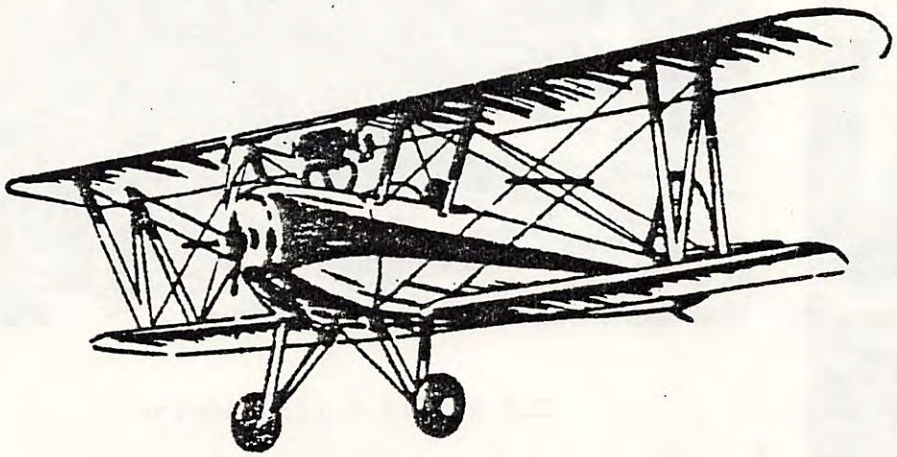
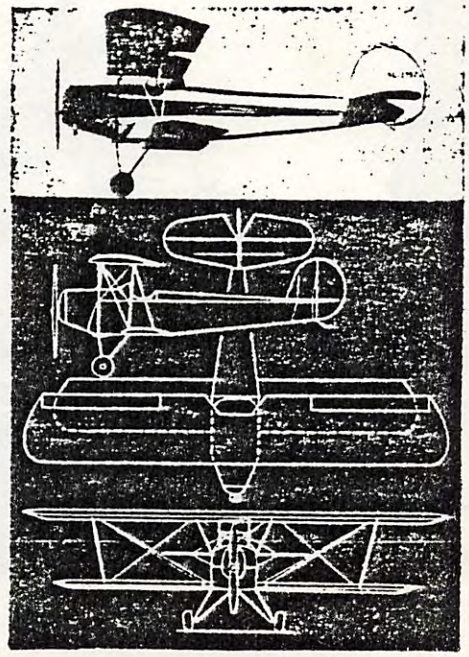
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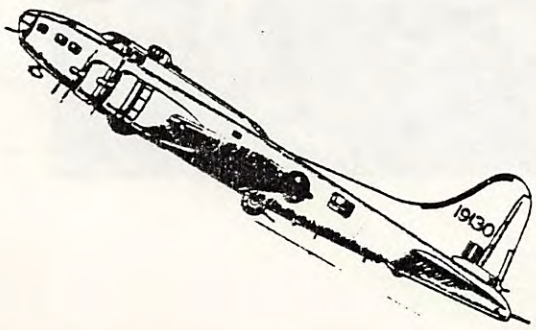




WILEY POST Model A

1934 WILEY POST SPORT: Ford A-1 powered. Originally Straughan Biplane backed by Post as his contribution to popularize flying. One still flyable.

TRW INC. R M. 2465B
23555 EUCLID AVENUE · CLEVELAND, OHIO 44117





GRILLO B-17

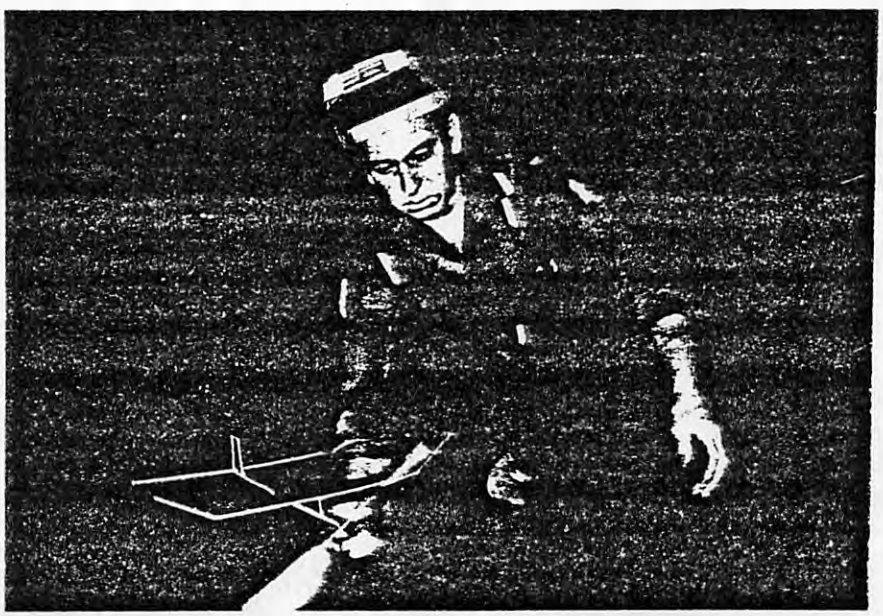


Walt Van Gorder

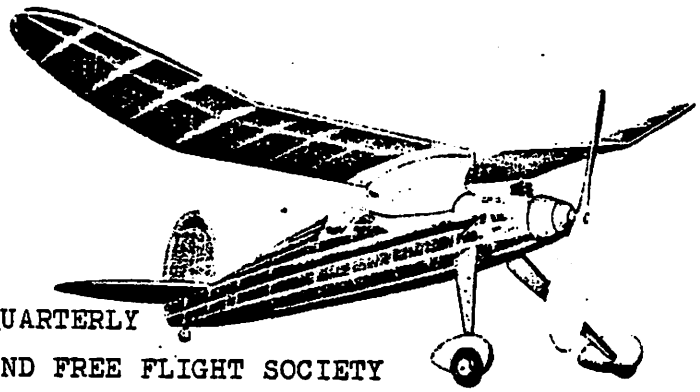


Tim Reilly & Lisa Adkins

February 19, 1984



Ken Groves



CROSSWINDS QUARTERLY

THE JOURNAL OF THE CLEVELAND FREE FLIGHT SOCIETY

ISSUE NO. 70

EDITOR: MICHAEL C. ZAND
7055 Seven Hills Blvd.
Seven Hills, Ohio 44131
TEL.. 216-524-3480

EDITORIAL COMMENT

Unusually fine traveling weather plus typical enthusiasm for indoor model airplane flying brought together twenty-seven contestants at the Estabrook Recreation Center, on Cleveland's southwest side for the CFFS Annual Indoor Contest, held on February 19th, 1984. The turn-out was less than last year but was still a fine showing. This contest is now firmly established as a tradition over the President's Day weekend and hopefully we will be able to continue to use Estabrook as a site. However, there is a possibility of obtaining a larger site for next year, and if so you will be informed in plenty of time to prepare for a big meet.

February's contest would not have been possible to run successfully withqut the advice and super job (as usual) of judging by Russ Brown and the assistance in organizing the director's table and timing given us again by my two faithful Rhodes High Band members, Lisa Adkins and Tim Reilly. Thanks again! It was most appreciated.

It was apparent that the revised rules for the Jetco R.O.G. and Scraps events were acceptable. Personally, I like the minimum weight for R.O.G. I thought it evened out the competition and made the event more in keeping with F.A.C. It allowed us non-indoor specialists to be somewhat competitive. As for Scraps, Gerry Skrjanc flew his Parlor-Mite to victory, but the flight times between it and the traditional Scraps entries were close enough to keep the event in this new format. Perhaps some additional model types will show up next year.

Again, Peanut-Scale was the most popular event. For fun, we were weighing the peanut models at the director's table and Jack McGillivray's Brandenburg C1 was around five grams. This is totalling amazing to me, as my latest effort, an SE-5, is nowhere near that weight and I thought that I would use it for indoor flying. Anyway I was so inspired by Jack's model that I am trying again and am currently working on a DH6 for indoor flying and this time it will be light! So far the total bones weigh in at 2.2 grams so I think I am on the right track.

In this issue of Crosswinds, CFFS offers you a variety of items which I have gathered together, and hope you find to your liking.

Walt Van Gorder gives us his revision of the Skyscraper Too, a Manhatten Cabin. Walt flew this at Estabrook after the contest for an official AMA record trial. To make this an official event at future CFFS contests will neeessitate having a larger flying site, as it is just to difficult to adjust a model of this type for a gym the size of Estabrook.

CFFS ANNUAL INDOOR CONTEST

February 19, 1984 Estabrook Recreation Center

FAC Peanut Scale

Place	Flyer	Aircraft	Best Flight	Scale Points	Total
1	Jack McGillivray	Brandenburg Cl	57	67	124
2	Ken Groves	Sopwith Tri-plane	41	75	116
3	Jim Miller	Waco SRE	50	65	115
	Jim Miller	Itoh	50	53	103
4	Norm Delaney	Gadfly	25	64	89
5	Lad Plachy	Piper Cub	35	51	86
	Lad Plachy	Heath Parasol		54	
6	Warren Weisenbach	SE-5	16	68	84
7	James Harris	Lacey	32	49	81
8	Bud Layne	Cougar	35	46	81
9	Walter McIntosh	Stinson	25	48	73
	Walter McIntosh	Lacy	21	51	72
	Michael Zand	Bleriot Canard		70	
	Andy Medovitch	Bristol Fighter		70	
	Andy Medovitch	Waco SRE		68	
	Gerald Moore	Zippy Sport		53	

Junior Peanut

1 Jason Layne Piper Cub
26 + 51 = 77

WWI Peanut Combat

1 Jack McGillivray Brandenburg Cl
2 Ken Groves Sopwith Triplane
3 Andy Medovitch Bristol

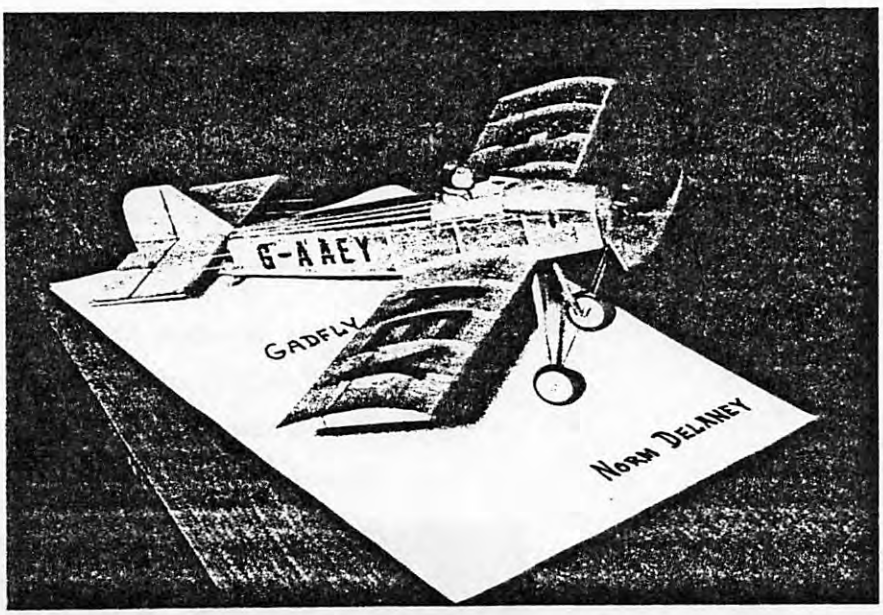


Russ Brown

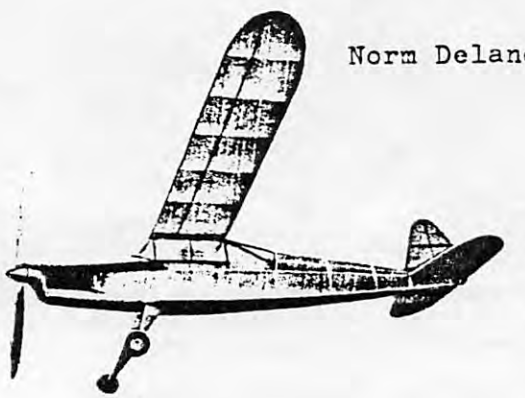
I have included a plan for the Yankee IV, from the January 1951 Model Airplane News. This is a model I built as a boy. It was my first successful large rubber-powered contest type airplane. My father, the late Dr. Stephen J. Zand who was a famous aeronautical engineer, was most impressed with its flying ability. I was most proud of it too, and someday when there is time I will build it again.

And lastly, Joe Fitzgibbon (Golden Age Rep.), at my request, sent me a plan that appeared on the back of one of his original listings. The 15" Wiley Post Biplane has been reduced to peanut size and should make up into a really neat model. The initial issue of Model Aviation (July 75) has a 28" rendition of this subject by Hurst Bowers. I researched out the references listed and have included them in this issue.

In closing, I would like to mention that putting together a newsletter of this type is no small task. If you have something in your personal archives that you think would be of interest please submit it to me for consideration when my turn to be editor comes around again. I need all the help I can get.



Norm Delaney's Outstanding Peanut Gadfly



26" 35¢

BUCCANEER Jr.

A smaller scale copy of one of America's most famous gas models. You will like its long smooth flights and enduring glides.



Henry Struck receives the National Championship Trophy from Colonel Roscoe Turner.

EZB

Flyer	Best Flight
Walt VanGorder	10:03
Larry Mzik	8:58
Larry Loucka	8:36
Gerald Skrjanc	8:06
Ken Groves	7:34
Norm Delaney	6:08
Jack Mcgillivray	5:12
Dave Pishnery	4:37
James McClaskey	2:29
Robert Wallace	1:32

Junior EZB

Don Slusarczyk	4:55
Jason Layne	2:00

Scraps and Mites

Flyer	Best Flight
Gerald Skrjanc	4:15
Chuck Slusarczyk	3:54
Larry Loucka	3:28
Robert Skrjanc	2:54
Robert Wallace	1:58

Hand Launch Glider

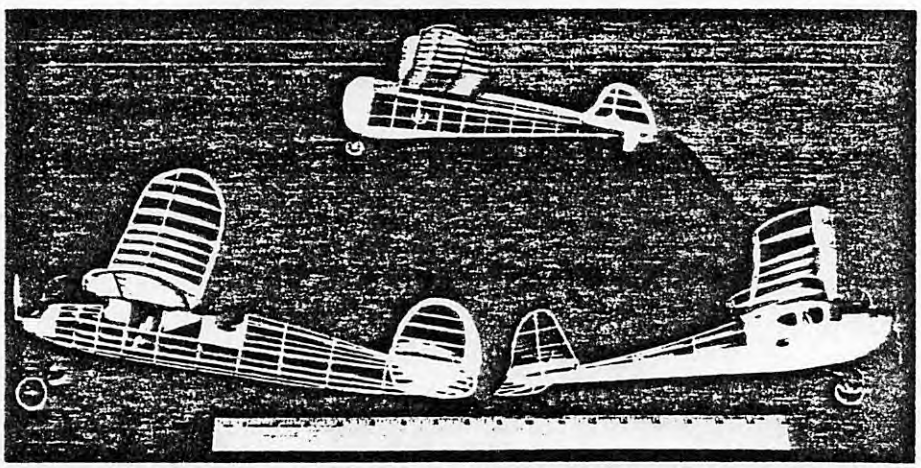
Flyer	Best 2 Flights		Total
Chuck Slusarczyk	25+26	=	51
Jim Miller	24+25	=	49
Larry Loucka	22+21	=	43
Dave Pishnery	19+15	=	34
Scott Wisniewski	12+12	=	24

Jetco ROG

Flyer	Model Weight	Best Time
Walt VanGorder	3.5g	106
Michael Zand	3.7g	81
Chuck Slusarczyk	3.5g	78
Robert Wallace	4.3g	52
David Narance	5.9g	44
Alex Solomonoff	6.2g	42
Jim Harris	7.0g	36

No-Cal Scale

Flyer	Aircraft	3 Flights		Total
Larry Loucka	Lacey	90+152+171	=	413
W. VanGorder	Fike	139+126+120	=	385
Ken Groves	Bonzo	33+87+113	=	233
Lou Leifer	Fike	54+55+49	=	158



Trio of miniature CO_2 powered Old Timers being kitted by Ed Toner. Each kit includes printed wood by Peck-Polymers and a set of FH Wheels. Recognize the designs?

The MODEL BUILDER Courtesy Hannan's Hangar.

CO-2 UPDATE

In cooperation with the A.H. Zed Company, Inc. of Chicago, Jack Dietrick, Director, CFFS has obtained as donations four (4) CO-2 engines per contest to be used as prizes this flying season.

These engines will be used as a 1st, 2nd, and 3rd place prize in each CO-2 event and as a first place prize in one additional designated event as follows:

June 24 - FAC GHQ Peanut Scale
July 1 - OT Rubber Scale
July 22 - FAC Peanut for A-23 with Soda Charger
Aug. 12 - Embryo Endurance (Open)
Sept.16 - FAC Rubber Scale for A-23 with Soda Charger

In order to equitably distribute the engines as prizes, you will be limited to one engine prize until such a time that CFFS feels that everyone has had an equal opportunity to participate in these competitions. The three engines per CO-2 event will be offered for win, place and show and the first place winner will have his choice of an MJ 140 (Twin), a Campus Bee, and an A-23. This means you must have a qualifying flight in scale and/or a successful time target flight or flights in OT Replica Precision, besides being in the top three.

Two plans are included in this issue of subjects that I think are very suitable for CO-2 OT Replica Precision. The plans were enlarged from Model Builder Magazine via the Xerox enlarger copy machine. The smaller version of the Interceptor should work out beautifully for the A-23. Be sure to extend the Interceptor's nose to insure proper balance. Also with this model you will have to calculate the correct dihedral angles. The Long Cabin could also benifit from a longer nose.

We hope to see a lot of you flying CO-2 soon. This is a great opportunity to win a valuable engine.

Michael C. Zand
CFFS Secretary/Treasurer

Extending the nose of O.T. models is attractive, and not a new idea. Rubber kit versions of gas power models include the Berkeley American Ace 30", Buccaneer 30", Cleveland Playboy (as Polish Valor), Comet Zipper, and Miss Tiny (as Pacific Ace). Other attractive options with original long noses include the Flying Quaker (built by Fernando Ramos) from Jan 75 Model Builder enlarged 2X to 22" and the Red Zephyr 13" plan in 6/74 MB. Another good type for CO_2 is the '39-'40 Era wire mount parasol KG, Miss Philladelphia, Lanzo Record Breaker 7/73 MB, and the Frank Ehling Midget Gas Winner4/40 MAN, where the wing can be easily adjusted to C.G.

Buzzer's Ed Toner at 52 Newbury Rd. Howell. N. J. 07731 has O.T. CO_2 Kits for $4.25 plus 10% of 20" American Ace (Mike Zand built), 18" Buzzard Bombshell, and 19" Super Sunduster. Ed also has"a beaut" of 20" Playboy plan for $1.75 plus 10%.

/RB.

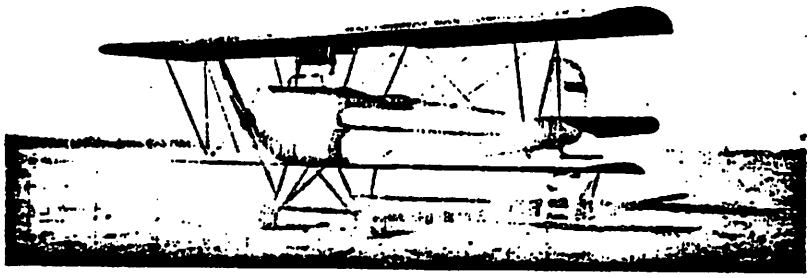
AVIATION Magazine, April 1934-p.128

A Newcomer, Under $1,000

AT A TIME when interest is centered in the developments of a light plane program under the wing of the Department of Commerce, a newcomer in this class has put in an appearance in the vicinity of Wichita. This little ship is the product of the Straughan Airplane Company. It is built around a modified Ford Model A four-cylinder engine, rated at 40 hp. at 1,900 r.p.m.

The machine is a conventional biplane with steel tube fuselage, wooden framed wings and fabric covering. Landing gear and tail surfaces are of welded steel tubing. It is arranged for side-by-side seating for two people.

At 1,400 ft. above sea level, the plane has shown a top speed of 80 m.p.h. The general specifications as given by the manufacturer are: span, 28 ft. 6 in.; length overall. 19 ft. 8½ in.; weight empty, 581 lb.; gross weight, 998 lb.; fuel capacity 7 gal.; fuel consumption (cruising) 3.5 gal. per hour.



The Straughan Biplane, a new light ship which carries two people with a modified Ford engine and which sells for less than $1,000.

Jane's ALL THE WORLD'S AIRCRAFT, 1935

WILEY POST.

THE WILEY POST AIRCRAFT CORPORATION.

HEAD OFFICE AND WORKS: OKLAHOMA CITY, OKLAHOMA.

The Wiley Post Aircraft Corpn. was formed in 1935 to manufacture a cheap two-seat biplane originally developed by the Straughan Aircraft Company. This machine is fitted with a converted Ford Model "A" automobile engine and has been placed on the market to sell for $1,438 (approximately £288).

Mr. Wiley Post, who had no connection with the Company other than that associated with the use of his name, was killed in an air accident in Alaska on August 16, 1935.

THE WILEY POST MODEL "A."

TYPE. Two-seat light biplane.

WINGS. Single-bay biplane, of unequal span and chord. Upper wing in one piece, supported above the fuselage by splayed-out steel-tube struts with one "N"-type interplane strut on either side of the fuselage. Wing structure of spruce and plywood, with fabric covering. Inset ailerons on upper wings only.

FUSELAGE. Welded steel-tube framework, covered with fabric.

TAIL UNIT. Monoplane type. Welded steel-tube framework, covered with fabric. Fixed tail-plane. Wire-braced tail-plane and fin.

UNDERCARRIAGE. Divided type. Consists of two welded steel-tube pyramids hinged to the lower fuselage longerons and each carrying an airwheel at its lower apex. Horizontal Vee extensions from the upper fittings meet on the centre-line of the underside of the fuselage, where they are anchored by rubber cord. Leaf-spring tail-skid.

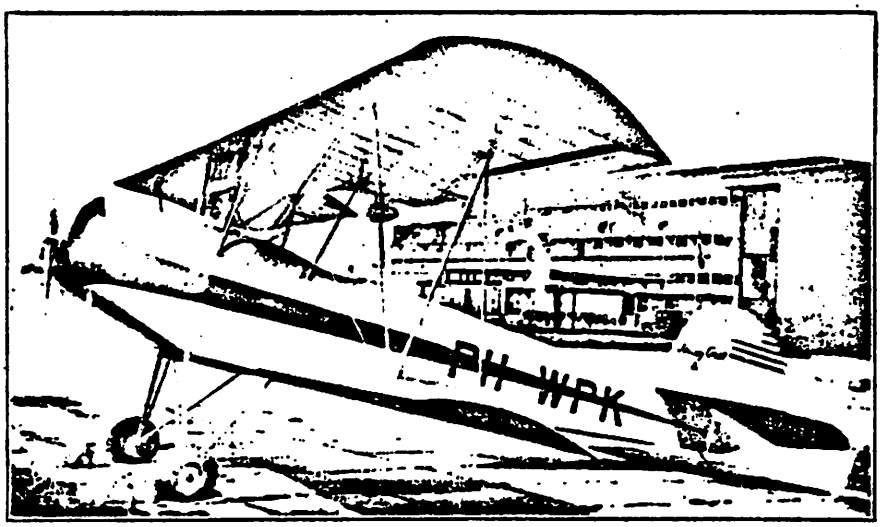
POWER PLANT. One 40 h.p. converted Ford Model "A" four-cylinder in-line water-cooled engine, on a welded steel-tube mounting. Water radiator mounted below the leading-edge of the centre of the wing. Fuel tank (7 U.S. gallons) in the fuselage.

ACCOMMODATION. Open cockpit, seating two side-by-side, below cut-out in trailing-edge of upper wing. Dual controls.

DIMENSIONS. Span 28 ft. 6 in. (8.17 m.). Length 19 ft. 8$\frac{5}{16}$ in. (6.01 m.). Height 7 ft. 8$\frac{1}{2}$ in. (2.35 m.). Wing area 206 sq. ft. (19.13 sq. m.).

WEIGHTS AND LOADINGS.—Weight empty 605 lbs. (278 kg.). Weight loaded 998 lbs. (452 kg.). Wing loading 4.8 lbs./sq. ft. (23.6 kg./sq. m.). Power loading 25 lbs./h.p. (11.3 kg./h.p.).

PERFORMANCE.—Maximum speed 80 m.p.h. (130 km.h.). Cruising speed 70 m.p.h. (113 km.h.). Landing speed 25 m.p.h. (40 km.h.). Initial rate of climb 600 ft./min. (138 m./min.). Service ceiling 10,000 ft. (3,050 m.). Absolute ceiling 12,000 ft. (3,660 m.). Cruising range 140 miles (224 km.).



The Wiley Post Model "A" Two-seat Light Biplane (40 h.p. converted Ford engine).

The July 1975 Model Aviation has a construction article for the Wiley Post Biplane, written by Hurst Bowers. Listed are five sources of data. The results of my research at the Cleveland Public Library are as follows:

1. The Aircraft of the World, Green & Pollinger. The only copy available is a new and revised edition and it does not contain the Wiley Post Biplane. Lots of other nifty 3-views and pictures however.

2. The Restorer Magazine, May-June 1962, not available at C.P.L.

3. Aviation Magazine, April 1934-p.128.. Under the name "The Straughan Biplane" there is a picture and a short description.

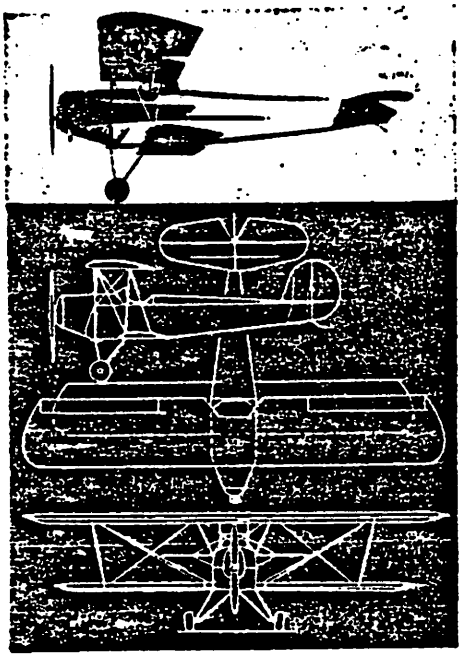
4. Jane's All the World's Aircraft, 1935- p. 348c.

5. Aero Digest, circa mid 1930's. I did not research.

The color scheme indicated by Bowers is standard aircraft color of yellow or cream with black numerals and trim. Details are black, copper, and silver.

ONE LAST P (note)

There is a plan available from OLD TIMER MODELS, P.O. Box 913, Westminster, CA. 92683 for a 21-5/16" Wiley Post Model A. It is plan # 112 by Zeboyan and is $1.50. I havn't seen it, so take your chances.

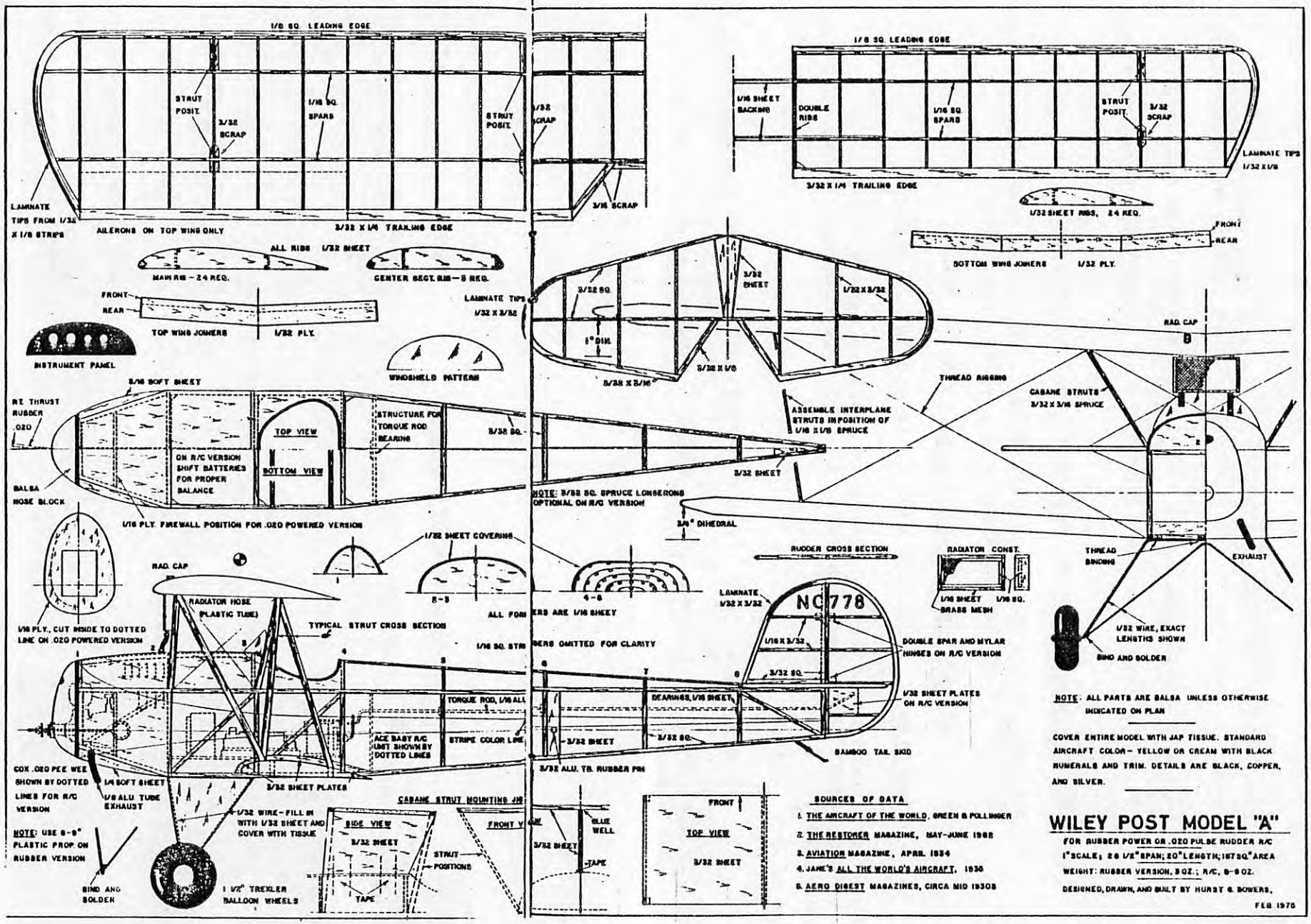


NC 13952

WILEY POST Model A — 2-place — ATC 561

Specifications. Span 28' 6" (8.7 m.). Length 19' 8.56" (6 m.). Height 7' 9.5" (2.4 m.). Wing area 204 ft.² (18.9 m.²). Power loading 25 lbs./h.p. (11.3 kg./h.p.). Wing loading 4.8 lbs./ft.² (23.4 kg./m.²). Weight empty 581 lbs. (263.5 kg.). Useful load 411 lbs. (186.4 kg.). Payload 170 lbs. (77.1 kg.). Gross weight 992 lbs. (450 kg.). Fuel 7.5 gals. (28.4 lit.). Oil 1.25 gals. (4.7 lit.).
Engine. Wiley Post AL-1000 (converted Ford Model 1A) rated 40 h.p. at 1900 r.p.m.
Performance. Maximum speed 82 m.p.h. (132 k.p.h.). Cruising speed 70 m.p.h. (112.7 k.p.h.). Landing speed 25 m.p.h. (40.2 k.p.h.). Service ceiling 10,000 ft. (3048 m.). Climb per min. 600 ft. (182.9 m.). Cruising range 140 mi. (225.3 km.).
Construction. Fuselage: welded chrome molybdenum tubular truss type, wood faired, fabric covered. Side-by-side seating arrangement, open cockpit type equipped with dual controls. Wings: wood construction with routed spruce spars, truss type ribs, plywood leading edge. Wings are fabric covered. The cell consists of two lower panels and one continuous upper wing attached to the fuselage by means of steel cabane struts with wire cross bracing. Outer N-type interplane bracing and lift and landing wires complete the wing trussing. The engine radiator is carried below the center of the upper wing. Tail group: the tail surfaces are of welded chrome molybdenum type of construction, fabric covered and wire braced. The stabilizer is fixed. The elevators have a continuous through beam. Landing gear of the split-axle type consists of two independent tripod structures mounting 16 × 7 × 3 airwheels and equipped with rubber cord shock absorbers. The tail skid mounted at the stern of the fuselage is of the leaf spring type.
Standard equipment. Supreme wood propeller, Goodyear airwheels, shock cord absorbers, Pyrene fire extinguisher, Johnson & Johnson first aid kit.
Instruments. Pioneer oil temperature gauge; tachometer, fuel gauge, altimeter.

Courtesy AERO DIGEST



NOTE: ALL PARTS ARE BALSA UNLESS OTHERWISE INDICATED ON PLAN

COVER ENTIRE MODEL WITH JAP TISSUE. STANDARD AIRCRAFT COLOR - YELLOW OR CREAM WITH BLACK NUMERALS AND TRIM. DETAILS ARE BLACK, COPPER, AND SILVER.

SOURCES OF DATA

1. THE AIRCRAFT OF THE WORLD, GREEN & POLLINGER
2. THE RESTORER MAGAZINE, MAY-JUNE 1968
3. AVIATION MAGAZINE, APRIL 1934
4. JANE'S ALL THE WORLD'S AIRCRAFT, 1936
5. AERO DIGEST MAGAZINES, CIRCA MID 1930S

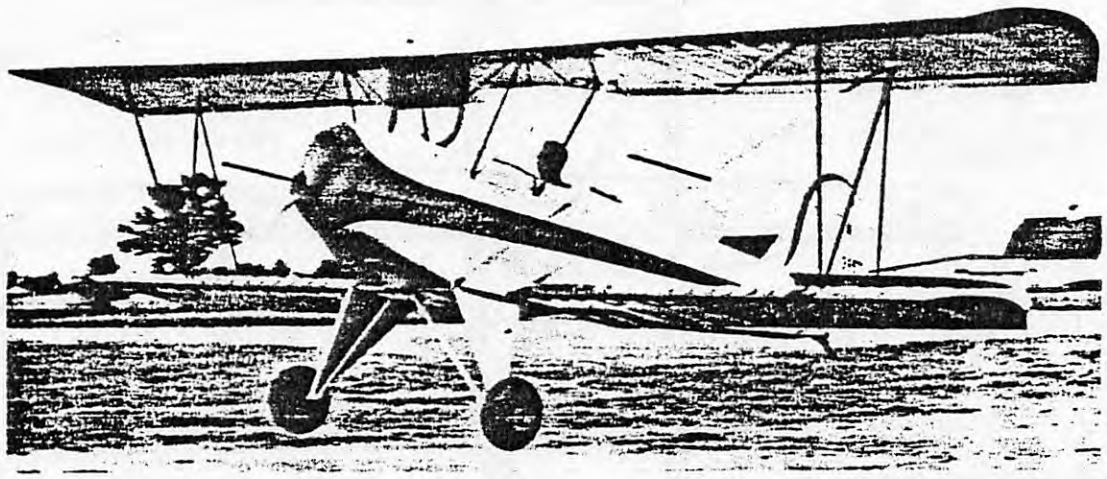
WILEY POST MODEL "A"

FOR RUBBER POWER OR .020 PULSE RUDDER R/C
1"SCALE; 28 1/8"SPAN; 20"LENGTH; 187SQ"AREA
WEIGHT: RUBBER VERSION, 3 OZ.; R/C, 6-8 OZ.

DESIGNED, DRAWN, AND BUILT BY HURST G. BOWERS.

FEB 1975

Wiley Post Biplane



Hurst G. Bowers

THE COLLAPSE of the stock market in 1929, followed by the great depression of the 1930s, came at a time when all Americans were filled with unprecedented enthusiasm for aviation. To a large extent this mania for flying was brought about by Lindbergh's successful Atlantic crossing, which was followed by other daring and history-making flights. With the economy as it was at that time, however, most of the enthusiasm manifested itself in the form of reading aviation publications and day dreaming of the time when one could afford to buy an airplane and become a pilot. Then, as at other times in our history, there were those determined and resourceful individuals who were not content to merely day dream. They had to put their dreams and ideas into action; into the development of actual hardware. Many barns, shops, and basements became small aircraft factories, just as is the case with homebuilders today, utilizing such tools, materials, and engines as could readily be obtained. Of course many of these efforts were futile, but many also were quite successful. For example, the Pietenpol *Air Camper*, powered by the cheap and plentiful Model "A" Ford engine of the period, began under such circumstances and is still a homebuilders favorite even now, some 45 years later. Another example is the subject of this article.

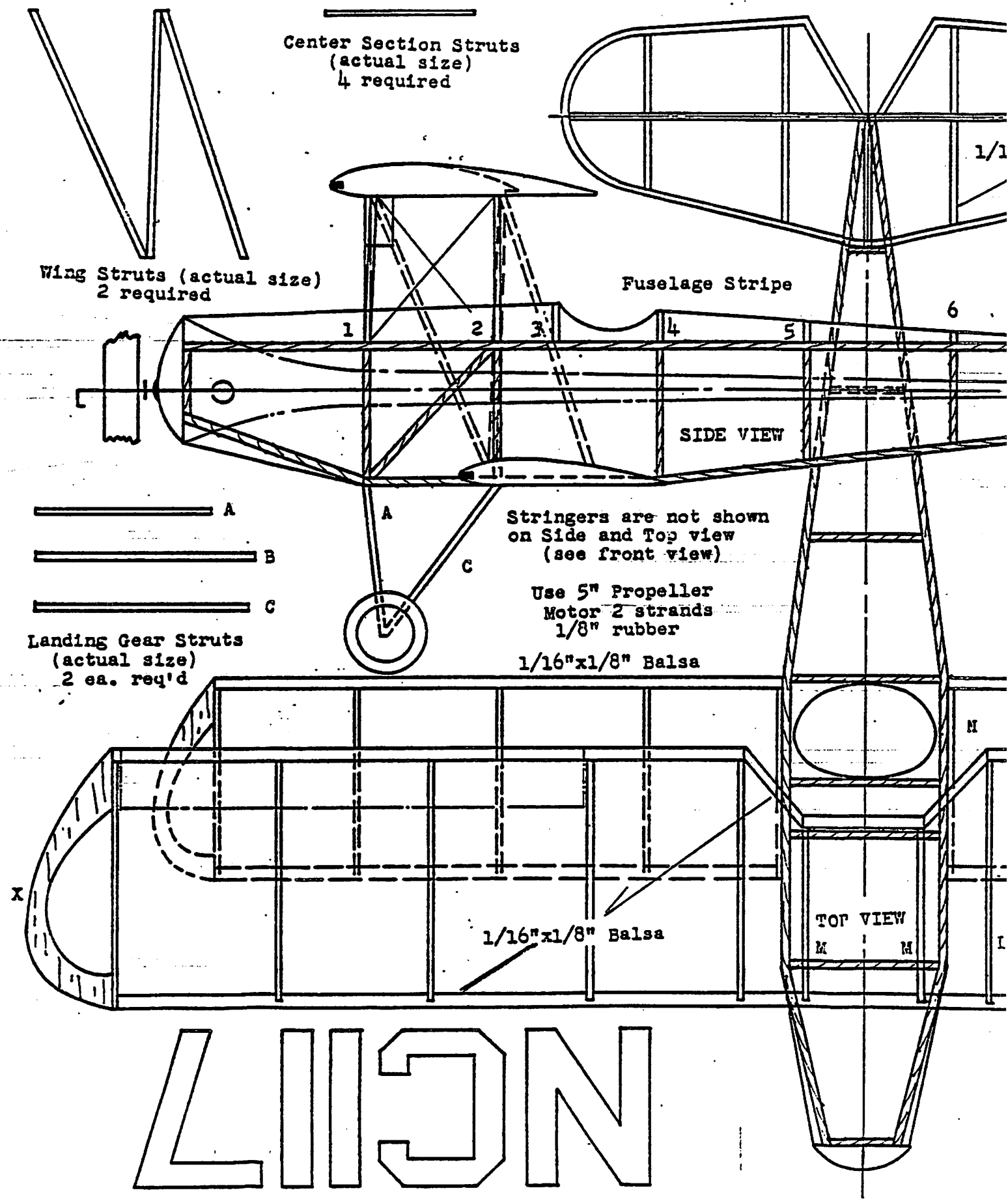
The Wiley Post Model "A" began as the project of an enthusiastic Ford garage mechanic in Enid, Okla. Unfortunately, the name of this gifted individual has slipped into oblivion, but the owner of the garage, a Mr. Straughn, was sufficiently interested in his employee's creation to establish the Straughn Airplane Co. in 1934 at Wichita, Kan. The small, Model "A" Ford engine powered, two-place biplane with side by side seating, was placed into production. Only three airplanes were built when the company was beset with financial problems. The machine, which was intended to sell for under $1,000, was costing more than that to build. In 1935 a corporation in Oklahoma City bought manufacturing rights to the airplane and named it after Oklahoma's most famous flier. In so far as is known, the use of his name is the only connection that Wiley Post ever had with the venture. More than a dozen airplanes were produced, reportedly selling for $1,438 each, when the company succumbed; another tragedy of the era. Those who flew the little ship indicated that it was very well liked, being docile and easy to fly.

The specifications and performance of the Wiley Post were typical of the light plane of the day, as was its construction. The wing span was 28½ ft.; length overall was 19 ft., 8½ in.; weights empty and gross were 581 and 998 lbs. respectively, and the fuel capacity was 7 gal. with a 3.5 gallon/hour consumption rate. Maximum speed was 80 mph, with cruise ranging from 60 to 70. The landing speed was reportedly 25 mph. Absolute and service ceilings were 12,000 and 10,000 ft. The construction was conventional with welded steel fuselage and tail framework and wooden wings with fabric covering. According to *The Aircraft of the World*, by William Green and Gerald Pollinger, there were two examples of the Wiley Post Model "A" on the *U. S. Civil Register* in 1965, one of which was active and one in storage.



Marion McClure of Bloomington, Ill. brought in his Wiley Post A. An interesting Antique aircraft, this plane still flies with the Straughn AL 100 engine. Built in 1935 the plane carries serial number 10.

Courtesy EAA August, 1960


Center Section Struts
(actual size)
4 required
Wing Struts (actual size)
2 required
Fuselage Stripe
1
2
3
4
5
6
SIDE VIEW
A
B
C
Landing Gear Struts
(actual size)
2 ea. req'd
Stringers are not shown
on Side and Top view
(see front view)
Use 5" Propeller
Motor 2 strands
1/8" rubber
1/16"x1/8" Balsa
1/16"x1/8" Balsa
X
N
M
M
TOP VIEW

WILEY POST PLANE

1/16" Reed

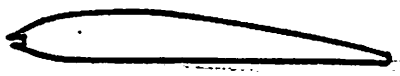
1/16" sq. Balsa

Designed by- Art Kronfelt

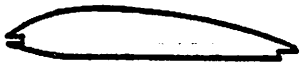
Manufactured by

Art Kronfelt's Model Supply

Arlington Massachusetts



Rib L - 10 required



Rib M - 2 required



Rib N - 10 required

ge Stripe

6

5

IDE VIEW

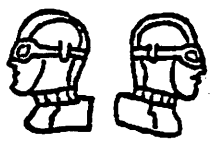
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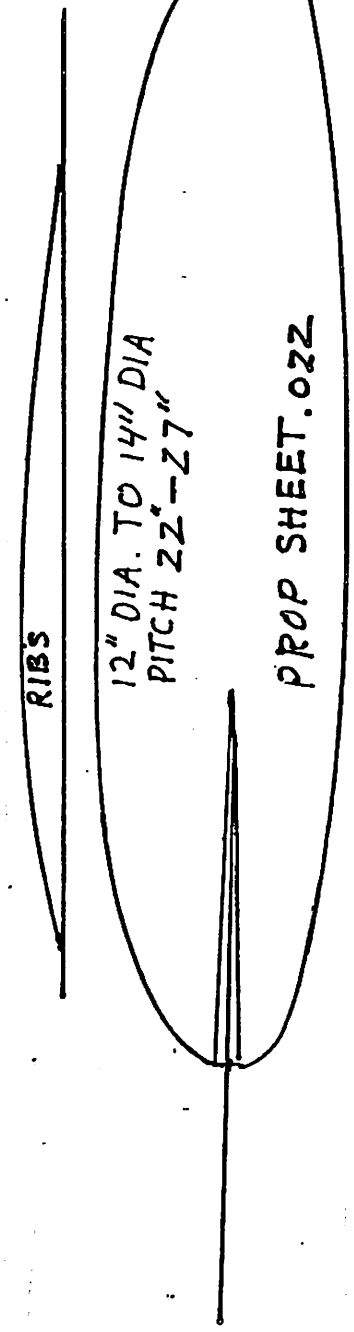
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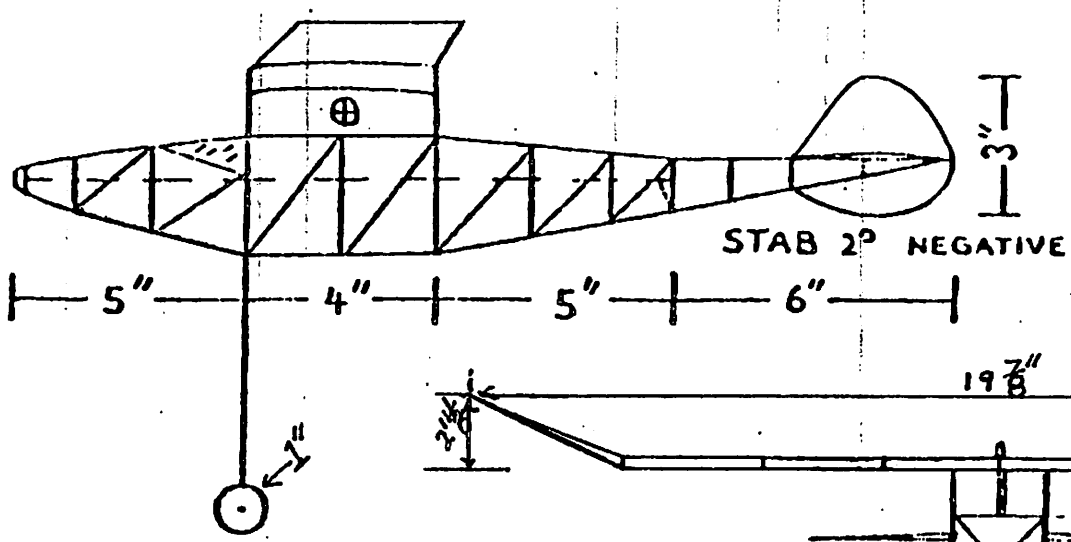
Leave a small section uncovered on the under side of the fuselage at the nose and tail to allow access to the rubber hooks.

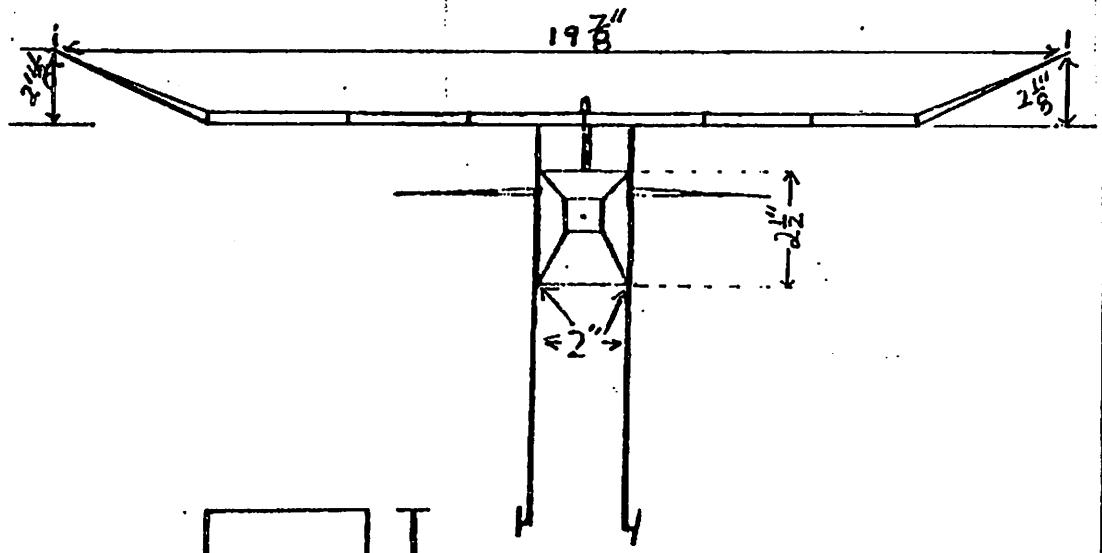
Cement on cardboard and cut out.

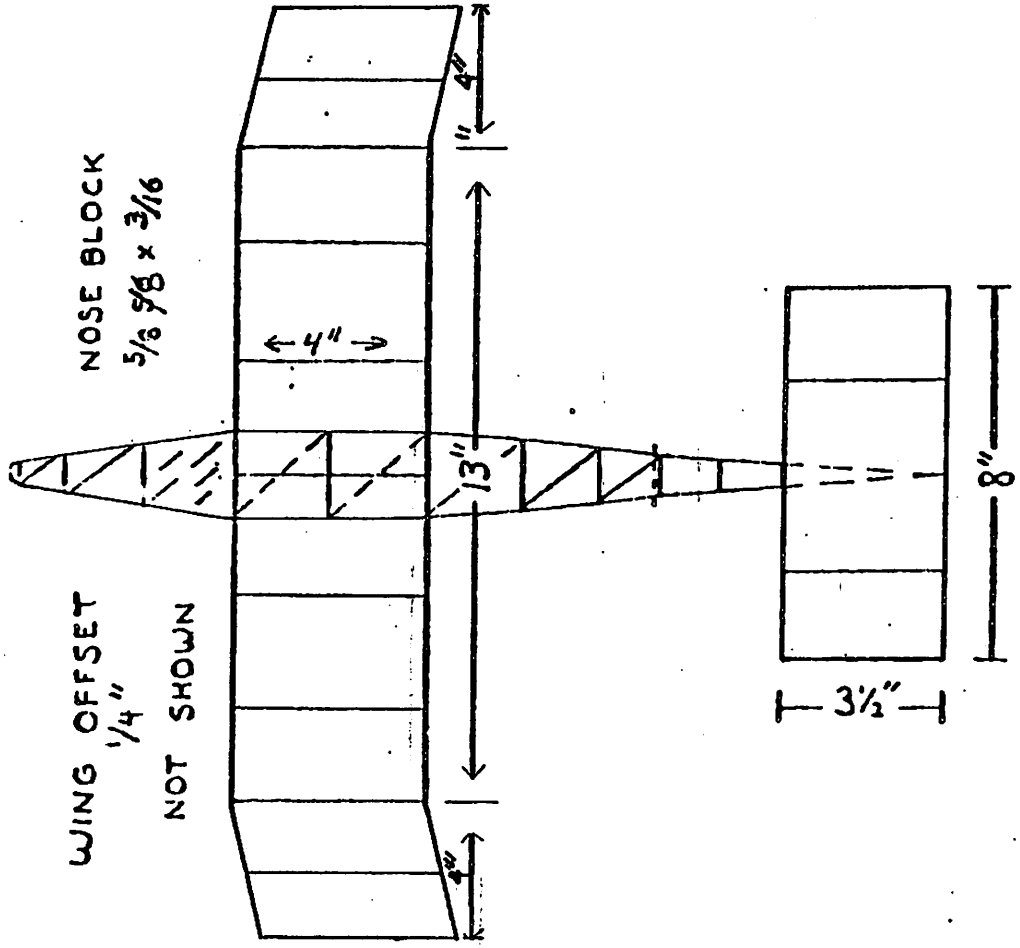


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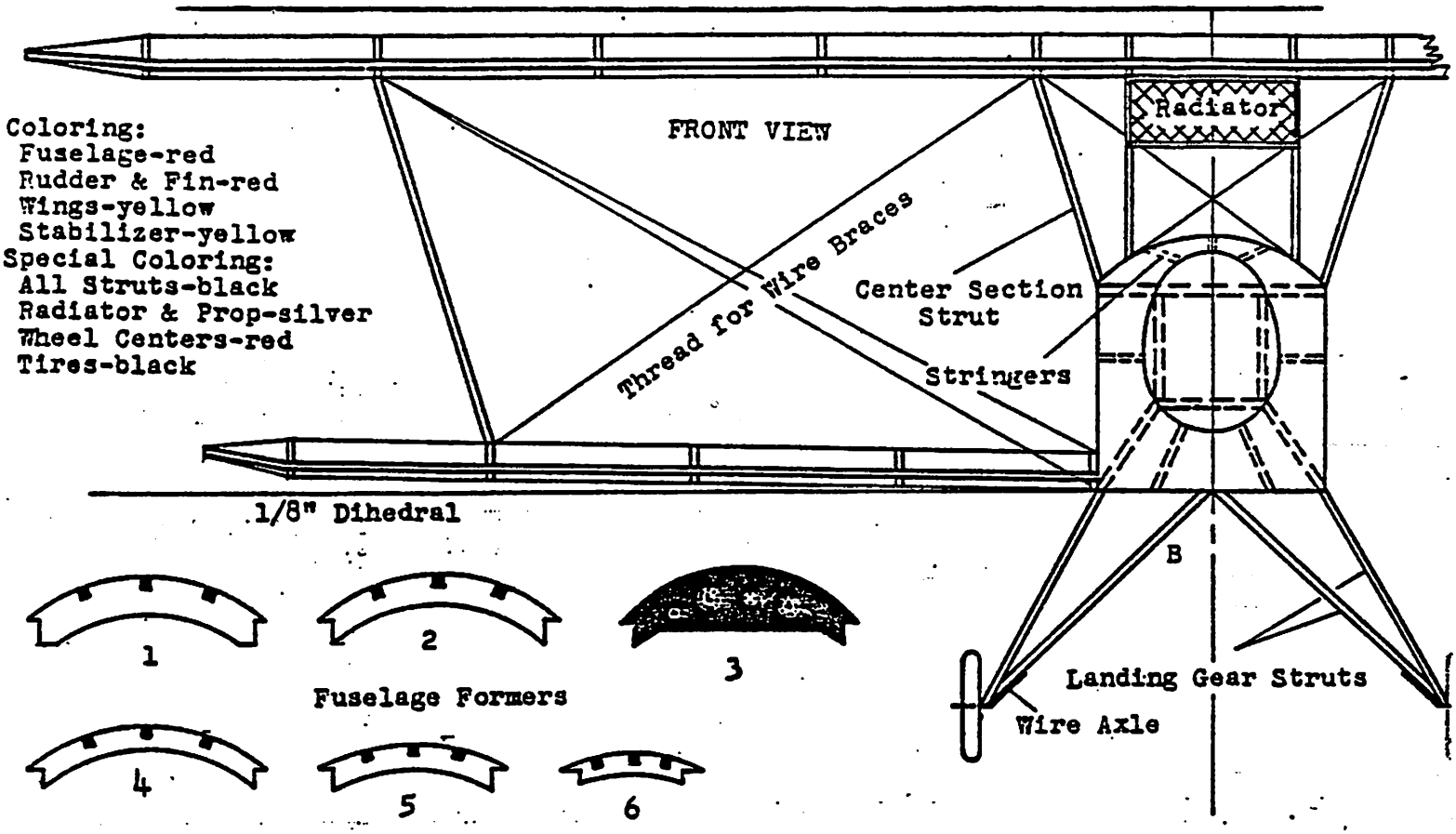






SKY SCRAPER TOO

MANHATTAN CABIN
DESIGNED BY JOHN G. TRIOLO
MODIFIED BY WALTER VAN GORDER
DRAWN AND INKED BY
WALTER VAN GORDER
CAT I RECORD 5:23-2-19-84



AIRCRAFT & AVIATION ~ WATERCOLOR PAINTINGS - MADE TO ORDER. WORLD WARS I & II ~ ACTION SCENES OF THE ACES & THEIR AIRCRAFT.

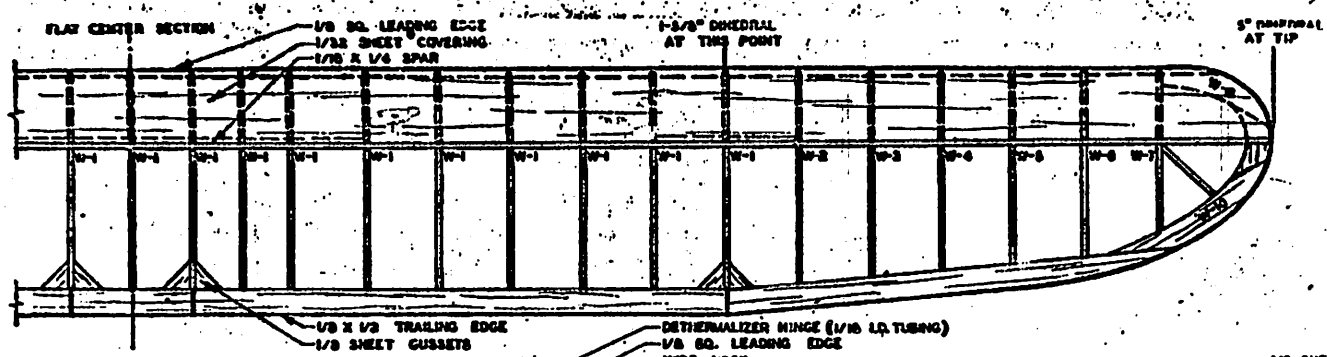
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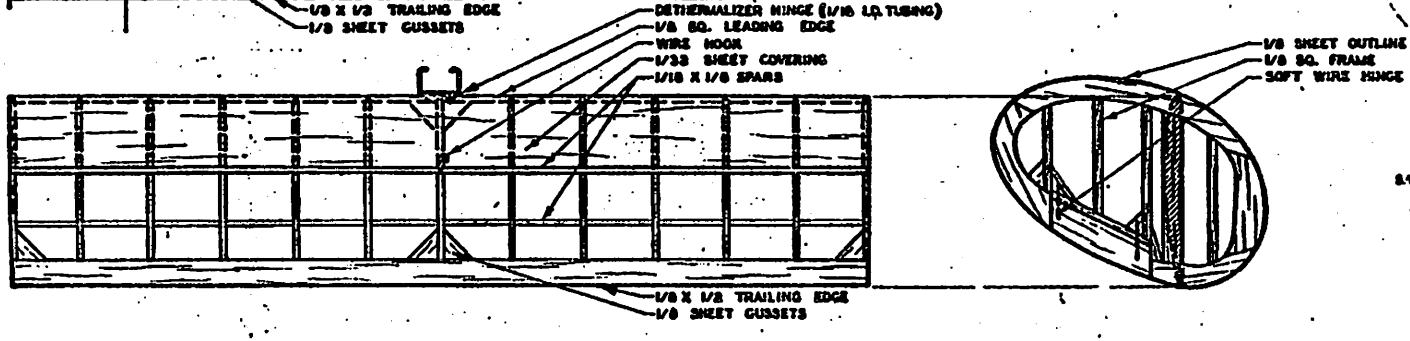
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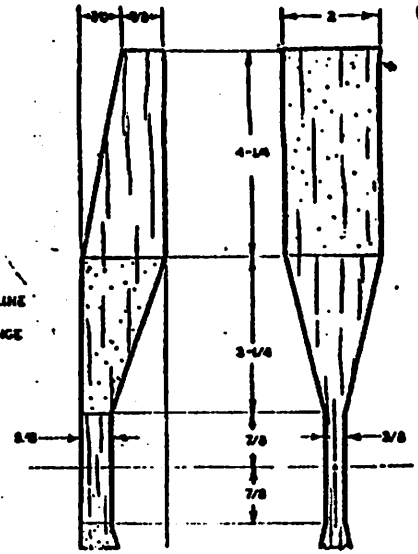
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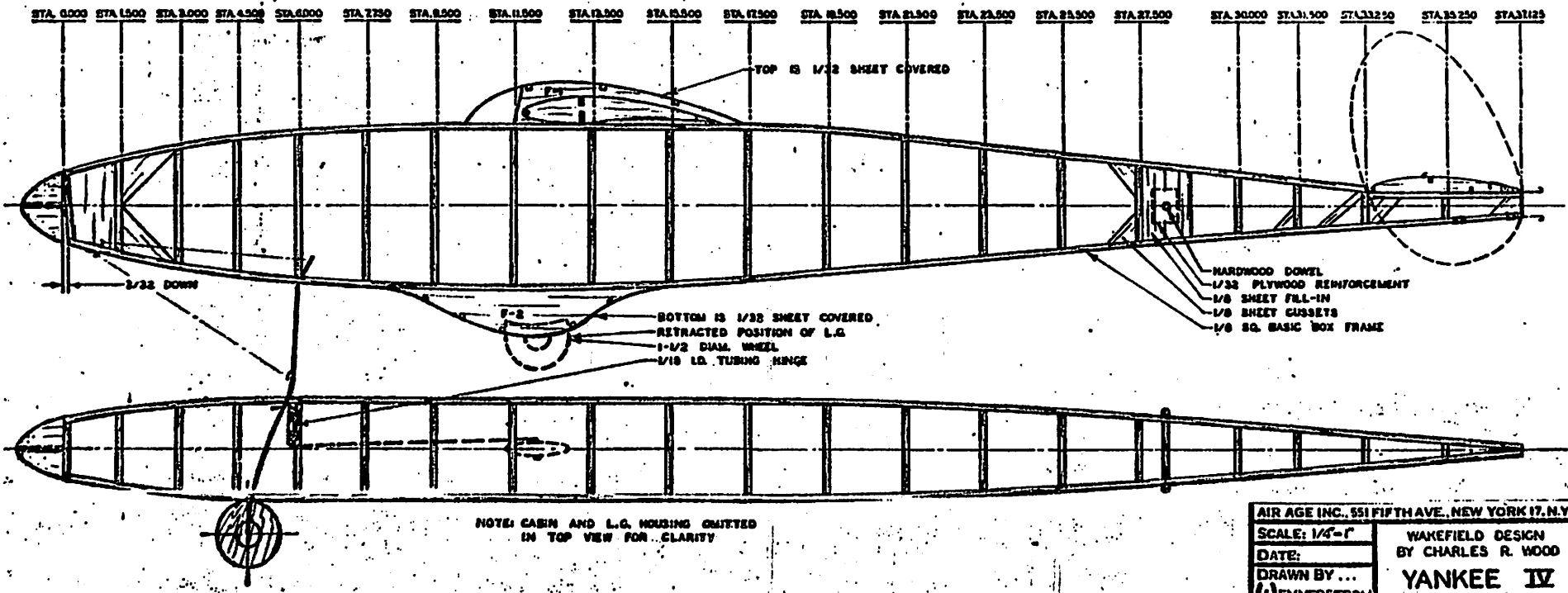
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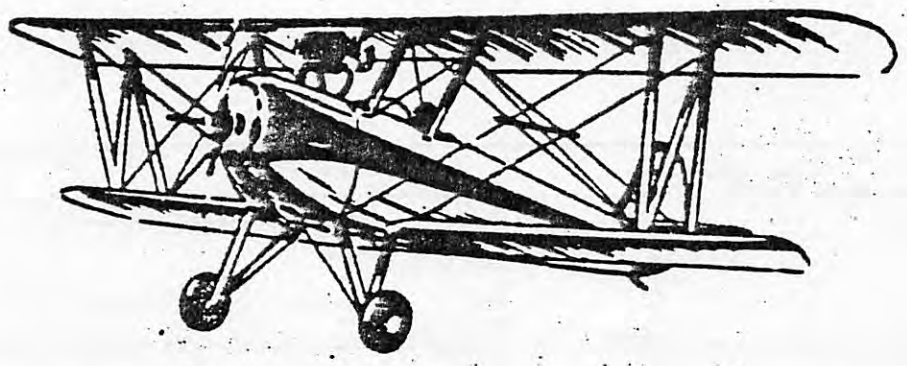






NOTE: CABIN AND L.G. HOUSING OMITTED IN TOP VIEW FOR CLARITY

AIR AGE INC., 551 FIFTH AVE., NEW YORK 17, N.Y.	
SCALE: 1/4"=1"	WAKEFIELD DESIGN BY CHARLES R. WOOD
DATE:	
DRAWN BY ... WENNERSTROM	YANKEE IV



INSTRUCTIONS FOR WILEY POST "A"

READ ALL THE INSTRUCTIONS AND STUDY PLAN CAREFULLY.

Fuselage

Make two fuselage side frames exactly alike (shaded portion on the side view) using 1/16" square. Next cut out the fuselage formers. Place the two sides over the top view and cement the bottom cross members in place. Then cement the fuselage formers in place. After shaping the nose block cement a cup washer to the front and a small washer to the rear for propeller bearings. Then secure the nose block to the fuselage. The side and bottom stringers run between the nose block and first bulkhead only (see front view) Finally cement the rear rubber hook in place.

Wings and Tail Surfaces

Cut out the ribs and wing tips. By placing wax paper on the plan you may build up the parts directly over the plan. The tail surfaces are built up of 1/16" square and a reed outline.

Covering

Always apply the paper with the grain of the paper running the long way of the surface being covered. The prop and propeller shaft should be assembled on the fuselage before covering. All the parts are covered before final assembly. The surfaces May be dampened to shrink the covering (Caution-Do not wet the covering or the surfaces will warp when it dries. Use a fine atomizer such as a perfume sprayer.

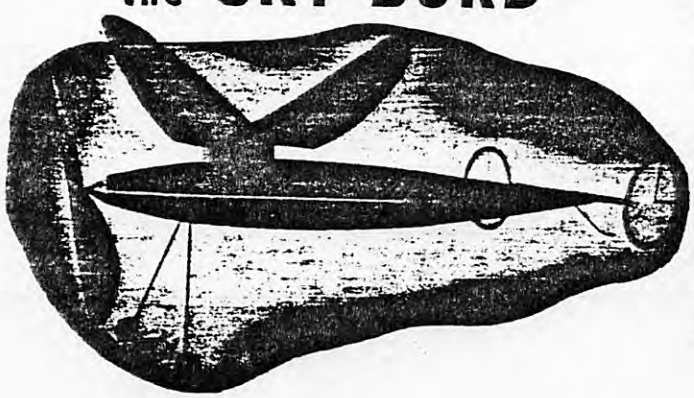
General

All the wing and landing gear struts are 1/16" dia. bamboo. The radiator supports are half round bamboo. When assembling be sure the lower wing has 1/8" dihedral. The numbers and fuselage stripe are cut from black tissue. The control surfaces may be marked with drawing ink.

Balancing and Flying

The model should balance approximately at X. Add weight to the nose or tail as required. It should make a long even glide before attempting to fly. Do not fly the model in a strong wind.

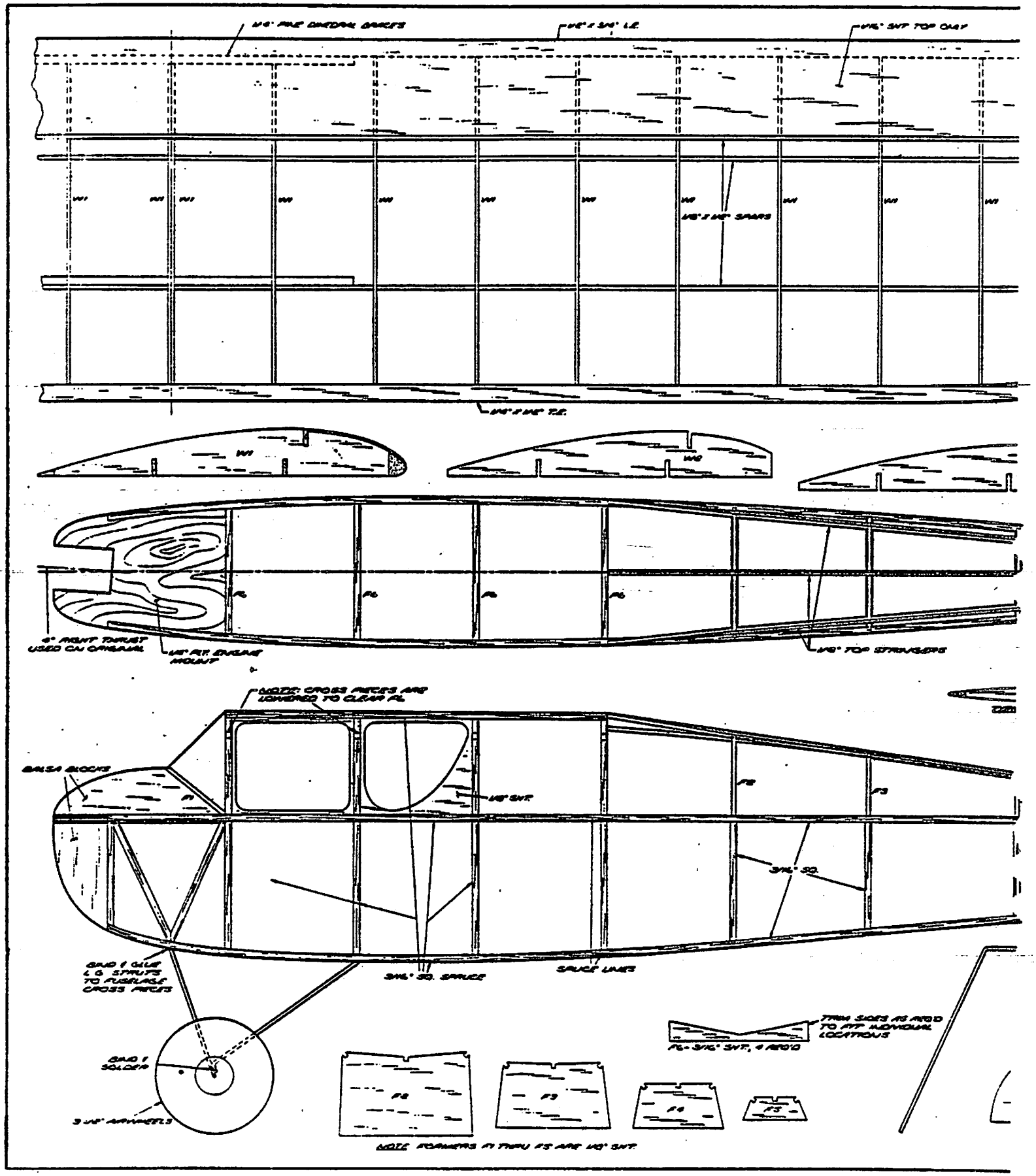
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30" FLYER


1/16" PINE DIAGONAL BRACES
1/16" SHT TOP CHAT
1/16" & 1/16" SPARS
1/16" & 1/16" T.E.
4° PRINT THRUST USED ON ORIGINAL
1/16" TOP STRINGERS
NOTE: CROSS PIECES ARE LOWERED TO CLEAR F6
BALSA BLOCKS
1/16" SHT.
3/16" SQ.
3/16" SQ. SPRUCE
SPRUCE LINES
GLUE & GLUE L.G. STRUTS TO FUSELAGE CROSS PIECES
GLUE & SOLDER
3 1/2" AIRWHEELS
TRIM SIDES AS REQ'D TO FIT INDIVIDUAL LOCATIONS
F6 - 3/16" SHT, 4 REQ'D
NOTE: FORMERS F1 THRU F5 ARE 1/16" SHT.

**********PHIGHTING PHUGOIDS**********

Mumbo Jumbo #9 from the Glue Guru, aka Leon Bennett

Salutations, disciples! Today we shall continue our meditations upon the issue of stability. Specifically, we shall focus on practical measures to counter the phugoid menace, sometimes known as the zoom to doom.

But first, let us address those philosophical doubts concerning the basic suitability of this topic for examination. There is indeed something about model death through zoom that causes a shrinking of the soul, a turning away of the gaze natural enough in dealing with distressing or disgusting phenomena. Consequently in the case of death, as in bowel movements, there is anxiety involved in microscopic examination of the process. Here our philosophy is to vanquish one's fears through relentless confrontation; in order to become strong it is necessary to become familiar--even overly familiar--with that causing disgust. As it is written, better a turd in hand, than two in the bush.

So let us turn again to the phugoid problem, which we have ascribed to (M.J. #8) three independent factors working together. In order of importance these are, first, a high velocity; second, a large wing angle of attack, suited for slow cruise; third, a highly stable tail plane setting--one capable of maintaining grimly that high angle of attack no matter what. Any successful therapy must change one or more of these factors.

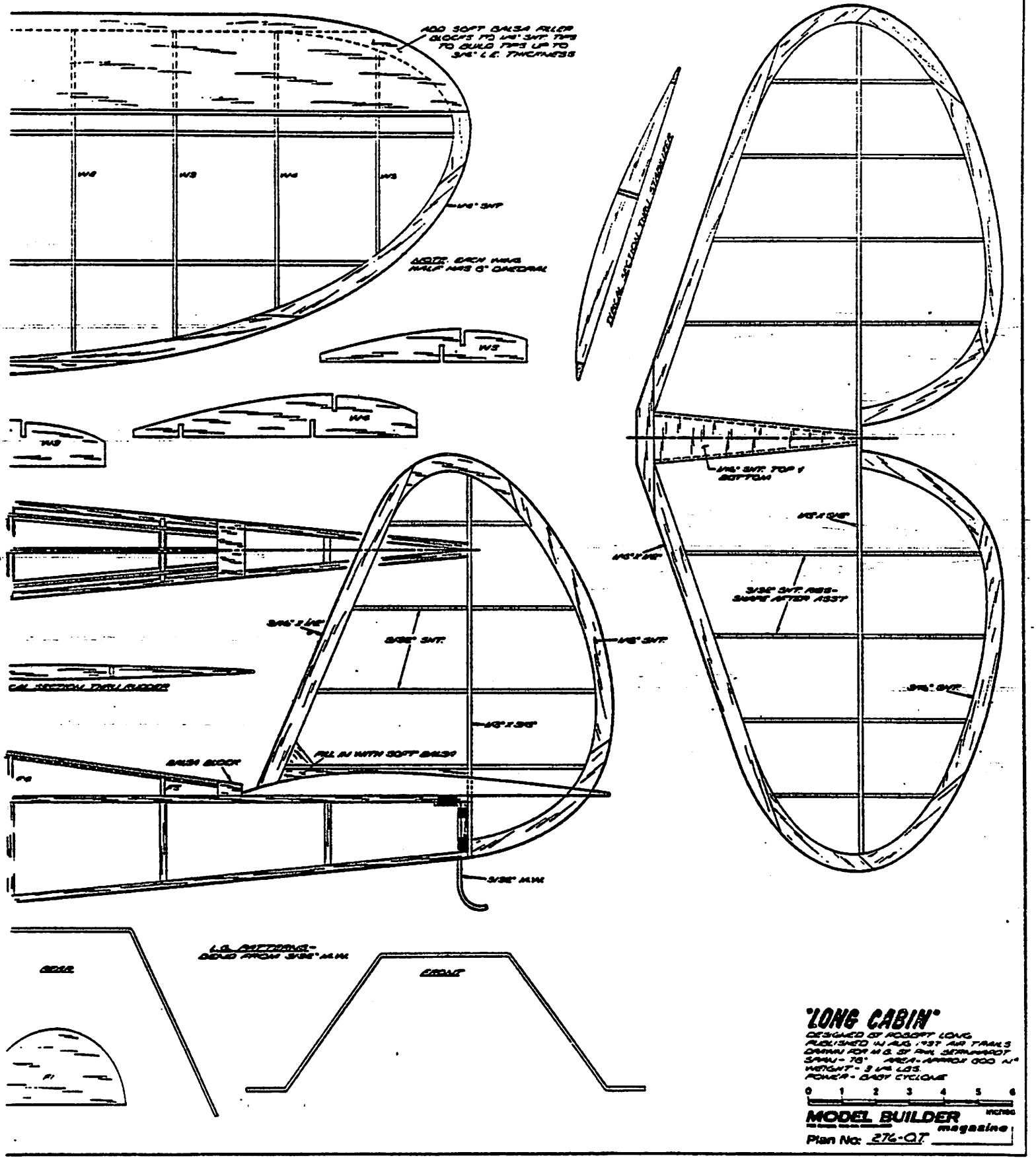
Therapy--Things That Work

1. Reduce power, especially torque. Cutting down on either the number of strands or the crossection of rubber per strand is an obvious and certain solution. The catch is that altitude will certainly decrease. Overall duration will also suffer unless the rubber weight so removed is restored in the form of a longer motor. If the configuration (short nose) prevents a lengthened motor, consider some alternate therapy.

2. Modify the prop to prevent the initial surge. Outdoor rubber props usually have a 30 degree blade angle within the "sweet zone" (roughly .6 to .8 of the prop radius as measured from the shaft--a band in which most of the useful prop work is actually performed). The 30 degree value represents a good compromise between conflicting requirements for climb (lower) and cruise (higher). By carving a new prop with a larger blade angle within the "sweet zone"--say 45 degrees instead of 30--you will increase the back load on the motor to the point where the prop slows down and less thrust is delivered, thus reducing speed and preventing zoom. The catch is that less altitude is obtained; however, overall duration is not affected much. Indoor people--who fear altitude--do this sort of thing as conventional practice, frequently going to a blade angle of 60 degrees. The 60 degree solution as applied to higher torque outdoor models is rare and one has doubts about the effectiveness of such an exaggerated blade angle. Prop stall is probable. While stalled props do generate a fair amount of thrust, the breeze blowing past the tail will be made up of highly turbulent components whose influence on overall stability is unpredictable. If something like 45 degrees of blade angle will not prevent zoom, look into another therapy.

3. Downthrust is our simplest and most powerful tool in controlling zoom. By pointing the nose down we achieve two useful things:(a) the breeze coming out of the prop hits the tail at an increased up angle, causing more tail lift. As the tail lifts, the wing is rotated to a smaller angle of attack, thus decreasing the wing lift generated. As zoom is caused by excess wing lift, generated at a high speed and a large angle of attack, reducing the angle of attack and subsequent wing lift is a good solution. And(b), in downthrust the thrust line is tilted so as to supply a larger nose down moment about the CG, a factor also tending to lower the angle of attack. Of these two effects,(a) is by far the more powerful for conventional configurations; (b) is quite slender. SEE FIGS A & B

Many of the older writings on this subject had the order of significance



"LONG CABIN"

DESIGNED BY ROBERT LONG
PUBLISHED IN A.A.S. 1937 AIR TRAILS
DRAWN FOR M.B. BY PAUL SEIFRIED JR.
SPAN - 78" AREA - APPROX 600 in²
WEIGHT - 3 1/4 LBS.
POWER - DAISY CYCLONE

0 1 2 3 4 5 6
inches

MODEL BUILDER magazine

Plan No: 276-QT

backwards, which produced mistaken suggested therapies--such as the widespread 1930's recommendation to employ upthrust on low wing models. No wonder low wings were viewed as difficult! The truth seeped in sometime in the 1950's--beware of earlier stuff.

Downthrust is generally regarded as benign; the consensus is that the cost of downthrust is negligible. The usual argument is based on the small valu of actual download imposed by downthrust. It is also easy to show that even a very large angle of downthrust--say 10 degrees--will not reduce the useful component (forward) of thrust significantly.

While this line of reasoning is arithmetically correct, I suspect that something important has been left out and that the true cost of downthrust is quite large.

The difficulty with downthrust is that it persists into cruise, when it is no longer wanted. Reducing the wing angle of attack at the time of initial power surge is a good thing; reducing the wing angle of attack later in cruise produces a high speed shallow descent that succeeds in throwing away some of the altitude so painfully earned.

With a particularly stable Jumbo as a guinea pig (64" MM) I ran a series of dawn flights to check out the cost of downthrust. Upping power beyond a certain point, and employing considerable compensating downthrust, produced a stunning climb indeed, but the climb out was followed by an equally striking shallow descent. The downward trajectory in no way suggested the aftermath of a stall; instead, it seemed a fully controlled and very determined business consistent with a great deal of thrust and very little angle of attack. After 3-5 seconds of such descent, in the course of which 20-30 feet of altitude was lost,the basic power would run down, downthrust effects in turn became small, and a completely new climb mode was initiated.

Every Jumbo I have built has shown this characteristic when operating at full power and large downthrust. While crashes due to this effect are rare (the initial climb offers more than enough altitude to offset the loss), there is a considerable waste of energy and duration occurring here, not to mention wear and tear on the nervous system.

Zaic at this point would probably suggest reducing downthrust and introducing more side thrust to control zoom without downthrust "hangover." Well--yes and no. To those who have good spiral stability, sure. To those who do not (and I rarely do) such advice smacks of "let them eat cake."

What might work is shown in (c). Instead of a fixed angle of downthrust, suppose we had a compression spring that would automatically change the downthrust angle as a function of the motor tension. As the rubber tension falls off, so does the angle of downthrust, becoming zero late in cruise. Would it work? I don't know; it seems right, but I have never tried it. The spring would have to be carefully matched against the motor tension. Should the spring extend too quickly, the result will be a stall.

4. Decreased stability is the zoom solution favored by the performance crowd. The idea is to reduce the determination of the tail to force the wing to fly at a high angle of attack. This may be done by moving the CG back and resetting the tail attitude for a good glide. When properly done, the new "longitudinal dihedral" angle (the difference between wing and tail incidence) will be decreased, resulting in a zoom path of larger radius than that obtained with the old settings. The virtue of the larger radius zoom is that it develops more slowly--in other words, the essential idea here is to buy time.

Given time, two good things can happen. First, the motor output drops to a lower level and the velocity decreases to one that can be handled without extreme zoom. Second, turns can be introduced into the flight path, further reducing lift that might otherwise go into zoom.

Now Jumbo is roughly equal to Wakefield in scale and Wakefield people do this sort of thing as part of their basic trimming procedure--yet, I have never had much luck with it. The catch is that in scale we start with precious

little static stability, for our tails tend to be small--certainly less than 25% of wing area. With so small a tail, operating on a short moment arm, our static stability is marginal even with the CG in a forward position. Moving the CG back beyond 35 to 40% of the chord usually results in a random flight pattern in which the model could not care less as to its trajectory and where either a stall or a dive can develop without provocation. This sort of thing just will not do.

However FAC rules do permit large tails without penalty. And so this procedure is worth further investigation. The ultimate decision as to the utility of this technique depends on the value you set on having scale-like tail surfaces. If true scale is important to you, forget it. On the other hand, if you can accept a tail equal to 35% wing area, there is something useful here.

5. High drag will reduce zoom tendencies. The effect of drag on phugoid oscillations is well known (Durand again)--indeed the mathematics of drag-upon-zoom effects is particularly clear.

Common sense would indicate that drag should help by using up energy that would otherwise go into velocity. And it does--zoom is one problem area where inefficiency pays off. The steady and realistic climb out shown by most biplanes probably owes little to the virtues of the two wing configuration and a great deal to the high drag resulting from (a) interference between the wings and (b)all that wetted area.

Yes, whether flying models with 2 wings or making water with two, er, members, it is unwise to fret over interference and wetted area. The purpose of the undertaking has little to do with efficiency and much to do with fundamental urges. Let us give thanks that a striking visual display results.

6. Variable tail incidence as a function of motor pull or torque is a concept that certainly ought to work. The catch is probably one of mechanical complexity and subsequent unreliability in operation. In Jumbo there has been only one well known attempt at exploiting this idea--the DH Tiger Moth by the famous British designer Rupert Moore. Published in Dec.1946 issue of Aero-modeller, the plans of this 44 inch biplane are still available through their plans service. However, examination of the photos and sketches submitted by Moore shows an amount of elevator throw (maybe 10 degrees or more) that is disturbingly large and I have an uneasy feeling that something is awry somewhere. Still,for those with guts,this might be the way to go,for it represents a particularly efficient means of countering zoom--a means endorsed by Zaic.

Things That Do Not Work

1. Increasing the moment of inertia is a sure loser. The effect is precisely wrong in its timing and, like a child "pumping" on a swing, will make each successive oscillation more powerful. Avoid it.

Disclaimer

In pressing for simple explanations of complex events, brutal oversimplifications are inevitable. Some of the above suffers from this effect. In defense, one can only advance the credo of countless inept draftsmen over the years, namely "stringers omitted for the sake of clarity." Sorry.

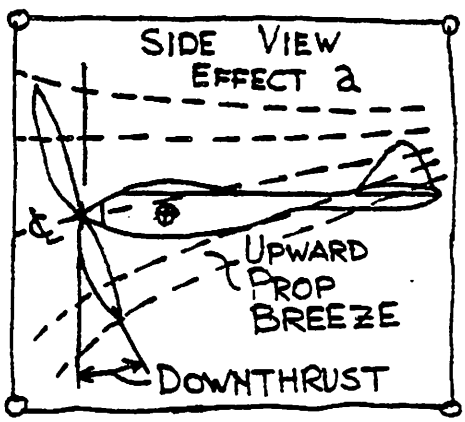


FIG A

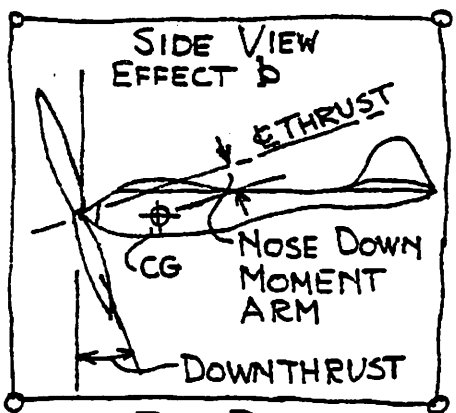


FIG B

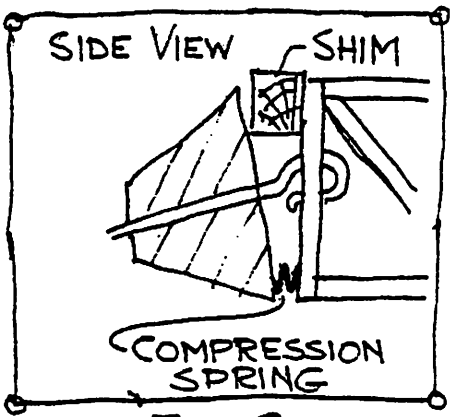


FIG C