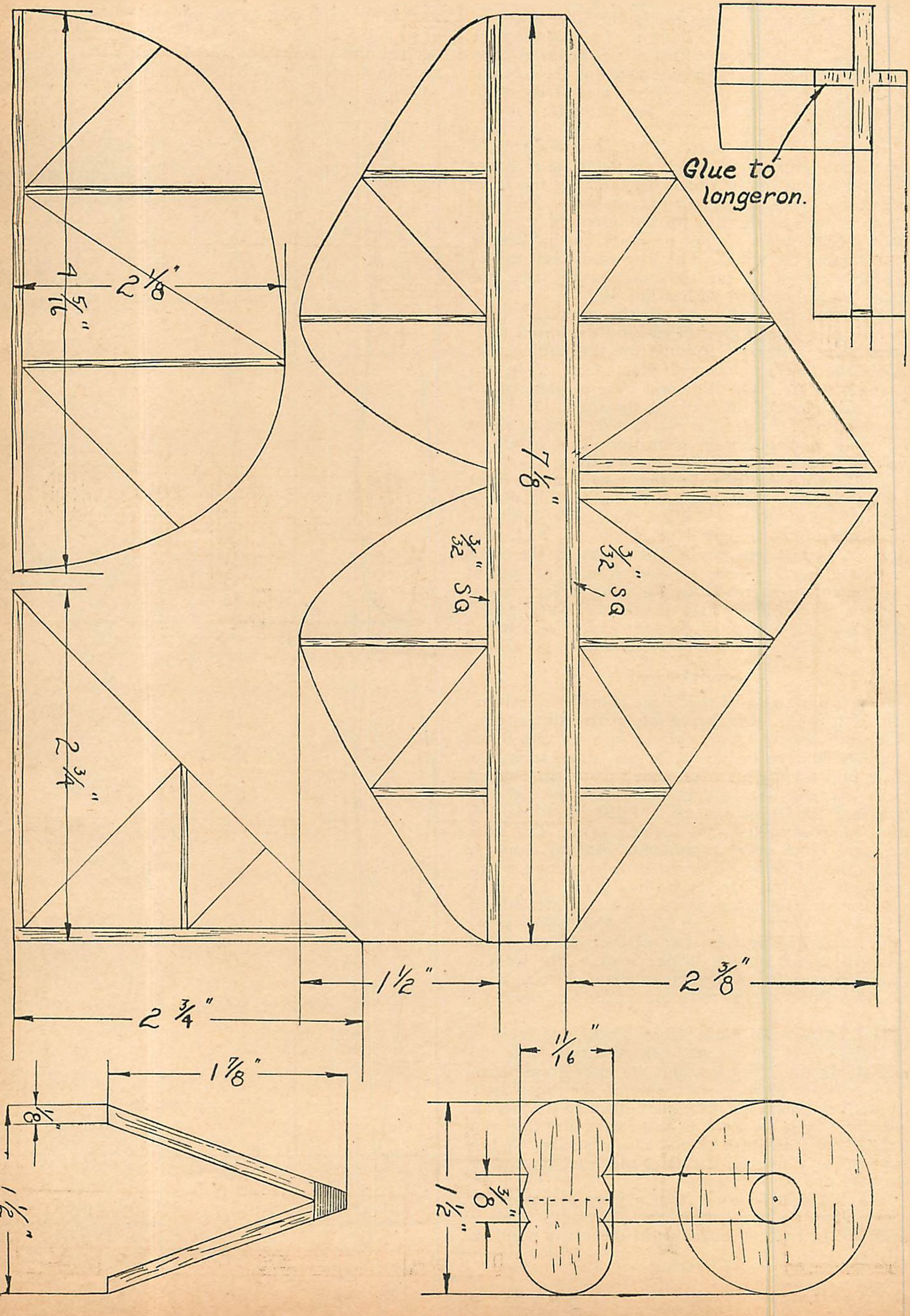
First build the spars for the wings. The spars in this model are of the box type. The box spar gives

(*Continued on page* 28)


U
W
Z
A
A'
B
B'
R
R'
Y
D
D'
E
E'
F
F'
G
G'
X
H
H'
J
J'
ZZ
L
L'
C
I
3/32" Sq
1/16" Sq
V
Snaps


1 5/8"
1/8" Sq.
1/32" x 1/8"
1/2"
3 3/16"


9/16"
1/16"
Balsa 1/16" flat
1/32"
1/16
11/16"
9/16"
1 7/16"
Snaps
3/16"
1/8"
7/16"
5/16"
1/4"
Rear Hook
Copper Screening
7/16"
3/16"
5/16"
1/8"
2 1/4"
2 1/2"
2"
3 1/2"
3/4
3/8"
1/8"
1/4"
5/16"
1/2"
7/8"
3/32"
3"
3/16"


Glue to longeron.
4 5/16"
2 1/8"
7 1/8"
3/32" SQ
3/32" SQ
2 3/4"
1 1/2"
2 3/8"
2 3/4"
1 7/8"
1/8"
1 1/2"
11/16"
3/8"
1 1/2"

the wing more strength with less weight. There is only one spar in the wing, the leading edge acting as a second spar. The spar is built in two halves, one for each wing. Each is constructed of two strips of balsa 1/16"x⅛/x12½". These are used for the top and bottom of the spars. The sides are made from strips of balsa 1/32"x¼"x12½". These strips are glued so as to construct a box.

The ribs are made next. They are made from a flat piece of balsa 3/64" thick. A template of heavy celluloid of one of the ribs is used to trace out fourteen ribs. When traced, cut out the ribs. Now cut a slot in each of the ribs for the spar and then the holes. These holes are not necessary but aid greatly in lightening the wing. The sharpened metal end of a pencil is used to cut the holes in the ribs, the metal being sharpened with a fine file.

When the spar is dry and the ribs completed, place the spar in a jig and glue the ribs in their correct positions. Cut a strip of bamboo for the trailing edge to size and hold in place with pins. Glue. The tips of the spars are made of a solid piece of balsa cut to shape and glued to the ends of the spars. A 1/32" square strip of bamboo is cut to size, bent to shape and glued in place for the wing tip. This is held in position with pins while the glue is setting.

The leading edge is made from a strip of flat balsa 1/32"x1"x12". This is glued to the bottom of the leading edge of the ribs. When this is dry, bend the balsa around the leading edge of the ribs and glue. Hold in place with pins. The braces in the wing are now glued in. They are made from 1/32" square bamboo cut to size. When the wing is dry remove from the jig and glue a strip of balsa 1/32"x⅛"x3½" to the top and bottom of the butt end of each wing. Trim off excess wood and sand smooth.

Landing Gear

The landing gear of this plane is made from bamboo 1/16"x⅛". It is shaped into a streamlined form. The struts are cut to size, placed in a jig and glued. Over the intersection of the points, small triangular pieces of balsa are glued on each side of the landing gear. Remove the landing gear from the jig, dry and sand the joints smooth. These balsa triangles are used to strengthen the landing gear. The axles are made from heavy piano wire bent to shape as shown on the plans. The axles are glued and wrapped with silk thread to the landing gear. The shock absorber strut is made from a piece of streamlined balsa ⅛"x3/16"x3". The shock absorber is made from piano wire bent to the correct shape, glued and wrapped to the bottom of the strut. The landing gear is fastened to the fuselage by means of piano wire, which is glued to the struts and to the longerons.

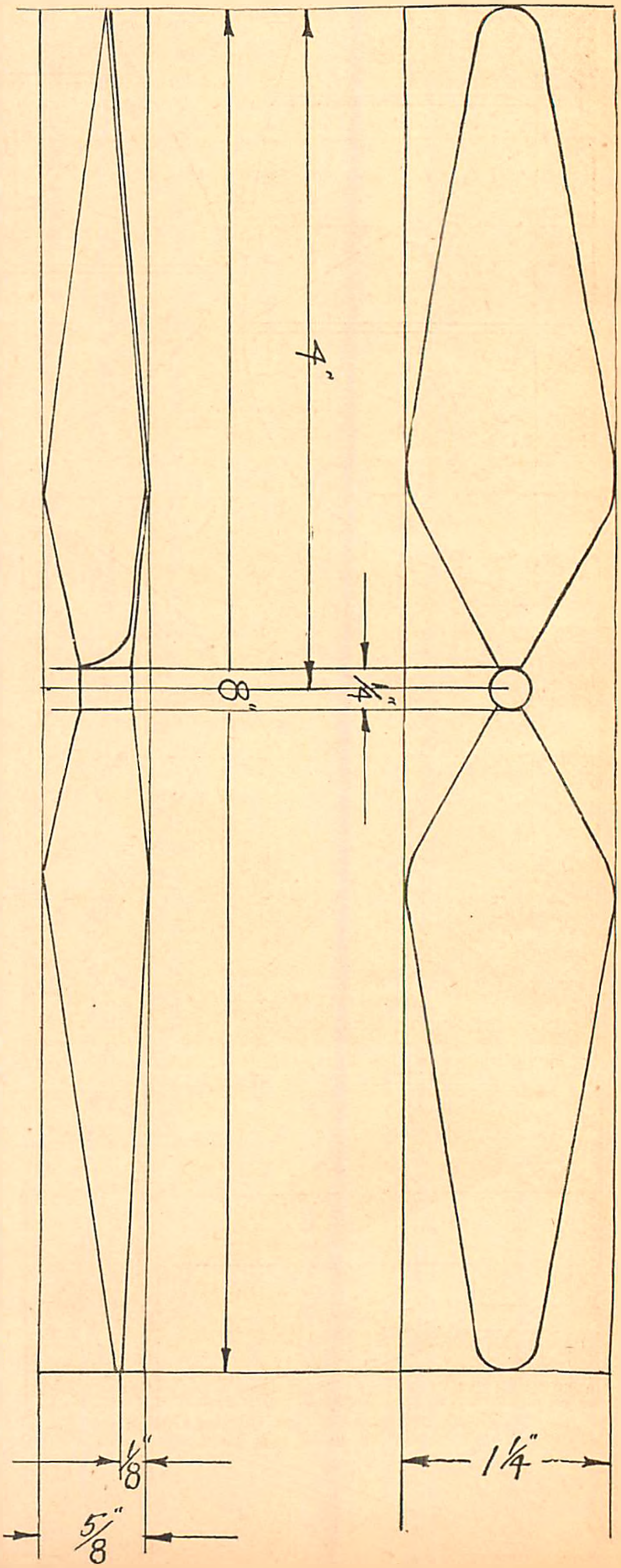
THE wheels are made from blocks 1½"x1½"x 11/16". They are cut to shape with a knife and sanded smooth. The bearings are made from aluminum washers glued to each side of the wheel hub. Before the washers are completely dried to the wheels, spin the wheels on a pin to make sure that they run true. Paint the tires black and the hubs silver. When dry put the wheels on the axles and bend the end of the axles up.

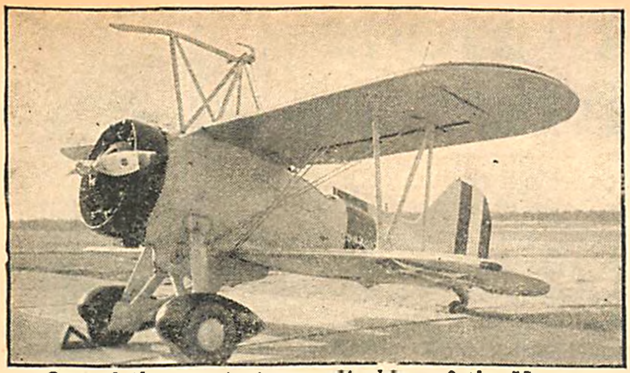
The tail skid is made from a piece of fine piano wire bent to the shape shown on the plans. This is glued to the bottom longerons in its correct position.

Covering

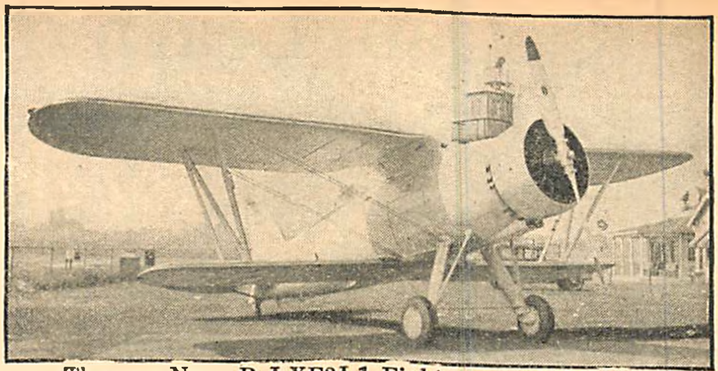
The plane is covered with a good grade of Jap tissue. The covering is glued to the plane. Glue is used as the agent to hold the paper to the plane because of its aid in strengthening the wood. When you have covered the plane, hold the covered parts over the spout of a steaming kettle. Steaming the paper shrinks

(*Continued on page* 46)

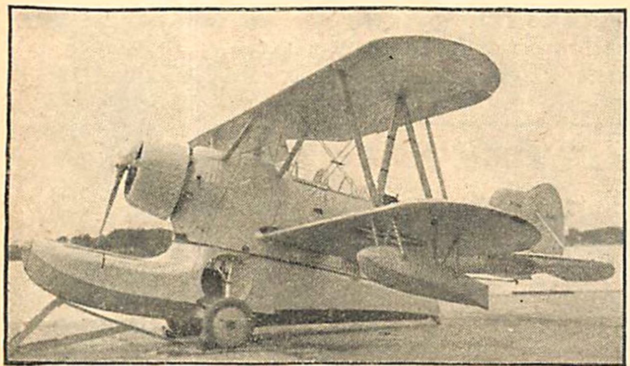




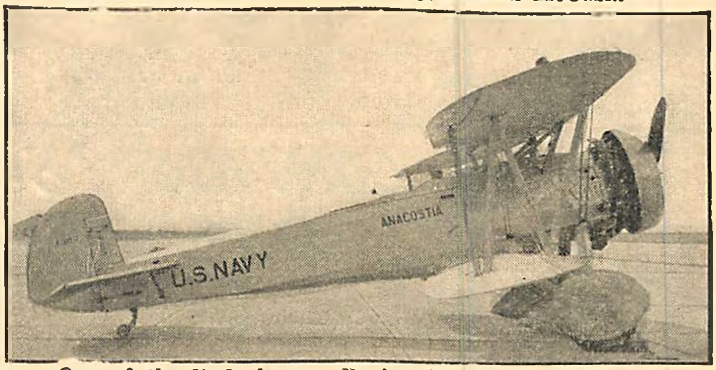
One of the greatest pursuit ships of the Navy, an F.9 C.2 (Whirlwind 420).



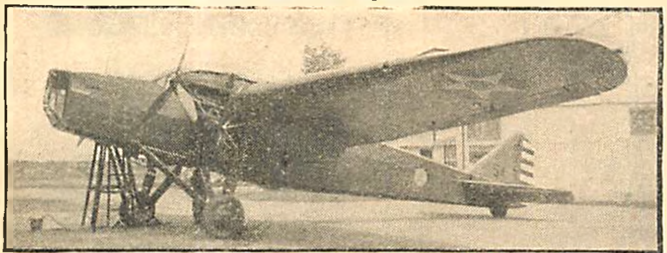
The new Navy B J-XF2J-1 Fighter, powered with a Cyclone double banked 800, by Donald McCash.



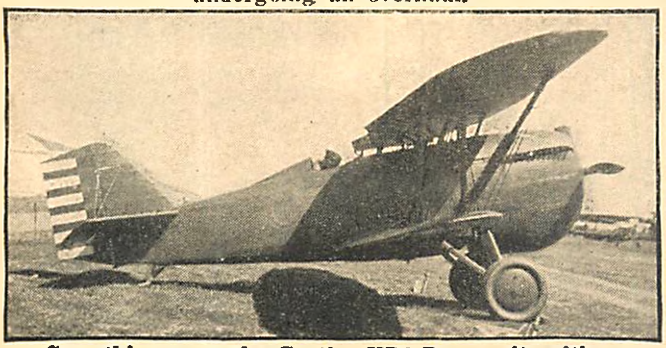
The new Grumman XJF-1 Navy Amphibian. It has unusual speed.



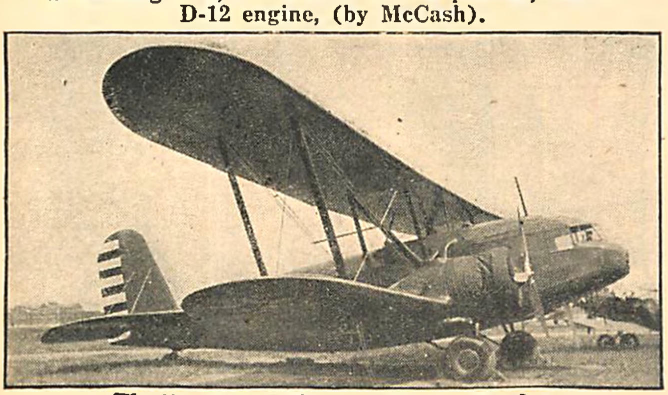
One of the little known Boeing Fighters, the Navy F3B-1, powered with a 425 Wasp engine.



An Army Fokker XO-27 observation bomber undergoing an overhaul.



Something new, the Curtiss XP6-B pursuit, with a D-12 engine, (by McCash).



The Army uses the new Curtiss Condor YIC-30 as a transport.

What the I.A.A.P.E. Is Doing

MEMBERS of the International Amateur Aircraft Photo Exchange have been exceedingly active treading the highways throughout the country that lead to airports or places of aeronautical interest. They have been in search of photographic treasure; pictures of unusual airplanes or interesting incidents. Success seems to have favored them as the photographs shown on this page will indicate. Here are some unusual ships from members in various parts of the country. Several of them are of the latest design and just what the model builders have been looking for.

Great interest was shown in the story printed about this club in the August issue and many young men have taken steps to become members. Members are well worth knowing so we are introducing them to you here. They are as follows:

John Hay, Harrison, New York
Al. Pegdan, Pittsburgh, Pa.
Ed. Staines, Australia
Leslie Mathews, England
Emil Strasser, Akron, Ohio
Bob Hare, Los Angeles, Calif.
F. Bamberger, New York City
Roy Milliren, Elyria, Ohio
Art Phillips, Seattle, Wash.
Harold Martin, New York City
Homer Reisinger, Cleveland, Ohio
Don McCash, Palo Alto, Calif.
Bob Attwood, Seattle, Wash.
Al. Schmidt, Kansas City, Mo.

(*Continued on page* 45)

What Can I Learn from Model Planes?

By GEORGE WASHBURN, JR.

ARE you learning something from building and flying model airplanes? Are you flying models as mere toys, or are you doing it as a means of furthering your scientific knowledge of aircraft?

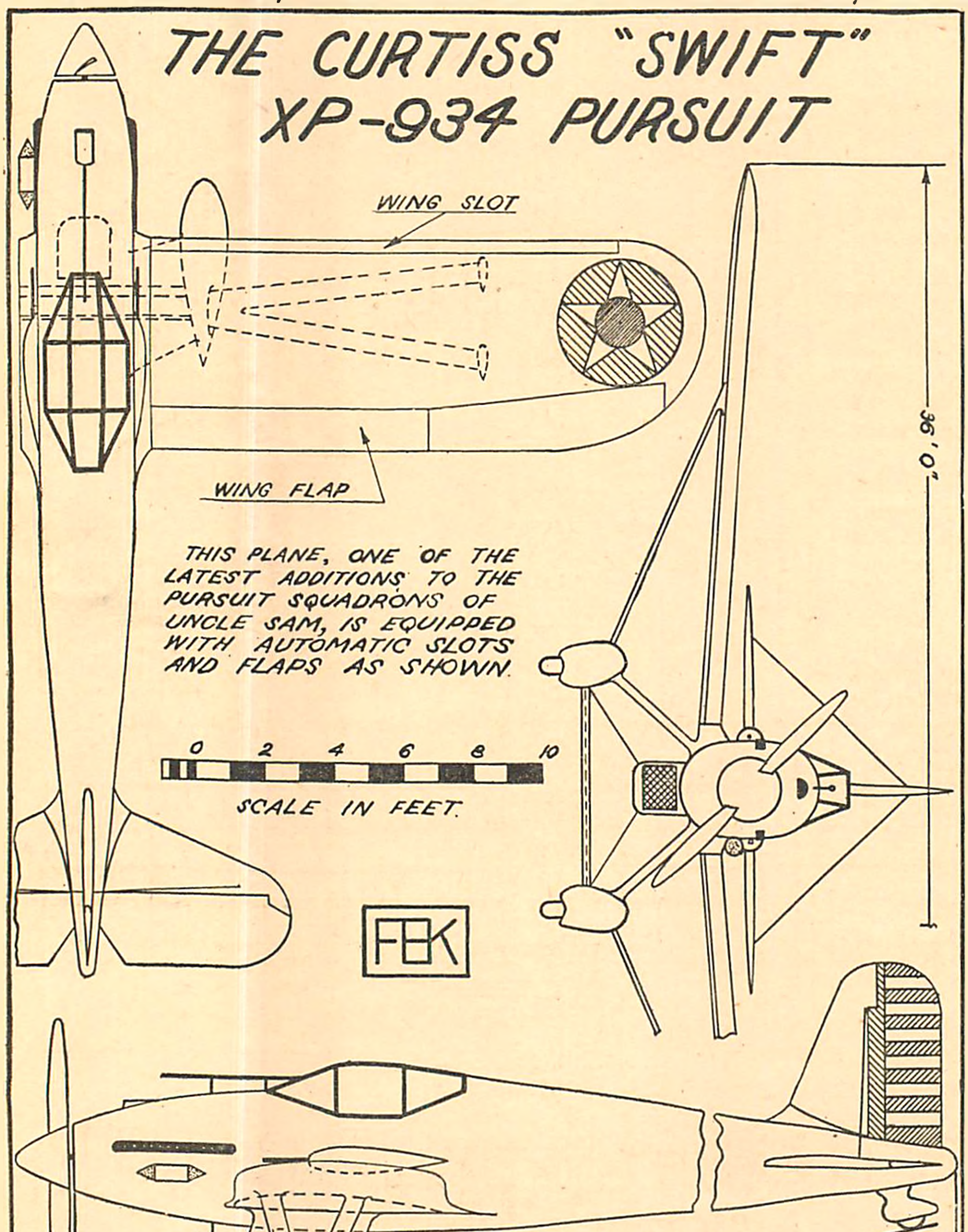
A model builder who builds models just for the fun of seeing them fly is not getting the knowledge that might well be his. Deriving any real good from model airplanes calls for a lot of effort and study on the part of the builder. This is a pleasure to those who are really interested in aviation, and who use some system in gaining their information.

The need for a systematic program of study is apparent for one can not accomplish much in a helter-skelter manner. Every model builder should have some definite method of widening his knowledge and applying it through the use of models.

Over ninety per cent of the boys and young men interested in aviation do not have the chance to gain or use what information they already have by actual contact with real airplanes. Therefore, the model airplane and aeronautical books and magazines if used in a systematic way, will to a large extent, make up for the lack of contact with the real ships.

A system based on four such points as follow will do much to help you gain a good deal of useful information on aeronautics in general.

First: Every model builder should subscribe to, or at least buy and read some good magazine which deals chiefly with model airplanes. Thus you can keep well informed on the latest developments in the model field as well as finding answers to problems which may be confronting you. In addition to a good model magazine, a progressive model builder should have access to the leading aeronautical publications.



Through these magazines you can learn what is going on in the Aircraft Industry throughout the country. You can become acquainted with the latest inventions and improvements, also finding the answer to hundreds of questions. You will find the opinions of the leaders in their field on the outstanding topics of the industry. You can learn to easily recognize new airplanes by studying the descriptions and photos which are to be found in these magazines. In general it will make you able to converse intelligently on real aircraft, on problems of the aircraft industry and give you more or less a working knowledge of these topics.

SECOND: When building a model of proven design look over the construction and ask yourself questions like the following: Are the braces and struts placed where they do the most good? Are there any lacking, or are there some that could be taken out without weakening the design? Is the center of gravity too far ahead of the center of pressure or vice

(Continued on page 46)

When Bleriot Flew "The Channel"

Recollections Of A History-Making Event and Plans From Which You Can Build the Plane That First Flew the English Channel

By V. M. BILSON

On THE twenty-fifth of July, 1909, Louis Bleriot made the first airplane crossing over the English Channel. The previous day, Hubert Latham, an Englishman, made the attempt but was forced down by motor trouble only ten miles from his take-off. He was uninjured but was later killed by a wild beast in Africa.

The London Daily Mail had offered to pay five thousand dollars for the first successful flight across the English Channel. Bleriot, Latham and a number of other aeronauts of that period decided to try for the prize. They assembled on the cliffs near Calais, France, and awaited favorable conditions. Much care and attention had to be given their early planes and motors as they were crude and temperamental in many respects. Several attempts were made, many of which ended or came near ending, in disaster. But those that were left showed the true pioneer spirit which is necessary in any new field.

At last a day came when Louis Bleriot felt that conditions were proper for his attempt. A final check was made of his ship which he had designed and built himself and the motor was started by M. Anzani who had made it for Bleriot. About ten minutes after taking off, he flew into one of the blinding fogs which are famous along that coast. However, he kept on, flying blind without even a compass to guide him. That is something which few pilots of today would be willing to try even with the greatly improved planes and motors now so common. Thirty-seven minutes later he landed in a field two miles east of Dover, Wales, having flown thirty-one miles from his starting point. As he attempted to land a violent gust of wind struck the plane and his descent was so abrupt that the propeller struck the ground and was broken but the plane was otherwise undamaged.

Truly this flight of 1909 was as important to aviation and was received with as much enthusiasm then, as Lindbergh's trip was in 1927. Indeed this early Bleriot airplane might well be called the ancestor of the "Spirit of St. Louis."

From then on the fame of Bleriot and his planes spread. The ships were known and flown in many countries including our

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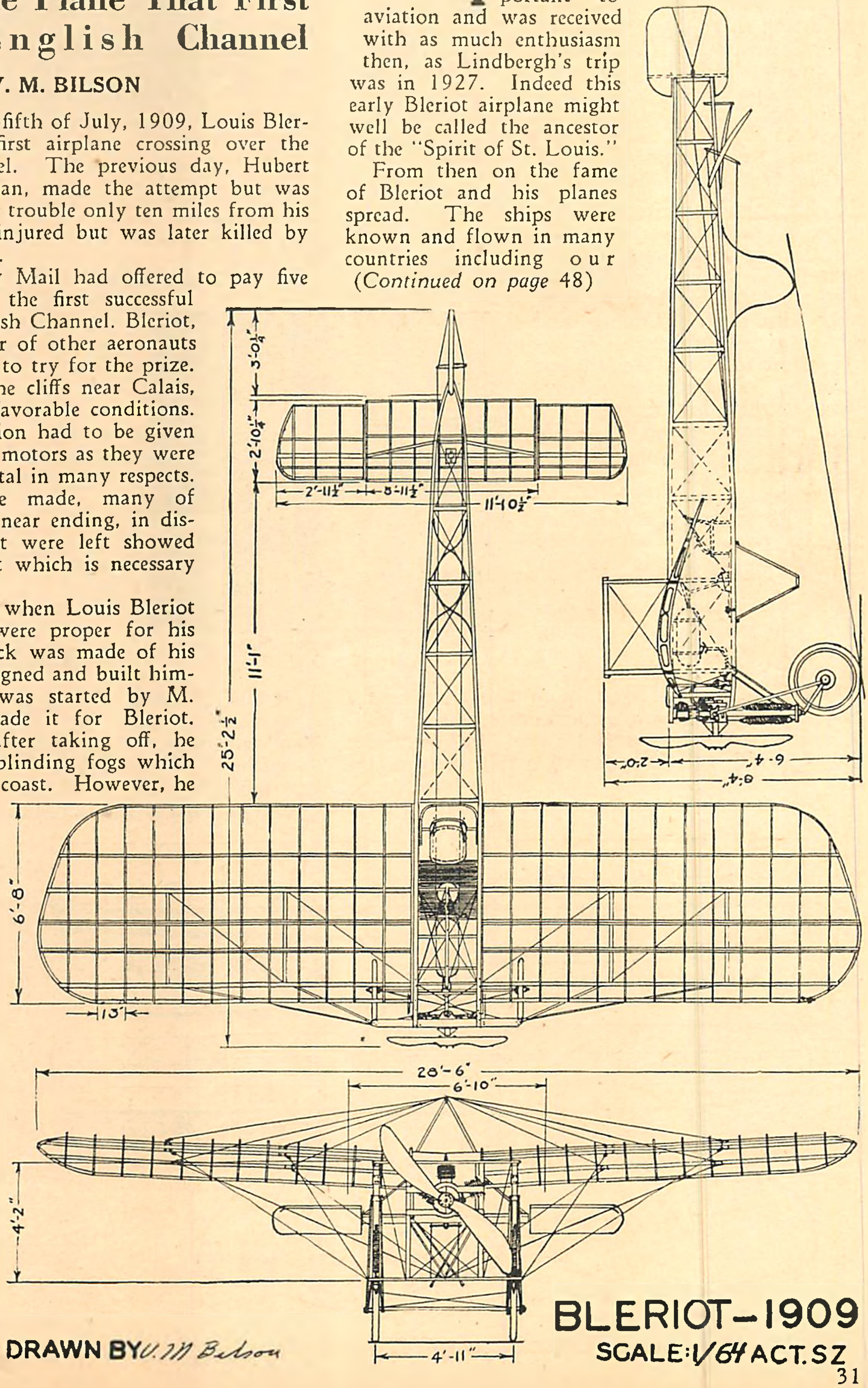
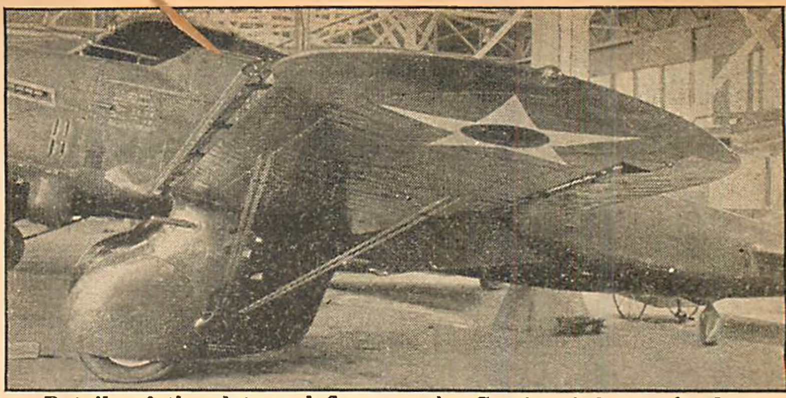


SLOTS AND FLAPS and HOW THEY WORK

By H. LATANE LEWIS II



Details of the slots and flaps on the Curtiss A-8 attack plane which give a higher top speed and lower landing speed.

THE slot-and-flap combination is to the stalled airplane what high tide is to a grounded steamship. Both supply the lift necessary to put the craft back into safe operation.

Slots and flaps are designed primarily to increase the lift of an airplane wing and to give greater control at low speeds. They are a safeguard against involuntary spinning.

When the speed of an airplane falls below a certain point, which varies in different types, the wings assume an angle too great to permit the air to flow over their surfaces smoothly. This angle, usually about 16° to the horizontal, is known as the "burble point" and the air becomes violently disturbed, bubbling and eddying as boiling water. Buoyancy is lost and the plane falls out of control. As airplanes are travelling at their lowest speeds in taking off and landing, it is here that stalls and crashes are most likely to occur.

Slots and flaps eliminate the stall. They permit the air to flow properly over the wing surface, but each by a slightly different method.

The slot is simply a small auxiliary strip hinged to the leading edge of a wing. When the plane is travelling through the air at normal speed, the pressure keeps the strip tight against the wing. However, when the speed drops near the stalling point, the strip moves forward, leaving a slot through which the air is guided over the top of the wing at high velocity, like water from a hose.

While the slot is automatic, the flap is adjusted and locked in position by the pilot before taking off or before landing. A crank for this purpose is located in the cockpit.

The flap is attached to the trailing edge of the wing and in appearance greatly resembles an additional aileron. There is one on each side. When lowered, it causes a deflection of the air striking it, and consequently produces an increased lifting force.

The use of slots and flaps makes possible a high cruising speed. An airplane with an extremely thin wing section, which is desirable as it decreases drag, would ordinarily have an excessively high landing speed. Equipped with the stall-eliminating devices, such a plane would have a low landing speed in spite of its high speed wings.

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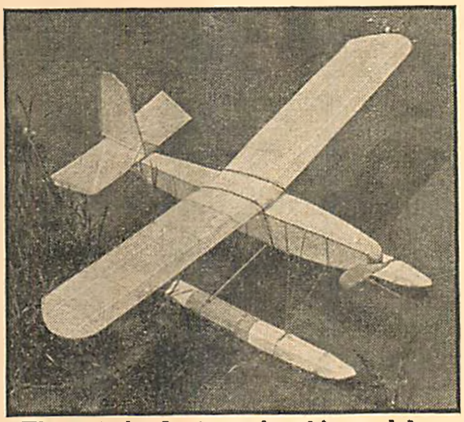

These twin floats make this model a consistent R.O.W. flyer.

TWIN FLOATS

By KEN WILLARD

SURFACE tension of water is one of the main obstacles which a model seaplane builder encounters. Usually if a model has enough power to rise off water, it has power far in excess of what it would ordinarily need to rise off the ground. This reduces the endurance not only because of the additional power but also because it must be stronger to stand the tension or torsion stresses, and therefore heavier.

With this in mind, the writer began the design of a pair of floats which would overcome the need for excess power. First he built a landplane and

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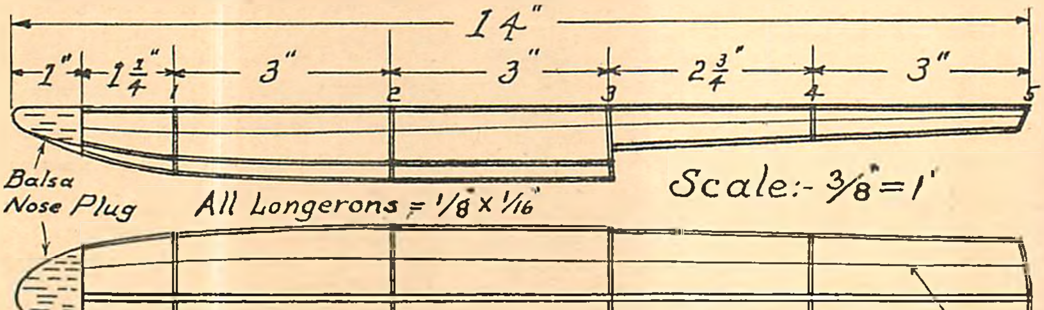
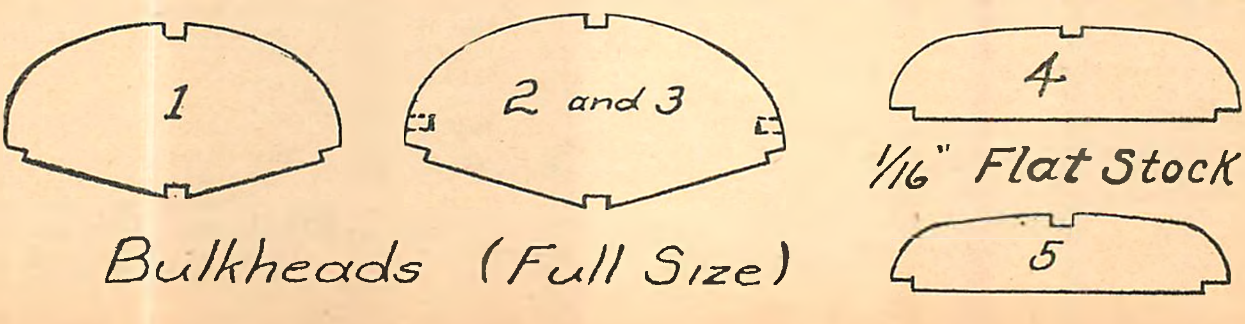




The Aerodynamic Design of the Model Plane

A Complete Summary of Outstanding Facts That Will Solve the Mystery of Stability For You and Act as A Guide to Future Experiment

ARTICLE No. 20 — By CHARLES HAMPSON GRANT — CHAPTER No. 4

IN ORDER to make the important facts of stability convenient for your ready reference without the necessity of searching through the text, we have summarized them. This summary started, but was too long to conclude in the previous issue of the magazine. Therefore, we continue with it here.

SUMMARY—Cont.

66. When a non-lifting tail is used on an airplane, the center of gravity should be located in front of the center of lift.

67. The center of gravity should be located approximately ¼ to ⅓ of the wing chord back of the wing leading edge, when the stabilizer is set at a negative angle or (0°) to the line of thrust. (Except in the case of extremely high-wing airplanes.)

68. The center of gravity of pusher airplanes with a front and rear lifting surfaces may be calculated by the following formulae:

$$X = \frac{2A_F\ (T-X)}{A_R} \text{ and } Y = \frac{A_R\ (T-Y)}{2A_F}$$

(X) = the distance from the rear wing to the center of gravity. (A_F) = area of front wing. (A_R) = the area of rear wing. (T) = the distance between the center points of the front and rear wings. (Y) = the distance from the center of the front wing to the center of gravity.

69. The movement of the center of lift on a wing, which occurs when the angle of attack of the wing changes, causes longitudinal instability.

70. The center of lift movement may be reduced or eliminated by: (a) Using a wing section with a reverse curve on the trailing edge of the wing. (b) By using a wing section which has a negative camber on its lower surface. (c) By using sweptback wings of (15) to (20) degrees, the angle of incidence of which grows less from wing root to wing tips. Method (b) is recommended as giving the most efficient results.

71. The movement of the center of pressure backward and forward on the airplane wing causes the model to be unstable. The greater the movement, the greater is the disturbing or unstable effect.

72. The movement is proportional to the length of the chord for any given airfoil section and angle of incidence change.

73. The smaller the wing chord, the more stable is the plane.

74. Never make the average wing chord greater than ⅓ the distance from the center of the wing to the center of the stabilizer unless a negative camber is used on the lower surface of the wing.

75. It is advisable to have as *little difference* in angle between the wing and the stabilizer as possible.

76. The stabilizer should always be at a smaller angle of incidence than the wing, except in cases where the wing is 1/12 the span or more *above the line of thrust.*

77. For average cases, the angle of incidence of the stabilizer should be 2 to 3 degrees less than the angle of the wing.

78. On fast models this difference in angle should be very small, as (1) degree or zero.

79. A difference in angle of incidence between the wing and stabilizer is required to insure longitudinal stability in most cases.

80. A zero degree angle of attack on the average cambered wing has an effective lifting angle of attack of three or four degrees, which produces an *effective difference* of this amount between the wing and the stabilizer when the stabilizer is set at (0) degrees or parallel to the wing chord.

81. The shorter the stabilizer moment arm the greater disturbing effect and the less stabilizing effect it will have.

82. The moment arm should be about equal to (½) the wing span and never less than 2/5 the wing span.

83. The faster the ship, the longer the moment arm should be.

84. The best position of the line of thrust is approximately 1/16 the length of the stabilizer moment arm below the center section of the wing or on a line with it.

85. The *lower* the line of thrust the more *positive* the angle of incidence of the stabilizer may be.

86. Never locate the line of thrust below the center of gravity (center of weight) of the airplane.

87. The distance from the center of gravity to the propeller should be as small as possible.

88. The greater this distance the more unstable the airplane will be.

89. Factors which promote stability when properly used are:

- (a) The angle of the chord of the stabilizer to the line of thrust as compared to the angle of the wing to this line.
- (b) The distance of the stabilizer from the wings.
- (c) The area of the stabilizer.
- (d) The position of the center of gravity relative to the center of lift, considered in a vertical plane.

90. The angle of the stabilizer to the line of thrust should be such that it has an angle of incidence which is from zero to two degrees less than the angle of the wing to the line of thrust.

91. The higher the wing is placed above the line of thrust, the less this *difference* in angle should be.

92. When the center section is close to the line of thrust the difference in angle should be (2) or (3) degrees.

93. When the wing is placed *below* the line of thrust (low-wing monoplane), the stabilizer should be set at an angle of incidence which is (3) to (3½) degrees less than the wing.

94. The stabilizer moment arm is the distance from the center of the wing to the center of the stabilizer.

95. The moment arm should not be less than (2/5) the wing span.

96. The longer the moment arm, the greater stabilizing effect the stabilizer will have for any given stabilizer area.

97. *For average conditions, make the stabilizer moment arm equal to one-half the wing span.*

98. In stick models the stabilizer moment arm may be ⅝ the wing span without adding undesirable weight to the fuselage rearward of the wing.

99. A long moment arm (3/5 the span) may be used when a "tail boom" is employed to hold the tail surfaces.

100. The solution to the problem of longitudinal stability is, large stabilizer area.

101. The greater this area compared to the wing area, the more stable the plane will be longitudinally.

102. A *general* rule which may be used for all cases with good effect is:—Make the area of the stabilizer equal to one-third of the total wing area.

103. More exact rules for the correct stabilizer area for the various classes of models are:

- (a) For single propeller stick type tractors without a landing gear, make the stabilizer area 40% of the wing area. (When a tail boom is used, make it 33% of the wing area.)
- (b) For single propeller stick type tractors with a landing gear, make the area of the stabilizer 30% to 35% of the wing area.
- (c) For single propeller fuselage tractors with a landing gear, the area

should be 25% to 30% of the wing area.

(d) For twin propeller stick type tractors, the area should be from 35% to 40% of the wing area.

(e) When tail booms are used, the stabilizer area may be 5% less than the above values.

(f) The above refers to monoplanes. For biplane models, the stabilizer area may be (5%) less than monoplane models.

104. These values are correct for average stabilizer angle settings and moment arm lengths.

105. Decreasing the positive angular setting of the stabilizer (giving more negative angle), increases the righting effect of the stabilizer but also produces a larger disturbing effect.

106. The following formula gives you the amount to increase or decrease the moment arm or stabilizer area for any change from the *normal* angular setting of the stabilizer, given previously in the text.

$$X = \frac{(-Y)\ A_s}{(3+Q)}$$

(Y) = the amount of angular change of the stabilizer from the normal setting in degrees. (See page No. 35, May issue.) (Q) = the normal difference in angle between the wing and the stabilizer chord lines in degrees. (X) = the amount to increase or decrease the stabilizer area or moment arm. ($_s$) = the area of the stabilizer before it is changed.

107. The moment arm times the stabilizer area should always equal a constant, or $K = MA_s$.

108. For planes where the center of gravity or weight is close up to the center section of the wing, the following formula will give the correct stabilizer area to use.

$$A_s = \left(\frac{A}{3M}\right)\left(1.5C+N\right)$$

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

For meaning of the symbols, see text Page 16, Article 17, June issue.

109. In order to gain added longitudinal stability and *gentle glide*, always locate the line of thrust *above* the center of gravity.

110. When the center of gravity is below the center of life, the stability of the plane is increased, longitudinally.

111. When the line of thrust is below the center of gravity, the stability of the plane is *decreased*.

112. In order to determine the correct stabilizer area (A_s) for various positions of the center of gravity and the line of thrust, multiply the answer to the formula given in (No. 108) by $1-\left(\frac{(G+2T)}{4C}\right)$

Where (G) = the distance from the wing center section to the center of gravity. (C) = the length of the wing chord. (T) = the distance from the center of gravity to the line of thrust.

113. The complete formula for stabilizer area is:

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

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

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

This formula applies to single propeller tractors only.

114. (A_s) for twin tractor monoplanes should be equal to (A_s) for single propeller tractor monoplanes, times (6/5).

115. For a single propeller tractor biplane, the stabilizer area (A_s) should be equal to (A_s) for a single propeller monoplane tractor of similar type, times (0.85).

116. In order to find the correct (A_s) for a triplane, multiply the (A_s) for a monoplane of similar type as obtained by the formula in (No. 113), by (0.75), or —Triplane (A_s) = Monoplane (A_s) × (0.75).

117. When a system of aerodynamic factors is used in which the center of gravity is located at a point to the rear of the center of life, greater longitudinal stability will result.

118. The center of gravity in the above case should be at a point which is 40% to 50% of the wing chord, to the rear of the wing leading edge or in a biplane, to the rear of a line joining the upper and lower wing leading edges.

119. In the system in general use, the center of gravity is located ahead of the normal center of pressure, about 30% of the wing chord, to the rear of the leading edge.

120. When the center of gravity is located to the rear of the center of pressure as mentioned above, the stabilizer should be set at an angle to line of thrust of one-half to one degree *positive*.

121. The wing should have an angle of incidence which is two degrees greater than the angle of the stabilizer.

122. When a *positive cambered* stabilizer is used, it must be set at an angle of incidence of (3°) *less* than a flat stabilizer, as the angle of no lift of a cambered stabilizer is about (—3°). (Average airfoil section.)

123. When a negative cambered stabi-

(*Continued on page* 48)

WHAT IS THE NATIONAL AERONAUTIC ASSOCIATION?

MANY of our readers have expressed a desire for information about the National Aeronautic Association and its position in the field of model activities. We have the following information to offer.

The National Aeronautic Association with national headquarters in Washington, D. C., is a patriotic organization operating without financial profit to further the advancement of aeronautics in all its branches. It aims to keep "America First in the Air" and to hasten the day when all Americans are able and willing to fly and to "See America From The Air."

The Association offers the most efficient means by which individuals and aeronautical clubs and societies may unite to promote growth of aeronautical knowledge and to increase public appreciation of aviation and what may be expected of it in the future. The insistent effort of many individuals and organizations, united in such a comprehensive association for the advancement of aeronautics is capable of exerting a most powerful influence for good in national and international development.

The organization functions locally in all parts of the country through chapters. The individual members have an opportunity of giving voice to problems of local and national importance. At the national annual convention, the chapter delegates are entitled to vote and members are invited to participate in the proceedings.

The National Aeronautic Association is the sole representative in the United States of the Federation Aeronautique Internationale (FAI), the international governing body for sporting aeronautics with a membership of more than thirty countries. The Association sanctions and controls record trials, air races, model airplane meets, balloon races, etc.

THE usefulness of the Association in furthering an interest in aeronautics is dependent upon the strength of its membership. The requirements for membership in the Association are that the applicant be a firm believer in the art and science of aeronautics and of its adaptability as a vital asset to the economic life and defense of the nation, and be agreeable to abide by the By-Laws of the Association.

The income of the Association is derived chiefly from membership fees and sanction fees. It is not endowed and receives no fixed income or grant from the Government nor from the aircraft industry.

The National Aeronautic Association is the representative body of aviation thought and activity in this country. A member of the Association has the satisfaction of knowing that he is working side by side with the foremost leaders in aeronautics, who constitute its officers, advisory board, board of Governors and committees. They give their time willingly and without compensation, solely for the purpose of seeing that America does not lag behind other nations in aviation.

The fee for regular membership in the Association is $5.00 annually; student membership, $2.00. The Association realizes that these fees are high for the average model builder and flyer, and is accordingly considering a plan whereby junior membership for model builders and flyers may be made available at a greatly reduced rate. If sufficient interest is shown, there is a good possibility of this plan being completed in the near future. It is intended that such members would be kept regularly informed of all matters concerning model plane activities.

All of our readers who are interested in this plan, will help demonstrate the extent of their interest by writing a letter or postal card to the National Aeronautic Association, Dupont Circle, Washington, D. C., stating that they would like to see the plan completed.

Choice of the U. S. Government

SELLEY alone comes through over all other competition, and has been awarded a large contract to supply the U. S. Government with Model kits, plans and supplies for a period of one year. This is the highest tribute paid to any manufacturer in this line, and your guarantee for the Best Quality products obtainable.

WE HAVE SIGNED

50c each
10c Postage

9 SENSATIONAL FLYING MODELS

Never before has such Value been offered in Flying Scale Models. Professionally designed and flight tested for performance. These dandy new models are the best *SELLEY* has ever produced.

15″ Wingspan: HAWK P6 E, BOEING P12, VOUGHT CORSAIR, LOCKHEED SIRIUS

18″ Wingspan: NORTHROP GAMMA

Each Kit is complete with special turned parts, printed Balsa sheet, balsa spray, Colored Jap paper, rubber cement, Insignia and everything necessary to construct any one of these models.

BAT • SWALLOW • SPORTSTER
18″ Wingspan

These new models are **sensational** in their flight performance. Flights over 300 feet are guaranteed with these snappy large Long Distance Flyers. With their large slow turning Propeller and bright colors, these models are the choice of the most critical model builder.

Like all **SELLEY** kits they are complete with all materials full size plans and complete building instructions.

SEND FOR YOUR KITS To-day and remember all **SELLEY** products are guaranteed and may be returned if not entirely satisfactory.

ADD 10c postage for each kit, 15c if west of Denver. On supplies 15c minimum postage up to $1.50. 10% on amounts over. West of Denver 15%. Any single item 5c postage.

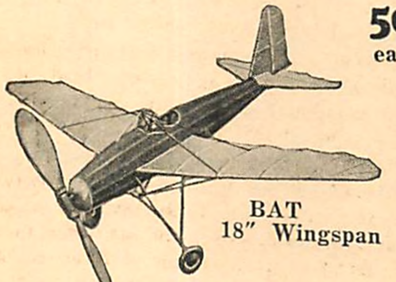
WATER SKIPPER

A new **SELLEY** creation, and the fastest thing on water. Following model airplane construction with its well designed hull, Speed propeller and large motor stick, it will speed away from any boat. **Complete Kit, plan and materials 50c. 10c postage.**

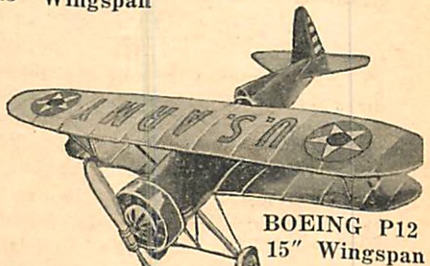
New York Sales Room
Hammacher, Schlemmer & Co.
4th Ave., corner 13th St., New York City
Send all mail and correspondence to factory.

50c each

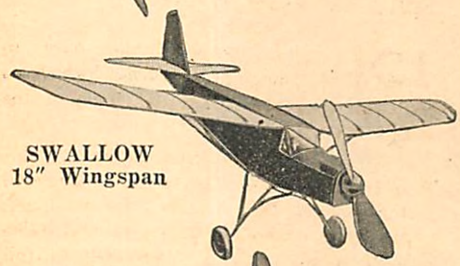
HAWK PGE
15″ Wingspan



BAT
18″ Wingspan

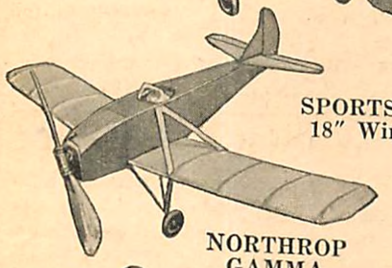


BOEING P12
15″ Wingspan

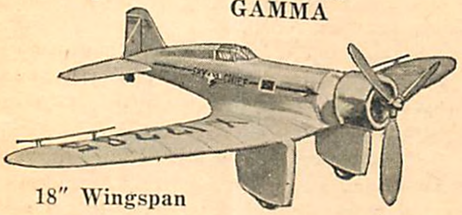


SWALLOW
18″ Wingspan

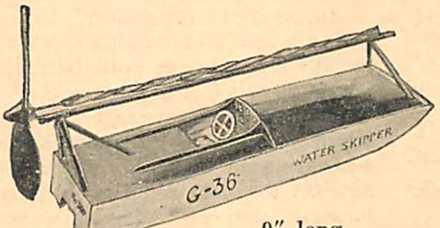
VOUGHT CORSAIR
15″ Wingspan



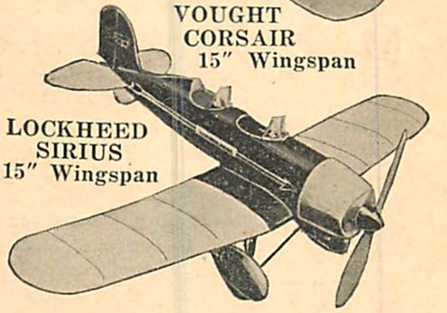
SPORTSTER
18″ Winspan



NORTHROP GAMMA
18″ Wingspan



9″ long
WATER SKIPPER



LOCKHEED SIRIUS
15″ Wingspan

Patented Applied For
LATA BALSA SPRAYS
18″ lengths

1/32x1/64″	40 for 5c
1/32x1/32″	40 for 5c
1/32x1/16″	40 for 5c
1/32x3/32″	23 for 5c
1/16x1/16″	23 for 5c
1/16x3/32″	23 for 5c
1/16x1/8″	15 for 5c
3/32x3/32″	15 for 5c
3/32x1/8″	12 for 5c
1/8x1/8″	12 for 5c
1/8x3/16″	6 for 5c
1/8x1/4″	8 for 5c
3/16x3/16″	8 for 5c
3/16x1/4″	8 for 5c
1/4x1/4″	6 for 6c

LATA BALSA LOGS
36″ lengths

1 x1″	10c ea
1 x2″	17c ea.
1 x3″	25c ea.
1 x6″	50c ea.
1½x1½″	23c ea.
2 x2″	34c ea.
2 x3″	50c ea.
2 x4″	68c ea.
2 x6″	$1.00 ea.
3 x3″	75c ea.
3 x6″	$1.50 ea.

SHEET BALSA
18″ lengths

1/64x2″	2c
1/64x3″	7c
1/32x2″	2c
1/32x3″	7c
1/16x2″	2½c
1/16x3″	4c
1/16x6″	12c
3/32x2″	3c
3/32x3″	5c
3/32x6″	12c
1/8x2″	3c
1/8x3″	5c
1/8x6″	12c
3/16x2″	5c
3/16x3″	7c
3/16x6″	12c
1/4x2″	5c
1/4x3″	7½c
1/4x6″	15c
1/2x2″	6c
1/2x3″	9c
1/2x6″	18c

REED
1/32″, 1/16″, 3/32″, 1/8″ dia. 6 feet 5c

CLEAR CEMENT
The fastest drying lightest and strongest cement known. Water proof.

½ oz. bottle	5c
1 oz. jar	10c
2 oz. jar	20c
½ pt. can	35c
1 Pint	60c

BANANA OIL
Acetone or Thinner

Large 2 oz. jar	10c
Pint can	60c

JAP BAMBOO PAPER
24 x 36″ sheet 10c

COLORED JAP TISSUE
Red, Orange, Black, Blue, Green, Tan
20x24″ sheet 3 for 10c

WHITE HAKONE TISSUE
20x24″ 2 for 5c

JAP WOOD VENEER
Double surface

10x15″	10c
20x30″	30c

THRUST BEARINGS
Large or small 3c

DOWELS
9″ lengths
1/16, 3/32, 1/8
12″ lengths 6 for 5c

BAMBOO
1/16″ Sq. Uncoated 12″ Long 2 doz. 5c
1/16″ Sq. Coated, 12″ Long 5c doz.
1/16x1/4″ 15″ length 10c doz.

RUBBER THREAD
210 ft. Skeins

1/32″ sq.	50c
1/16″ sq.	60c
1/8″ flat	75c
3/16″ flat	1.25

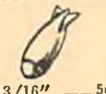
RUBBER LUBRICANT
1 bottle 10c

ADHESIVE

Large bottle	5c
1 oz. jar	10c
2 oz. jar	20c

SPECIALTIES DIE CAST

BOMBS
TORPEDOES



13/16″	5c
1¼″ long	10c
3″ long	15c

PROPELLERS

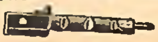
SPINNER TYPE 2 BLADED		SPINNER TYPE 3 BLADED		STANDARD STEEL TYPE 2 BLADED		STANDARD STEEL TYPE 3 BLADED	
3¼″	25c	4″	35c	1½″	10c	1½″	15c
4″	30c	4½″	45c	2½″	15c	2½″	20c
4½″	35c	5″	50c	3¼″	20c	4″	30c
5″	35c	5⅝″	60c	4″	25c	4½″	40c
5⅝″	40c	6¼″	70c	4½″	25c	5″	45c
6¼″	40c	7″	80c	5″	30c	6″	60c
7″	55c	8″	90c	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.

NEW GUN WITH RING MOUNT

1¼″	25c
1¾″	30c

SWIVEL TYPE GUN 15c
PURSUIT TYPE GUN 5c



Anti-aircraft Guns	25c
Dummy Flood Light	25c

Postage 3c

LIGHTS WING AND TAIL

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

For 12″ model	10c set
For 15″ model	15c set
For 24″ model	20c set

Packing and postage 3c set.

Send 5c for Catalog
10c with Free Plan

ALUMINUM .010 Wall TUBING

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

Stamps Accepted

ASK YOUR DEALER FOR SELLEY PRODUCTS

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SELLEY MFG. Co., Inc. 1373A GATES AVENUE, BROOKLYN, N. Y.

Aviation Advisory Board

(*Continued from page* 21)

other direction, is negative.

Now add up all the positive moments and subtract the one negative moment from the sum. Next, add up the column of weights and determine the total weight of the airplane. Then divide the sum of the moments (negative and positive) by the total weight of the airplane. The answer which you get from this process will be the distance of the center of gravity to the rear of the front end of the propeller bearing or the fixed point.

In this way you know that the center of gravity is located somewhere on a vertical line, a given distance from the front end of the propeller bearing. In order to determine the point of the line at which it is located, it is now necessary to take moments about a point such as the intersection of this vertical line, with the upper longeron of the fuselage.

However, I should not advise this in most cases. Usually, the important thing to know is where the center of gravity is located longitudinally along the fuselage. A fairly accurate guess can be made regarding its vertical disposition. If an error in the estimate of this vertical disposition should exist, it will not effect the performance of your airplane to any great extent.

After you have built one machine of any given type, you can make changes in the construction of the second machine, which will relocate the center of gravity in a more desirable position if it is required.

How to determine the center of gravity after the model is built, had been described in previous issues. Briefly, it is determined by hanging the model on a thread in two different positions and extending the vertical lines of the thread downward until they intersect.

If this does not explain the matter to the satisfaction of you readers, we request that you write in and tell us of your difficulties.

HERE are one or two questions from Gordon L. King, 9 McIntosh Av., Etobicoke, Ontario, Canada. It seems that King has had trouble with his tail planes. Of course, I am referring to models. Nothing personal meant by this remark.

After having sprayed the paper on the stabilizer and rudder of his Curtiss model, the paper tightened to such an extent that the bamboo outlines warped badly.

Question: How can this be corrected, asks King?

Answer: This depends upon two things. First, what was used to spray the paper with? Second, the rigidity of the bamboo outline of the surfaces. King asks if he might be able to straighten these surfaces by using threads to hold them in place. Personally, I doubt this very much. It might be possible to do so if the paper was moistened again as he suggests in his letter and then fastened in the proper position before they dried. However, from what he tells me, I should say that the tail planes were not of the correct rigidity or construction. Personally, I believe that tail surfaces of this type, namely, bamboo outline covered with paper, are very bad. They always have a tendency to warp in this manner. It would be much better to have a built-up stabilizer with two l'ght spars and ribs.

If the paper of these surfaces has been sprayed with dope, the cause of the trouble probably is that the dope was too concentrated and not thinned down enough. This caused too much contraction and warped the surfaces.

Question: Will streamlining in a model be proportionately as beneficial as in a big ship?

Answer: No, it will not because the model flies at a speed much lower than the large ship. The importance of streamlining increases in proportion to the speed of any airplane. Nevertheless, streamlining your model will give sufficiently beneficial results to warrant great care in working out streamline designs.

Question: Why is a blunt nose used on such airplanes as the Lockheed Orion, when the rest of the ship is streamlined to such a high degree?

Answer: A blunt nose does not necessarily cause a great deal of resistance. In fact, properly designed, it often builds up the air in front of the airplane so that its reaction against the rear tapered part of the body amounts to a pressure against the side of its body which helps to squeeze or force the plane forward. Thus, the resistance caused at the nose is gained back by a push forward at the rear. However, I personally believe that a ship such as the Lockheed Orion equipped with a water-cooled engine, carefully streamlined, would give far better results than with the air-cooled engine and N. A. C. A. cowling. This latter design is bound to cause a great deal of turbulence and boiling as the air passes rearward around the body. This turbulence is lessened by the cowling but not absolutely eradicated. The blunt nose is used on the Orion because an air-cooled engine is required which has been streamlined as much as possible.

QUESTION: Does the propeller on an elastic powered motor turn faster when it is held stationary, than when the model is allowed to fly?

Answer: The propeller turns more slowly when held stationary. While the model is flying the propeller turns approximately 20% to 25% faster.

In order to answer the next question in which King wants to know how many times to wind his motor which has eight strands, it will be necessary to know how long his motor is. The formula which may be used to determine the number of turns that you can put into a rubber motor is as follows:

$$T=\sqrt{\frac{350000}{S}}$$

(T) equals the number of turns per foot of length of the motor. (S) equals the number of strands of 1/8" flat rubber in the motor. This formula gives the number of turns possible when the motor is wound by hand. If a winder is used, it is possible to get approximately twice the number of turns into the motor that the formula will give you. Of course, there will be a variation in the possible number of turns due to varying qualities and ages of rubber. Also if a lubricant is used, you will be able to get about 10% to 20% more turns.

Question: Is a three-bladed propeller more powerful than a two-bladed one?

Answer: The power of a propeller depends upon the power of the motor and the efficiency of the propeller. A three-bladed propeller is not necessarily more efficient than a two-bladed one. In fact, it is probably less so. Just the same as a biplane is less efficient aerodynamically than a monoplane. There is greater interference between the blades. The purpose of a three-bladed propeller is to absorb more power without increasing the diameter. In other words, to increase the combined area of the blades of the propeller without increasing the diameter.

Until next month keep that youthful spring in your landing gear.

Airplane Maneuver Contest

(*Continued from page* 20)

follows:

William C. Drake, 123 Clifton St., Malden, Mass.

Roger F. Parkhill, 501 E. 27th St., Minneapolis, Minn.

John Alfirevic, 3000 S. Homan Ave., Chicago, Ill.

Harold S. Petersen, 2511 Santa Clara Ave., Alameda, Calif.

Gordon Holbrook, 9 Beach Street, Maplewood, N. J.

Arnold J. Gregerson, 1210 4th St., S.W., Mason City, Iowa.

Ike L. Kibbe, 1105 San Jacinto St., Austin, Texas.

P. Gilbert, Jr., 145 W. Lincoln Ave., Roselle Park, N. J.

Philip Chandler, Peabody Manor Apts., Nashville, Tenn.

W. O. Watkins, P. O. Box 207, Tucson, Arizona.

Robert C. Doerr, 4906 Sixth Avenue, Brooklyn, N. Y.

Dominick Osmulski, 3279 E. Thompson Street, Philadelphia, Pa.

Albert R. Cline, Third Avenue, Derry, Pa.

Alvin J. Brault, New London, Wisconsin.

L. H. Tarbox, 33-25 Union Street, Flushing, L. I., N. Y.

In our next issue, winners of the grand contest of six answers will be announced together with the photographs of the young men who won each of the six individual monthly events. Though you may not have won one of these monthly contests, look for your name as a winner of one of the nineteen prizes which will be given away for the six best answers.

We hope all of the contestants will write us and let us know whether or not they have enjoyed working out the maneuvers.

The Boeing F3B

(*Continued from page* 20)

Schiff Trophy. Another squadron demonstrated tactics at the 1931 National Air Races at Cleveland and won much mention by their splendid flying qualities.

While somewhat larger than previous Navy fighting airplanes, they were better in climb and carrying a heavier load at altitude than the lighter F2Bs.

The ceiling was about 25,000 feet with a top speed of about 160 miles per hour and a very high load factor for diving vertically. The range was four hours at cruising speed. The planes were fitted with the Wasp motor of 425 h.p.

Exceptional Letters From Readers Discussing Various Phases Of Aviation Will Be Published —Editor—

Air Ways—Here and There

(Continued from page 18)

Fighter in flight. This picture is not "faked." Picture No. 16 shows a close up of the machine. It is a very nice looking job, we would say.

Picture No. 17 is the result of a great deal of effort on the part of Duncan C. Morrison of 107 S. Main Street, Abingdon, Illinois. It shows a scale model Monocoupe flying at considerable altitude. Morrison tells us that this picture was only possible with the help of Francis Lambiaso who built it. He says "Francis would wind and launch the model while I rushed frantically around the field, pointing my camera at the swiftly moving model and snapping the shutter at random. After eight tries we got a picture that was not badly blurred and also fairly well centered."

Picture No. 18 shows an 18 inch model of Capt. Page Navy Racer in full flight. It was built by Cedric E. Galloway of 610 South 4th Street, Austin, Minn. It has a straightaway speed of about 30 miles an hour and without question, exceptional flight characteristics as the picture shows.

(Continued on page 42)

Model News From Other Countries

(Continued from page 19)

national Cup Competition.

1st—J. W. Kenworthy, 5 min. 21 sec., England.

2nd—A. M. Willis, 2 min. 23.5 sec., England.

3rd—Gordon S. Light, 2 min. 23.3 sec., America.

4th—R. N. Bullock, 2 min. 16.5 sec., England.

5th—H. W. Bexley, 2 min. 14.4 sec., England.

6th—J. Pearce, 1 min. 18.1 sec., England.

Mr. Jack Garrett of the Auckland Model Club, sends us a picture of a group of club members. However, this picture is not clear enough for publication.

Garrett writes us that there has always been a rivalry between the Auckland Model Club and Wiseman's M. A. C. He says:

"About six months ago, we issued a challenge to them to compete in a series of three matches, two to be flown in the respective flying halls and the remaining one to be flown outdoors in a place common to both clubs as regards their use of it as a flying ground. The first competition was flown in our hall, and we had an easy win. The outdoor competition came next but had to be cancelled owing to the bad weather we struck and the proximity of winter. Lastly, we flew in their hall, the Auckland Drill Hall, which, I gather, corresponds to your armories. Well, this hall used to be ours for indoor flying purposes until we found our present hall, which we consider the best in Auckland. The old Drill Hall is only 15 feet to the rafters and above that height, a model has no chance because of a forest of girders, beams and whatnots. Hence the general poorness of the results."

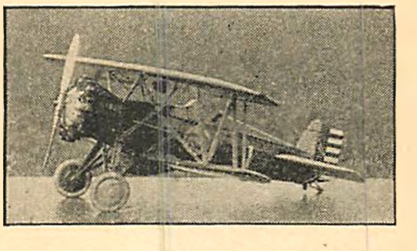
Spar Duration, hand-launched—

1. R. Clarkson (W.M.A.C.) 3 min. 1 sec.
2. L. Marten (W.M.A.C.) 1 min. 40.6 sec.
3. W. Mackley (A.M.A.C.) 1 min. 25 sec.

Fuselage R.O.G.

1. A. Martin (A.M.A.C.) 1 min. 41 sec.
2. L. R. Mayn (A.M.A.C.) 1 min. 40.8 sec.
3. H. Easton (A.M.A.C.) 1 min. 7 sec.

We will look forward to more Australian news in our next issue.



A Boeing. By Joseph Battaglia of N. Y. C. Every detail has been faithfully reproduced.

Over The Lines With Pegoud

(Continued from page 11

the anti-aircraft guns which popped at him from all sides. Pegoud's bullets riddled the ship so badly that it was swept by flames even before it could get into the air.

The second ship, meanwhile, had succeeded in taking off but as it labored for altitude Pegoud roared in upon it and poured such a murderous fire over the craft that the latter's ship fell with a crumpled wing from a distance of scarcely more than fifty feet above the ground.

These two Boche ships were thus annihilated within a space of ten minutes and that only shortly after Pegoud had entirely devastated the area they were commissioned to defend. Verily, he was a tyrant of the air in the consummation of his vows of vengeance.

Occasionally Pegoud would vary his tactics and take a pursuit plane in search of individual combat. On July 11th, 1915 he earned his Military Medal for a particularly brave display of heroism.

A formation of six Boche ships had winged over the Allied lines and headed toward a French concentration camp into which new arrivals from behind the lines were pouring that day.

The advance of the German air fleet was reported to the field where Pegoud was stationed by balloon observers. As luck would have it, Pegoud was there alone when the message came through, a lame arm having kept him home that day when his companions left on their morning's mission.

He did not hesitate an instant nor deviate from his custom of accepting battle regardless of the odds. He was off in a swift pursuit ship as fast as the ground crew could get it ready and caught up with the German formation a few miles back of the lines. They were moving along slowly seeking their objective.

THE clouds were rather heavy and quite low. Pegoud took full advantage of this fact and condition. He dove from one fleecy mass into the Boche sextet and drilled one machine so full of holes with the murderous fire of his two machine-guns that it succumbed without effort and fell in a flaming tail spin.

Back into the clouds he ducked and then with bewildering speed and uncanny accuracy popped forth once more to throw further terror into the remaining five Germans who had by now forgotten the original objective of their flight and thought only of their own safety.

Pegoud's second attack was directed at the German flight leader head on and evidently the Frenchman's first shot found immediate effect on the Boche's body. In any event the pilot threw his hands to his face as if vitally hit and an instant later the cross-marked ship wavered in mid-air and then nosed down into a final fatal plunge.

Spectators of the encounter who had rushed to the spot where the German fell later confirmed the fact that he had been shot through the head three times.

It was only a short month after Pegoud had thus distinguished himself, that the great misfortune occurred.

Flying along leisurely at about three thousand meters, on a sunny August afternoon in 1915, Pegoud had about decided that for once the Germans were wiser than he and were remaining on the ground in such hot weather. He was on the point of turning for home himself when far off toward the east he thought he perceived another ship.

At that distance it was impossible to distinguish characteristic wing markings so Pegoud turned and flew toward it. The pilot of the distant craft must have been seeking an answer to the same question for soon the two planes were heading toward each other.

As they drew closer, Pegoud discovered the approaching stranger to be a Boche, a two seater. He went into immediate action.

At about the same moment that the Frenchman's guns spoke, the German also recognized his caller as an enemy and in an instant the two ships were at it hammer and tongs.

Pegoud had apparently succeeded in drawing first blood for the German ship seemed to stall in mid-air and then nose dive. It looked very much like another direct hit for the sharpshooting Allied officer.

Anxious to finish his antagonist off in expeditious fashion, Pegoud circled the careening German craft, occasionally throwing an additional bit of lead into her.

Then, suddenly and without warning, the crafty Boche pilot pulled his ship to an even keel. He leveled off just in time to turn his guns full blast onto the poor and unsuspecting Pegoud.

A withering fire swept over both the unfortunate Frenchman and his ship, the latter trembling from prop to rudder under the fierce impact.

Even under such startling circumstances, Pegoud remained cool and worked his controls with desperate dexterity to extricate himself from this deadly position. Bullets were still cascading all about him as Pegoud darted downward. As he commenced his dive he felt several sharp pains in his neck and side.

BLOOD was trickling from his collar as he pulled his ship from her downward swoop. Growing weaker momentarily, Pegoud felt himself going into a faint so he wisely decided to head for home.

The flow of blood had now become so severe that he was barely able to maintain consciousness long enough to reach the airport. He did succeed in bringing his ship to earth without any great damage but then, suffering excruciating pains and utterly weakened, Pegoud collapsed at the controls.

Members of the ground crew who had seen his erratic approach toward the field had readily guessed that something was amiss with their superlative pilot. They rushed toward his plane to assist Pegoud from it but the hour of help for the gallant officer had flown.

Pegoud was dead. Examination disclosed that a bullet had severed an artery from which his blood had poured in profusion. Even this relentless body and soul could not withstand such a fatal blow.

His passing was a heartrending loss to his mates and to France for Pegoud had been held in highest regard as both a fighter and a friend.

This feeling of admiration and respect was not confined solely to Pegoud's cohorts for during his funeral procession, ships of the German air fleet appeared overhead and let flowers fall upon the cortege. To some were attached messages of sympathy and condolence, the sincerity of which were unmistakably genuine.

France fittingly recognized the greatness of the man by conferring upon him the day after his death, the Legion of Honor. He deserved it well.

The Development of the Fokker Fighters

(*Continued from page* 15)

to a point about one-third the chord's distance from the leading edge.

Unlike the Etrich, Albatross, and Rumpler machines of this type, the Fokker M-4 boasted ailerons for lateral balance instead of wing warping as employed in the earlier types. The hinge line of the ailerons traveled at an oblique angle from the rear spar at the wing tip to a point on the trailing edge where a compression rib was located. The ailerons were carried on an independent spar. This compression member also served as the anchoring station for the wing bracing wires. Five such wires were fitted in each panel, top and bottom, twenty wires in all. As usual the landing gear anchored the ends of these wires; while a two post cabane on the fuselage took care of the upper wires.

No performance data is available on this machine but from the details given here, a very poor rating, at least according to modern standards was probable.

IN THE design of the Fokker M-5 we find the first really "scrappy" ship. This design was so successful that hundreds of planes of this design in modified forms were used in 1915 and 1916.

Fokker was accused of copying the 1914 French Morane monoplane when he built the M-5. As an actual fighter, it had little or no chance to prove its mettle because it came out several months before the Fokker machine-gun was invented for which larger and more powerful monoplanes of this type were designed and built.

Its sleek little body of rectangular cross section was 23 feet 9 inches long. In its nose it carried a Le Rhone rotary motor of 80 h.p. What might seem strange in having a French motor in a German plane at the time of hostilities between the two countries was a reality. Le Rhone motors were built in Germany under license and called the Oberursel later on in the War. An open front cowling covered the motor, while a series of aluminum stampings faired the round motor into the square body. In plan, the body tapered from the front to the rear, to form a horizontal knife edge already familiar on the Albatross machines. For a cockpit, a rectangular section between two fuselage braces was left uncovered. A turtle deck was provided from the motor to the cockpit, but no headrest was fitted. With the exception of the aluminum cowls, the entire body was fabric covered.

A distinctive landing gear was designed for this plane that is very similar to the

(*Continued on page* 41)

Balbo—The Modern Columbus

(Continued from page 6)

the experimenters learned that the front motor of the pair had to be set up higher than the other and far back, so that the leading edge of the wing would protect it from the spray.

Those motors and propellers by the way, are a whole story in themselves. Working backward in the telling, the propellers were the last feature of the machines to be decided upon, just before they took off for America. During the whole period of trials, the search to find the best propeller type had been unceasing and different propellers were constantly being placed on different ships of the squadron, then flown for comparison of performances at all kinds of altitudes and speeds.

Metal propellers came from America; three-bladed variable-pitch Ratiers from France; huge Junkers models from Germany; cocobolo wood. props from the Argentine, and metal-strip propellers from England. When there was any doubt about a new type, a whole set of them were bought and installed on three machines, then flown in competition with three other machines.

The motors got an even more severe going-over. In the first place they were selected only after a competition among all the motor-makers of Italy. Isotta-Fraschini won it and G. Cattaneo was the engineer who designed the motors, but he did not do it without help. The Italian government appointed a special motor commission. Every step in the production of the new motor was watched by this commission, which included the best motor technicians in Italy. Whenever they thought they saw something that could be improved, they said so, but engineer Cataneo had the final authority to accept their suggestions or not, just as his was the final responsibility for the performance of the motors.

What he finally turned out was an 18-cylinder, W-shape motor with a maximum performance of 1900 revolutions a minute and 950 horsepower. The cruising speed was 1600 r.p.m., 600 h.p.

BUT this was only the beginning of the work with the motors. The next step was the block tests. For these a wonderful testing chamber was built at the Isotta factory. It is air-tight, with a wind-tunnel leading into and out of it; both wind-tunnels lead through high-power refrigerating chambers and are connected with vacuum-pumps. When it is desired to test the motor at any given altitude, the vacuum goes on and so does the refrigeration; the temperature and air-pressure in the motor room can be regulated to exactly that of any altitude. Out through the walls of the chamber, project instruments that enable the performance of the motor to be watched accurately and the wind-driving arrangement produces the same air currents that a plane's flight would give. The motor is thus tested under exactly the conditions it will face in flight.

Well, the Isottas for the trans-atlantic flight were tested up to five hundred hours of continuous running, in air so rare you couldn't breathe it and at temperatures all the way down to 90 degrees below zero. The conditions were those of an elevation of 40,000 feet, higher than these planes will ever fly, and only when a motor was produced that functioned perfectly under such conditions was the test judged complete.

Similar tests were carried on to choose the oil and gasoline used in the flight and only after 200 hour tests was it decided to use the heavier, but more certain castor oil. Like everything else, certainty was what these modern Columbuses were after.

And after all these tests, were they ready to start? Not at all. The tests covered years, remember. In the meanwhile, American and German builders had begun to make all-metal planes. The design of the planes was all right, but perhaps it would be better to make them of metal. All right, they made them of metal; several of them. Some were sold to the Russian government along with some wooden planes of the same design, and by the Russians were flown from the White Sea, way up in the Arctic Circle, to the Black Sea, way down in the tropics. They reported that both types functioned perfectly. Marchetti was not satisfied. More planes went to Czechoslovakia and were used in over-mountain flights (the trans-atlantic flyers would have to cross at least two ranges of mountains.) Not yet enough. So a metal and a wooden plane were towed behind fast motorboats for over 700 miles in the open sea. They were both all right, but in landing the metal plane was bumped by a motorboat and a small hole knocked in one hull. The machine had to be hauled out for repairs. That settled it; the planes for the flight were built of wood, for a wooden machine could be repaired in the water.

The step proved that; at Londonderry and again at Chicago, the boats of welcomers crowded around the air armada so thick that the planes were badly bumped about and in several cases holes in the hulls developed. They were repaired then and there before taking off; all-metal planes would have had to be left behind for repairs on shore.

THUS the machines and the men were gotten ready for the great flight, but that was not all. Columbus could sail straight west; he was aiming at a whole continent, was bound to hit something sooner or later and anything he hit would be all right. Italo Balbo was aiming at a pocket handkerchief six thousand miles away and had to hit it right on the dot. Moreover, Columbus had only two other ships to take care of; Balbo had twenty-three Columbus could drive right on through the thickest fog there was; if a fog hid the water from Balbo's ships there might be a crack-up and a terrific tragedy.

Therefore, the weather service had to be perfect as well as the arrangements for keeping the ships on their course. Six trawlers and a yacht were rented by the Italian government and fitted up as floating weather bureaus and radio beacons. They were anchored at chosen spots along the route from Ireland to Iceland and then, later from Iceland to Canada.

In command of each trawler was placed a flier of the Italian aviation service who had long experience with overseas work. Most of them, in fact, were officers who had accompanied Balbo on the flight to

South America. The whole resources of the I. T. T. were mobilized to gather weather reports and predictions and big shore stations at Cartwright in Labrador, in Newfoundland, at Shediac, at Julienhaab in Greenland and at Rekjavik were established. Every hour, the I. T. T. gathered Canadian and American weather reports and weather predictions for the next twelve hours, and radioed them to Shediac. Shediac added its observations and passed them along to Newfoundland; Newfoundland added a report on the weather there and sent the whole on to Cartwright, and Cartwright called up the first of the station ships in the line, and so on.

Thus Balbo's fliers were constantly receiving a continual stream of weather reports from all down the line; they knew exactly what weather conditions they were going to encounter at every minute of the flight and the continual stream of reports formed a radio beacon down which they flew with as much accuracy as though they were running engines on a railroad track on land.

What if a sudden storm had dislodged one of the trawlers? Or all of them? Even this was not forgotten. Two submarines were sent to take up their posts at the crucial point along the line of ships. No matter how heavy the storm or how wild the sea a submarine doesn't have to worry; it can shut up tight and with just its radio mast sticking above the water continue to send warnings.

So everything was forseen in advance—everything provided for. There were even mechanics and stocks of spare parts at every stopping point and at Chicago and again at New York, engineers to give the ships accurate inspection. Nobody had to be daring; as Engineer Schiatti said: "There is no room for daring in modern aviation. What we want is security and certainty. We want to prove that aviation is no longer a toy and the day of the practical trans-atlantic service has come.

Twenty-four Savoia-Marchetti planes stood in line in Orbetello Bay. General Balbo climbed up in the cockpit of the leading plane and waved his arm; forty-eight motors roared, the crowd on the shore shouted, "Avanti, Savoia!" and the planes took off for their perfect, six thousand mile journey.

The Development of The Fokker Fighters

(Continued from page 39)

landing gears used on the modern Boeing pursuit ships. The split-axle undercarriage was composed of a series of welded tubes in the form of triangles. Two triangles, with an apex of each fastened to either lower longeron had their other two angles welded to a central longitudinal tube and a wheel spindle respectively. Further back on the underside of the body another tube triangle was welded, in this cases with one apex fastened to the central tube and the side opposite this apex welded to the fuselage member stationed there. In addition to these members, a tube ran from each axle to a point where the rear triangle and the longitudinal tube met. A tail skid of the already familiar tripod type completed the landing assembly.

IN THE tail assembly the M-4 rudder design is repeated but an entirely different type of elevator is used. Since the M-5 was not equipped with a stabilizer, the tail plane was all elevator and operated as a separate unit. The axis of rotation was on a steel tube run through the entire span of the plane at a point about one-third of the chord's distance from the leading edge. This type of elevator with its raked tips and divided center was very similar to the type used on the 1914 Morane monoplane.

For a wing, the M-5 has a plane unlike any heretofore discussed in this series. Its 36 foot 8½ inch span and 5 foot 10½ inch chord gave it an aspect ratio of approximately 6 to 1.

The airfoil section is somewhat more evenly curved on the lower surface than had been its predecessors, but was still quite thin in order to attain speed. Thirty-two ribs were held together by two main spars and three compression members located between the spars. These members acted as anchoring stations for the many wires needed to provide wings strong enough to withstand "stunting" or the maneuvers which came under this classification in 1914.

No ailerons were provided in the M-5, the old wing warp control for lateral balance was again relied upon. Of the twenty-four wire leads employed in the bracing of the wing, four were used to operate the wing warping portions of the plane. As usual, the undersurface wires were anchored to the undercarriage while the upper wires were joined at a two post cabane located in front of the cockpit.

Although the exact performance of the M-5 is not known at this time, a fairly accurate estimate of the speed would be 75 miles an hour, the climb about 500 feet per minute.

Since the M-6 is little more than an enlarged version of the M-5 and follows the construction of the M-5, a description will be spared to only the greatest differences.

IN THE M-6, a nearly round or "comma" rudder as they were popularly called, was fitted instead of the type used on the M-5. The comma rudder is remembered on the Fokker triplane types of 1916 and 1917.

The wing is, in the case of the M-6, of the parasol type. While the rear spar is fastened to the upper longeron between the front and rear cockpits the front spar is raised and welded on the cabane about 18 inches from the upper longerons. The wing was not covered in this section over the body. Raising the leading edge in this manner provided a good view for the occupants and at the same time gave the wing the necessary angle of incidence. In plan, the wing is much like the wing of the M-5 but the tips are more rounded. Wires were identical even to the wing warp control.

Finally, the engine fitted was a Le Rhone of 110 h.p. to take care of the weight of the passenger.

The next installment of "The Fokker Fighters" will bring to the fore some of the much denied and seemingly forgotten Fokker two seater training planes. These have been confused with the two seater Fokker C-1 which never came to the front, hence the statement that Fokker built no two seated biplanes during the War.

Air Ways—Here and There

(Continued from page 37)

CLUB NEWS

Columbus Society of Model Engineers

AT THE time this is written, dozens of Ohio towns and cities are beginning to stir with new activity and interest in preparation for the coming Ohio State Fair Model Airplane Contest to be held at the Ohio State Fair, August 27th to September 1st, in Columbus. By the time the magazine is off the press this event will have been concluded. However, in our next issue we hope to have the results for you to read.

The builders will compete for 180 awards. Mr. J. E. Konkle will direct the contest which is divided into Junior and Senior divisions. Indoor events will be held in the huge coliseum on the Fair Grounds and the outdoor events will be held at the Horse Race Oval.

At a recent contest of the C.S.M.E. at the Ohio State Polo Field, Mr. Woodrow, one of the older builders, flew a fuselage model with a new type of "floating landing gear control." Mr. Woodrow has been experimenting considerably with various control devices. However, this device has been found to be highly efficient in controlling the lateral and longitudinal stability of the model while in flight. The test flight, while not of great duration, 39 seconds, was a remarkably smooth and stable flight even after the model turned and flew cross-wind for a part of the distance.

The novel feature of this device is that it does not add any additional weight to the model as the landing gear is utilized. Wire is running from the landing gear to the fuselage, where it is hinged to a triangular piece of aluminum. From this piece of aluminum, the aileron wires are taken and when the landing gear falls to one side, the control on that side is automatically pulled down and the plane is returned to its normal flying position. The action of the pendulum type and large surfaces were used on the first model to bring quick control action.

Picture No. 19 shows a group of flying scale ships built by Harry Van Kirk. It is certainly an exceptional array. The quadruplane on the extreme left is of unusual interest. The models are all built to a scale of ¾ inch to the foot.

East Cleveland Exchange Club

THE annual boys model airplane and glider meet sponsored by the East Cleveland Exchange Club of Cleveland, Ohio, has made history. Never was there so much enthusiasm in metropolitan Cleveland before. Only two events were run, the twin pusher and the commercial events. What a wind! It certainly was enough to tear up most of the little models sturdy as they were, but the boys went right to it although no records were made. Nevertheless, the crowd that turned out was not disappointed.

Mr. Osmun of the Model Contest Association, acted as the contest director.

For five weeks previous to the meet, a weekly broadcast was held from station WGAR on the Statler Hotel in Cleveland and Ellis Van der Pyl the sports announcer of WGAR, became an ardent model fan, being present at the meet. The winners were as follows:

Commercial Event—

1st. Bronik Seroka, 3567 East 79th St., 50 seconds, NAA Class D. Round trip to Pittsburgh on the Pennsylvania Air Lines.

2nd. Richard Spooner, Story Road, Rocky River, Ohio. 46 seconds, NAA Class E.

3rd. Sam Biskind, 11613 Hopkins Avenue, Cleveland. 18 seconds, NAA Class D.

Twin Pusher

1st. Harry Walker, 5703 Mound Avenue City, 5 min. 7 sec., NAA Class E. Round trip to Detroit, American Airways.

2nd. Paul Mignard, 1408 E. 112th St., 3 min. 44 sec.

3rd. Harold Schwede, 16805 Lakewood Hts. Blvd., Lakewood, Ohio. 3 min., NAA Class D.

Glider Events—Distance and Precision—

Winning Bronze Trophy emblematic of City Championship—

Robert Bell, 2214 Forestdale Ave., Cleveland, Ohio. Prize, round trip to New York.

Picture No. 20 shows the Collinwood High School glider and model club entrants. The machines shown in the picture were built by them. To liven up the model contest, Chuck Smith did stunts high above the clouds in his Great Lakes Trainer which is shown in picture No. 21.

Stix, Baer and Fuller Model Club

THERE has been great activity among the model builders of St. Louis, who belong to this very active club. Three big tournaments have kept model builders of St. Louis and Mississippi Valley very busy during the summer season.

The first of the series of this club's 1933 project was the All-Boy-Scout contests for non-powered gliders and outdoor fuselage models. Scouts who wished to compete for the prizes were required to participate in an annual boy scout circus held in the St. Louis arena prior to the contest. The circus was held in April and the contest followed in June.

Winners of each event enjoyed a week at the Chicago Century of Progress Exposition with all expenses paid. Winners of second place were given two full weeks at the boy scout camp in Irondale, Mo., with all expenses paid by the Stix, Baer & Fuller Store. Winners of third place in each event received a complete ground course in aviation from Parks Air College, East St. Louis, Mo.

The second series was held to select a delegate to represent the Stix, Baer & Fuller Club in the National Contest, sponsored by Universal Model Airplane News and held at Roosevelt field, in New York, June 27th. Albert W. Courtial, Jr., came to New York accompanied by the club instructor, with all expenses paid. Courtial took third place in the Admiral Moffett International Contest which was an event of the National Championships.

A contest was held at Parks Air Port, East St. Louis, Mo., August 18th and 19th. The events were twin pusher, outdoor fuselage, indoor and amateur sweepstakes. The latter was a contest for builders of any age who had never won a prize in any contest. We are awaiting with interest, the results of this meet.

By way of commemorating the 5th anniversary of the club, the director is planning a club book. Pictures of the club members and special articles by members, will be included.

Picture No. 22 shows the winners of the St. Louis All Scouts contest. Left to right, they are Billy Pascoe, Leland Schubert, Edward Levey and Dick Courtial.

The Lakewood Model Speed Foundation

We find that there is an extremely active group of boys who are interested in speed out in Ohio: Mr. Robert Brumbaugh, chairman, writes to us as follows:

"I read with considerable interest, your comments on speed contests, which followed the article on the Lakewood Model Speed Foundation and I heartily agree with their text in almost every respect.

"Ships entered in early contests were more or less heavy and built to carry a 'ton' of rubber. Many of them had fuselages turned out to a perfect streamline on a lathe, hollowed out and highly finished. Some were flown with as many as 18 strands of 1/8" flat—and many of the heavier ones needed all of it. We were alarmed at the trend and it looked as though the peak of development had been reached, when, by accident, a new type was introduced. Two boys without previous experience in our contests, entered ships in the 3rd contest which closely resembled cleanly-built and moderately strengthened commercials. They flew on 6 strands of 1/8" flat and were the sensation of the contest, taking second and fourth places. Here was something new—it put new life into the contests—and up to and including the sixth contest, practically all those who placed up among the winners entered this type of ship. Speeds jumped amazingly, hand in hand with control and beauty of flight. We were delighted at the trend, for like you, our aim was aerodynamic efficiency—not brute power."

"Red Cross" Model Airplane Club

Another model airplane club has sprung up at Kingston, Pa. It has started with five members. Mr. S. Zipay of 135 Pennsylvania Avenue, Kingston, Pa., is president. We will be pleased to hear of their further activities.

CORRESPONDENTS

FRANK Atrosh of 4377 Madison Street, Gary, Indiana writes in and asks if we cannot help him get some more members for his club which is called The Mail Club. All those who may be interested in becoming members or communicating with Atrosh, write to him at the above address.

Earl Wm. Kollender of 3850½ Motor Avenue, Culver City, Calif., wishes to hear from boys who have built successful gliders. Here is a chance for some of you.

High Lights of Model Types

(*Contiued from page 10*)

from one piece of steamed bamboo, for light indoor models. A piece of light music wire bent to form a clip at its top is also used when a light springy undercarriage is desired. See (f-1). (g) and (h) show two crossed-strut bamboo landing gears.

In Fig. 3 we have various types of fuselage models. (a) shows a design known as a high-wing cabin model. Advantages of this type are easy wing adjustment along the flat top of the body and high wing placement in relation to the center of gravity for good lateral stability. However, a little too much dihedral in this type induces a bad oscillating or side-to-side swinging tendency, especially in a wind. (a-1) is a three-sided fuselage frame that is used where neatness in the air with good duration is desired. It is strong and light and is used often on indoor fuselage models.

At (b) we see a low-wing fuselage type. This design is pretty in flight and if it is built lightly it will make easy landings due to a "cushioning" effect produced by the closeness of the wing to the ground when landing. However, in this style of ship, the center of gravity is high in relation to the wing and hence the machine will not come out of a bank as readily as the high-wing type. For this reason care should be taken not to have too large a movable rudder on this type, as the adjustment would have to be very delicate to prevent the plane from going into a tight spiral earthward from what apparently started to be a graceful bank.

(c) shows the front view of a mid-wing type. This design built with fixed wing in an oval fuselage is beautiful in flight and good flying adjustment can be secured with small weights in the fuselage arranged to slide back and forth by hand for adjustment, by a slight pressure of the fingers, on a force-fit horizontal balsa rod. Instead of moving the wing to bring the center of pressure over the center of gravity, the wing is built into the machine by careful checking and balancing so that the center of gravity passes through a point about one-third back from the leading edge of the wing. (This can be determined by balancing the model until it rides in a horizontal position in the air when suspended by a thread from the one-third wing point). Further adjustment can be made by moving the weights back and forth over the original center of gravity point.

(d) indicates the side view of a "parasol" fuselage model, so called because the body is suspended below the wing. The upright cabane struts, the ones next to the body, extend to the bottom of the fuselage and are fastened to flat bamboo guides that slide along the fuselage bottom to permit of wing adjustment.

(e) is a view of a biplane fuselage model. In this type the wing "cell" can be made in one piece and arranged to slide back and forth on the body in a manner similar to the parasol type. Two rubber bands slung around the bottom wing at the fuselage and caught on wire hooks on the top longerons will hold the unit firmly in place, as in the monoplane design. The center section of the bottom wing where it rests against the fuselage should be left flat and not cambered on the top, in order to provide a firm connection.

At (f) we have a biplane cabin model in which the depth of the fuselage is equal to the gap between the wings. The biplane cell on this type is easy to adjust as it is a combination of high-wing and low-wing and merely rubber bands at the fuselage will retain the wing unit in place and yet allow it to swing from the body if the machine's wings should strike a tree or other obstacle. The disadvantage in this type is that the fuselage has to be so deep that its side area is apt to interfere with the stabilizing effect of the fin and rudder.

(g) is a triplane fuselage model in which the low and middle wings form the same connection with the body as do the wings on the type at (f), although in the triplane, for the same fuselage length, the fuselage depth will not be as large. In the triplane the wings should have high aspect ratio—a ratio of twelve to one is not too high for this type. In the illustration at (g), each wing is longer than the next lower one; this "overhang" adds somewhat to the lateral stability of the model. The aspect ratio decided upon would be the average for the three wings. The same area arranged in biplane or triplane form is not as effective as in monoplane form, due to interference between the surfaces, but the higher aspect ratios of the wings in the two former types compensate to some extent.

FIG 4, showing different seaplane models, or "hydro" types is practically self-explanatory as all the types shown have been considered above. The drawing gives an idea of the general location of the pontoons on the ships and their approximate proportions to each machine. Experimenting will determine the best pontoon setting and position of any given machine.

With tractor hydros, care must be taken not to have the propeller placed too high as a nosing-over tendency will be encountered while the model is taxiing for the take-off. The front of the pontoons must plane well above the surface of the water, and they must make sufficient upward angle with the machine to prevent "digging in" when the plane is landing at its normal gliding angle. A slightly greater fin area on seaplane tractor models is advisable to neutralize the side-to-side rocking tendency sometimes produced by the pontoons.

The hydro at (a) is the most common type—a three-pontoon twin-pusher. (b) is a pretty design in the air and takes off quickly if properly built. (b-1) is a modification to the bow-frame type and (c) shows an effective type of hydro pusher flying "big-wing first."

At (d) we have the most difficult seaplane model type to balance—the two-pontoon fuselage ship. If the pontoons are too far back the plane will not take off, and if they are placed too far ahead, the model will be tail-heavy on the water and tend to submerge its empennage—tail unit—in a breeze. However, by careful planning, a satisfactory flyer in this type can be developed and then its beautifully realistic appearance in the air is well worth the extra care required in designing and balancing.

(c) shows us a five-pontoon, biplane twin-pusher hydro. This is probably the most stable type of model for landing on the water, although it is rather heavy. The two widely spaced front pontoons combined with the rear wing tip pontoons on the lower wing make the ship very steady in alighting. One of this type built by the author made over thirty flights off the Williamette River in Portland, Oregon, in calm, breezy, weather and landed without capsizing, riding the water perfectly until picked up by its "pilots" who followed it in a boat.

(c-1) indicates another pontoon arrangement for the type shown at (c) in which small outrigger pontoons are extended from one main pontoon. A small pontoon in the rear supports the propellers and tail as in (c).

It is the hope of the writer that this brief outline discussion of some of the model types will acquaint the reader with the diversity and extent of the model field and give him an idea of the vast room open for experiment. There are many other types of models such as compressed air ships, autogyros, helicopters, etc., a discussion of which space does not permit. However, we have here covered the more common types.

And who can say what new type may come from the brain of one of our readers to be added to the Hall of Fame for Models!

Here Are Plans to Build Balbo's Seaplane The Savoia Marchetti S 55 X

(*Continued from page 7*)

their proper relationship when finished. Details of construction may be determined to a large degree through examination of the photographs given on the preceding pages.

The color scheme is silver and black. The entire ship is silver except for the dark strips along the top of the wing leading edge, the top of the floats and the lower part of the floats below the water line. There are three vertical stripes on each rudder. The rear one is red, the middle white and the front one, green.

Do your work carefully, give a little thought to problems of construction, use a little skill and you will have a scale model you will want to keep for the rest of your life.

What the I.A.A.P.E. Is Doing

(*Continued from page 29*)

Ned Moore, Ysleta, Texas.
Ernesto Tabio, Havana, Cuba.
Gordon Williams, Seattle, Wash.
Bob Stevens, Baltimore, Md.
Charles Kossack, Chicago, Ill.
Art. C. Beer, Australia
Ben H. Heinowitz, Mountainside, N. J.

Eight new members are pending. Those who may be interested in communicating with anyone in this organization or who may wish further information concerning it, address all correspondence to the secretary, Ben H. Heinowitz, Mountain Ave., Mountainside, N. J.

How To Build A Flying Scale Aeronca

(Continued from page 28)

it so that when it is doped, less dope is necessary to give the paper its desired tightness. If you wish to use colored dope on the plane, you can mix some artist coloring with the banana oil, which is used as the dope.

Motor and Propeller

The motor is one of the most important parts of any scale model and its neatness and accuracy adds greatly to the appearance of the model. The motor is made of heavy disks of paper glued alternately with disks of balsa, the balsa disks being 1/16" flat. There is one valve cover for each of the cylinders. It is made from a block of balsa 3/32"x11/16", cut to shape and sanded smooth. The valve rockers are made from pieces of 1/32" square bamboo cut to size and glued in their respective places.

The nose piece is cut from a block of balsa 11/16"x1-1/16"x1-7/16". This is shaped with a knife and sanded smooth. The completed cylinders are glued to sides of the nose in their correct positions. There are two bearings for the propeller shaft, one at the front of the nose and one at the back. They are made from aluminum washers. The reason for having the tow washers is to keep the prop shaft from vibrating. The nose is held to the front of the plane by means of snaps which are glued to the nose and the bulkheads as shown. The small cap on the top of the motor is cut from a small piece of balsa.

The air strainer for the carburetor is made from a piece of balsa 7/16"x7/16". This is cut to shape as shown on the plans. A small piece of copper screening is glued around the strainer as shown.

The propeller is carved from a block of balsa ⅝"x1¾"x8". First draw the dedesign of the prop on the block. Then drill a hole for the shaft, being careful to get the hole at right angles to the block. Now cut out the prop roughly with a knife, trim to shape with a razor blade and then sand smooth with fine sandpaper. Glue an aluminum washer to the back of the propeller hub. When this is dry, balance the prop. This is done by inserting a needle through the propeller shaft hole. Place two small blocks of equal size under each end of the needle and see if the prop balances. If it does not, sand the heavy side until it does. If the prop is correctly balanced it will add greatly to the flying of the model. Bend the prop shaft as shown on the drawings. Insert the shaft as shown on the drawings. Insert the shaft through the bearings in the nose, then through the shaft hole. Bend over the end and then glue to the front of the prop. Give the prop several coats of banana oil to strengthen it.

Assembly

THE wings are held to the fuselage by means of aluminum hinges bent to the shape shown on the drawings. These are glued and wrapped to the upper longeron and glued to the spars. The wings are rigged with heavy silk thread. This is done by taking a needle threaded with the thread that you are using and forcing the needle through the points where the braces are to be fastened. When the rigging is done and the wings have their correct angle, then glue the threads wherever they intersect with the plane. The braces for the tail assembly are made in the same way.

The model is powered with four strands of ⅛" flat Para rubber. It may be found necessary to balance the plane with the use of small pieces of solder fastened to the nose of the plane. Try gliding the model and if it stalls give the elevators a negative angle. If the model dives, give the elevators a positive angle. When the model glides correctly, fly it and enjoy the fruits of your labor.

What Can I Learn From Model Planes?

(Continued from page 30)

versa? Is the weight of the model in proportion to the wing area for the type of ship you are building? Go over the entire airplane in this manner and if you can not account for or answer these questions, make it your business to find them out.

Go to a library and secure books on aerodynamics and airplane construction. Although most aerodynamics books will be way over your head, you can gain considerable useful information on the above subjects which you will be able to understand and apply. The more you read such books the more you will be able to understand and soon you will have a useful knowledge of aerodynamics.

Third: After you become familiar with aircraft construction and a certain amount of aerodynamics, try your hand at designing models of your own. This is thrilling and educational. It is an achievement to build well, a model of proven design but it is a still greater achievement to design and build a model of your own. With so many different types of monoplanes and biplanes as there are today, it is really a job to design a model which you may truly say is not copied from some popular design.

The best way to secure originality and use to the limit your knowledge of aerodynamics and aircraft construction, is to design your ships in the following ways: First select some standard engine as you may see advertised in some aeronautical magazine. Then select a suitable scale such as ¾ inches to the foot, and design your airplane around your motor the same as an aeronautical engineer would do. Try to make a good looking and well proportioned design. Estimate as closely as possible the weight of the complete model and then figure the approximate wing area. Put the landing gear in a position that will make it easy for the tail to come up for a takeoff, but will still be far enough ahead to prevent the ship from nosing over in landing.

Another thing in designing models is not only designing them around whatever engine you like, but design the ship for some specific purpose, such as climb, speed and maneuverability: or combine two or more purposes and see how close your model comes to you approximations.

Of course let it be understood that you can not figure exactly what a model will do or what proportions to use. But if you use the previously described methods of gaining scientific information, you will know enough about methods of aircraft design and construction to design a model efficiently and can tell just about what it will do before it is flown.

FOURTH and last point of the system deals with flying your models. If you go about flying them in the right way, you will learn many things about the stability and control of an airplane, as well as the effects of airflow over certain parts. Some information on the effect of proper and improper rigging may also be picked up.

To really learn something from flying a model you must mentally analyze each flight carefully from beginning to end. If something occurs during the flight which you do not understand, look it up and find out about it.

The following will give you some idea as to the method of getting the most out of flying your models.

If the flight is from a take-off, observe carefully the length of run and the height to which the tail rises. As the model leaves the ground, notice whether one wing drops and if so, which one.

When the model is well on its way, notice the stability; does it hop erratically about or fly level, is it inherently stable, so that it will recover from the effects of gusts of wind?

If, while your model is in the air, it should do some sort of maneuver, note what it is and if you do not know what it is, try to find out. You can find information on aerobatics in many of the aviation magazines. It is well to know the names of the different maneuvers a plane can do and by noticing what your models do and looking up the ones you do not know, you soon will know much about them. If you understand the action of the forces to which an airplane is subjected, you can readily determine the cause for any particular action.

When your model comes in to land, watch carefully the gliding angle and the manner in which it makes its approach. That is, does it come down in a steady glide or does it come in in a series of dives and stills? Most models will not make a three point landing because there is no pilot to pull the tail down at the right moment. Occasionally a model will persist in making three pointers, the thing to do in that case is, try to find the reason for its doing so. If you make a mental note of the actions of your models in flight and then apply your knowledge of aerodynamics to correct whatever may be wrong, you will get much better results from your models.

All these things mentioned here may seem to make model building an uninteresting, tiresome occupation. But once you try some system in building your models and gaining more information, you will agree that it is even more interesting and certainly more educational than you thought model building could be. The mystery of its action will hold your interest. You will have the satisfaction of knowing you are really learning something from building and flying model airplanes. Get some useful knowledge from model airplanes and they will cease to be mere toys.

The Aerodynamic Design of the Model Plane

(*Continued from page* 34)

lizer is used (concave surface upward), it should be set at an angle which is (3°) *more* than a flat stabilizer.

124. When correctly used, a cambered stabilizer is more effective than a flat one.

125. The area of a cambered stabilizer may be only 80% or 4/5 as large as a flat one to obtain the same stabilizing effect.

126. The formula for the correct area of a positively cambered stabilizer is as follows:

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

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

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

127. The formula for the area of a negatively cambered stabilizer is the same as the above except the quantity in the third radical sign should be changed to:

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

118. These formulas are modified for biplanes and triplanes in the same way that the formula for flat stabilizers is changed.

In our articles to follow we will thoroughly discuss the *theories underlying the facts* given in the last chapter.

Twin Floats

(*Continued from page* 32)

equipped it with power enough to rise off the ground and fly until the rubber was completely unwound.

The next step was to remove the wheels and put on twin floats. This, however, was not so easy. Floats that looked excellent would cling to the water and hold the model down.

Finally, after six designs had been tried with varying degrees of success, the seventh and last was tried. Nobody was more surprised than I. The plane rose as though taking off from ice, climbed to a height of about fifty feet and came down with the rubber completely unwound. Several flights were made, both with a hand winding and with a winder. The duration was remarkable. One flight of two minutes and forty-two seconds was recorded.

The plane used was a fuselage model with a Wakefield required cross-section and a span of thirty inches.

The accompanying drawings will show the materials needed. If, however, endurance is not the major objective, the floats may be made stronger by using 3/32" square balsa for the longerons. If this change is made, be sure and notch the bulkheads with the right dimensions.

The dotted lines on the bulkhead marked *2 and 3* indicate the position at which the rear part of the bottom fits the front. Be sure to fit this exactly. The height of the step was one of the major troubles with some of the preceding designs.

The bulkhead at station three was slanted forward slightly. For some reason this seemed to help, so without investigating it was done.

Cover the model with Japanese tissue. Use a grade which is commonly used on outdoor models. Coat the floats with banana oil until they shed water without affecting the paper. The writer used five coats.

Slots and Flaps and How They Work

(*Continued from page* 32)

The Army Air Corps has become interested in the possibilities of such an arrangement and is now conducting tests to determine its practicability. The latest types of pursuit and attack airplanes, the Curtiss XP-934 and the Curtiss YA-8, have been equipped with slots and flaps and are undergoing service trials.

When Bleriot Flew "The Channel"

(*Continued from page* 31)

own. Your father may recall having seen one of our early birds piloting them around the fairs and flying exhibitions.

The Bleriot airplanes were made in this country under special license by the Queens Company on Long Island. Earle Ovington flew our first air-mail in 1911 using a Bleriot of this type. The French government used them as training equipment and at the beginning of the World War in 1914, French students were trained on Bleriot Penguins These training ships were so called because, like a Penguin they had short wings and were unable to fly but the student was able to learn the use of the controls without the danger of being in the air. A similar idea is now in use at flying schools which tow the beginner on the ground at low speed in a glider. When they have learned this fundamental, they are advanced to the next stage of instruction.

The model of this plane on exhibition at the Aeronautical Building of the Smithsonian Institute, was built by Mr. J. Edward Reeves of Washington, D. C. Mr. Reeves' model has a span of twenty-one and one fourth inches as it was built to the standard scale of ¾" to 1'. If the drawing is enlarged three times, it will closely approximate this scale.

The model is completely built up and has working controls. White pine, maple, spruce, balsa and bamboo were used in its construction. White china silk was the covering material and was not doped but merely sprayed lightly with water after cementing to the frames. Silk thread known as buttonhole twist makes the best imitation of wire braces. The shock absorbers are wire springs and the wheels are built up, the spokes being soldered to the rims and hubs. Small pieces of wire and aluminum were used for the various parts and fittings.

All framework and exposed parts are painted black. If care is taken a realistic model can be made which will be in vivid contrast to a ship such as the "Spirit of St. Louis."

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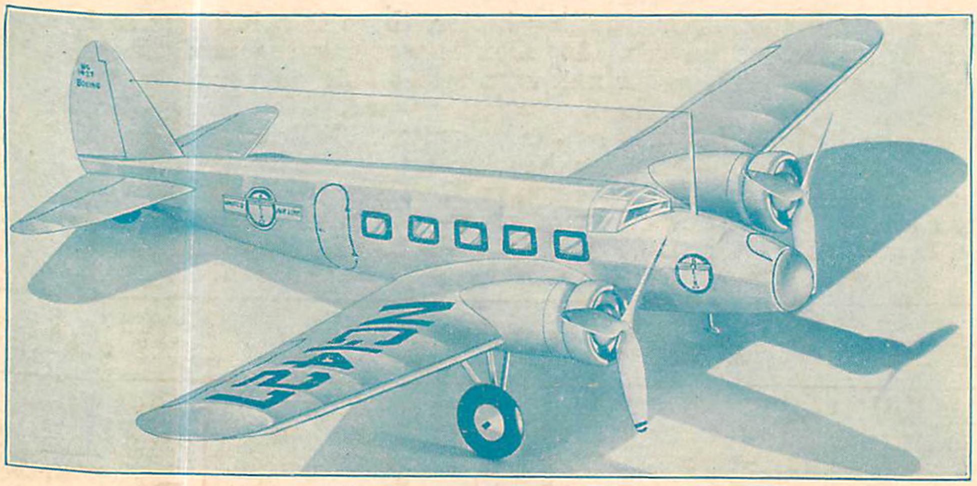

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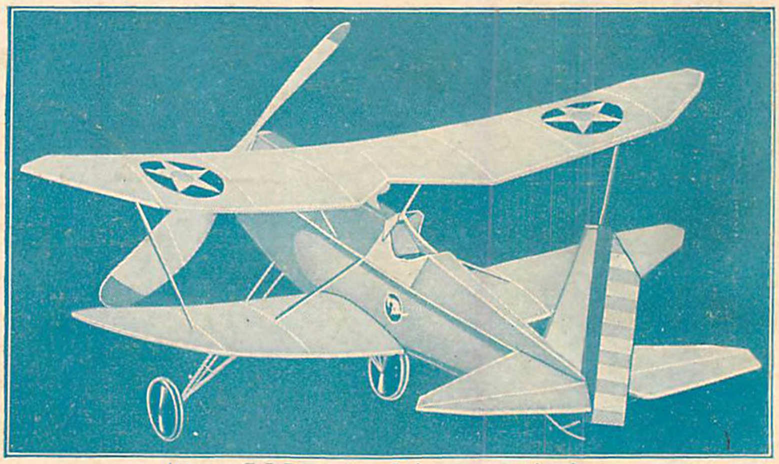

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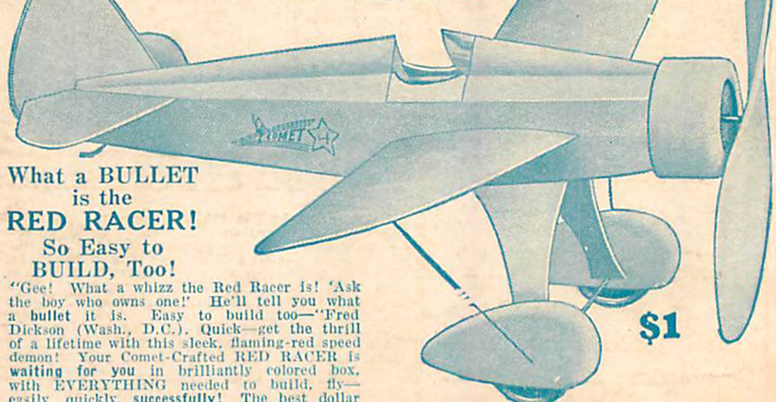

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