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Junior

AERONAUTICS

Year Book — by Frank Zaic

JUNIOR AERONAUTICS YEAR BOOK

● By FRANK ZAIC ●

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FOREWORD

In this book the author has attempted to bring into one handy volume as complete resume of scientific model airplane building as practiced today as possible. It is intended to show just where we are in this field, and so prevent repetition of experiments that have already been made. Also, to make the use of the knowledge we have to obtain results by scientific methods.

The art of model airplane building is as old as the general aviation, but we have been hopelessly left behind in science. We are still in the pioneering stage; just guessing. We must get out of this stage if we want to progress. We cannot get much help from the big boys. All they know about is high speed reactions, and what we want is more knowledge on Low Speed Aerodynamics. Very little has been done in low air speed testing and it is still a virgin field for experimenters. If we want to add our grain of sand to the human knowledge, now is our chance!

The material of this book has been gathered from personal experiences and those of the correspondents. At this point the author would like to thank all those who have lightened the author's task by unstintingly furnishing information and freely contributing plans and articles.

The author hopes to present next year a bigger and better book, and would appreciate all worthwhile contributions. You need not go through the trouble McBride did in presenting his splendid article. Just join the Postcard Brigade.

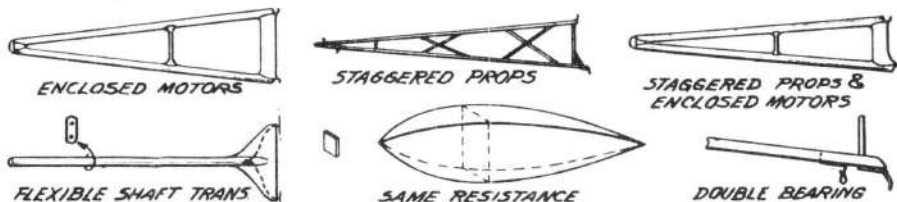
September, 1934
New York, N. Y.

Frank Zaic

TWIN PUSHER

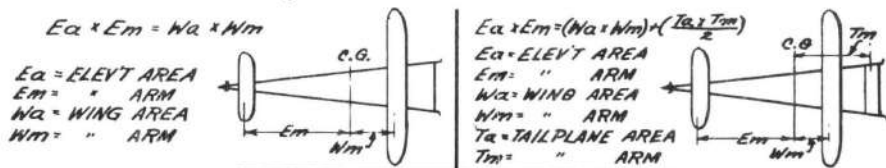
The standard "A" frame with exposed rubber has a great deal of resistance and detracts from overall efficiency. Tubular and streamlined frames with rubber enclosed are much better. The sketches show several proposed designs which are not impossible to build: Consider them when building your next twin pusher.

Staggered props lower the triangular thrust line, but care should be taken that they do not hit each other. A double bearing, as shown, will do the trick.



PROPORTION BETWEEN PUSHER SURFACES

The most important factor in the design of a twin pusher is to have the proper proportion between the surfaces--wing, elevator and tailplane, if used. The following formula can be used for ships already built, to minimize test flights, and to check the placement of surfaces so as to give the most efficient results:



Only half of the tailplane product is used as the tailplane works in disturbed air.

FINDING THE CORRECT ELEVATOR AREA WHEN WING AREA IS KNOWN

Make the complete ship with the exception of the elevator. Assemble and place the wing at the most favorable spot, in respect to fastening, and distance from tailplane, if one is used. Place a weight equivalent to the finished elevator about 3" from the frame apex. Find the C.C. and use the above formulas, making Ea the unknown. The result will be the correct elevator area to use for that particular setting. But before you make the elevator, check it for the proper dihedral, which determines the position of Directional Center (D.C.). (The Directional Center is treated separately later on.)

The formulas given are fairly accurate regardless of which airfoils are used on the different surfaces, but if we want to be exact, when different airfoils are used, we should use this formula:

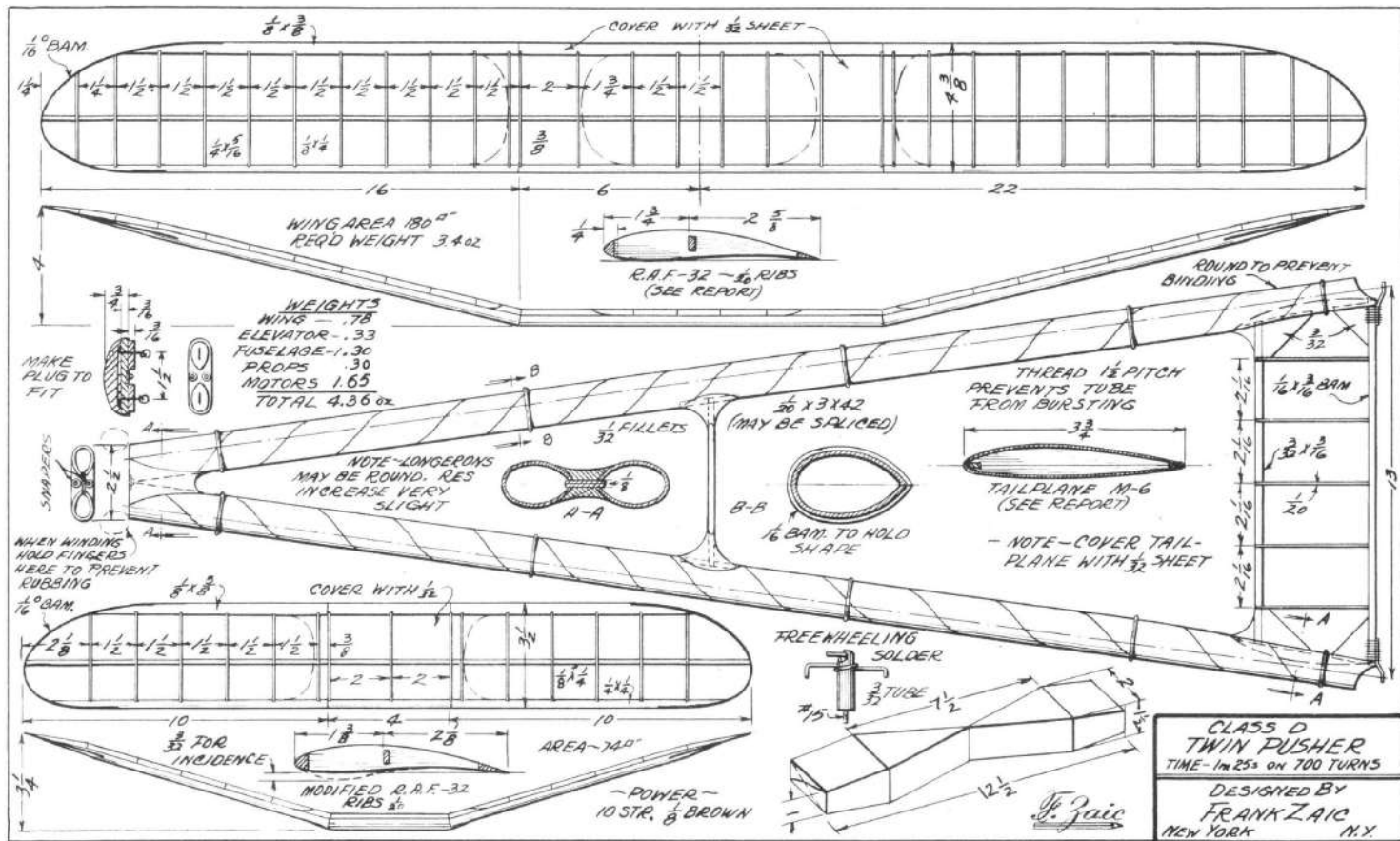
For model with wing and elevator only.

$$EC_L \times Ea \times Em = NC_L \times Wa \times Wm$$

For model with wing, elevator and tailplane

$$EC_L \times Ea \times Em = (NC_L \times Wa \times Wm) + \left(\frac{TC_L \times Ta \times Tm}{2} \right)$$

C_L is the lift coefficient of the particular airfoil used. The other factors are the same as in the other formulas. The calculations should be made with same incidence on all sections. The extra 2 or 3 degrees incidence of the elevator, when flying, will produce the arrangement that makes pushers so popular, namely, the elevator



stalling before the wing and keeping the plane on its best glide. It is a good idea to make several calculations (at different angles of attack) to find out just how the model might behave. Of course, the calculations should be made using the C_L of the elevator at its flying setting; that is, 2 or 3 degrees more than that of the wing.

ASPECT RATIOS, selection of airfoils, props, wing construction, and winding, will be treated under their respective headings.

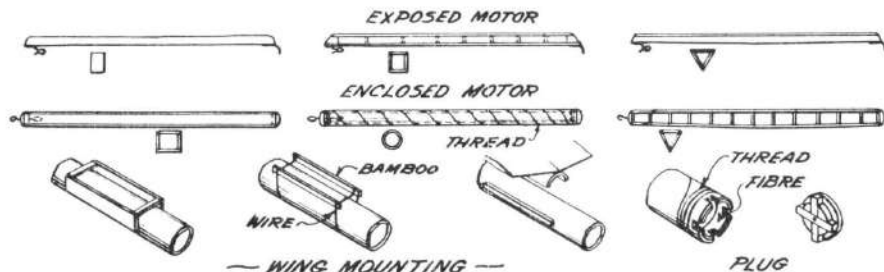
LAUNCHING TWIN PUSHERS

Stand in a walking position, back slightly bent, holding the model just above, and in front of your head. This posture permits you to swing the model over head and turn at the same time in case of a sudden gust. Launch by swinging your arms a little faster than the flying speed of the model. Do not hurl, as this will upset the model, and being close to the ground, it will not have time to recover.

When bringing back a model in a windy weather, hold it by the apex and let it swing behind your back, or hold the apex with the left hand and have the wing under your right arm.

SINGLE PUSHER

The same rules that were given for the twin pusher are applicable to the single pusher. The only difference between a twin and a single is the motor stick design, and the wing mounting. The drawing shows several types. A motor enclosed in the tube is the best as it offers the least resistance at all angles of attack. If you have to use rubber outside, use the built up design, as it has better anti-twist and anti-bending characteristics for given weight.

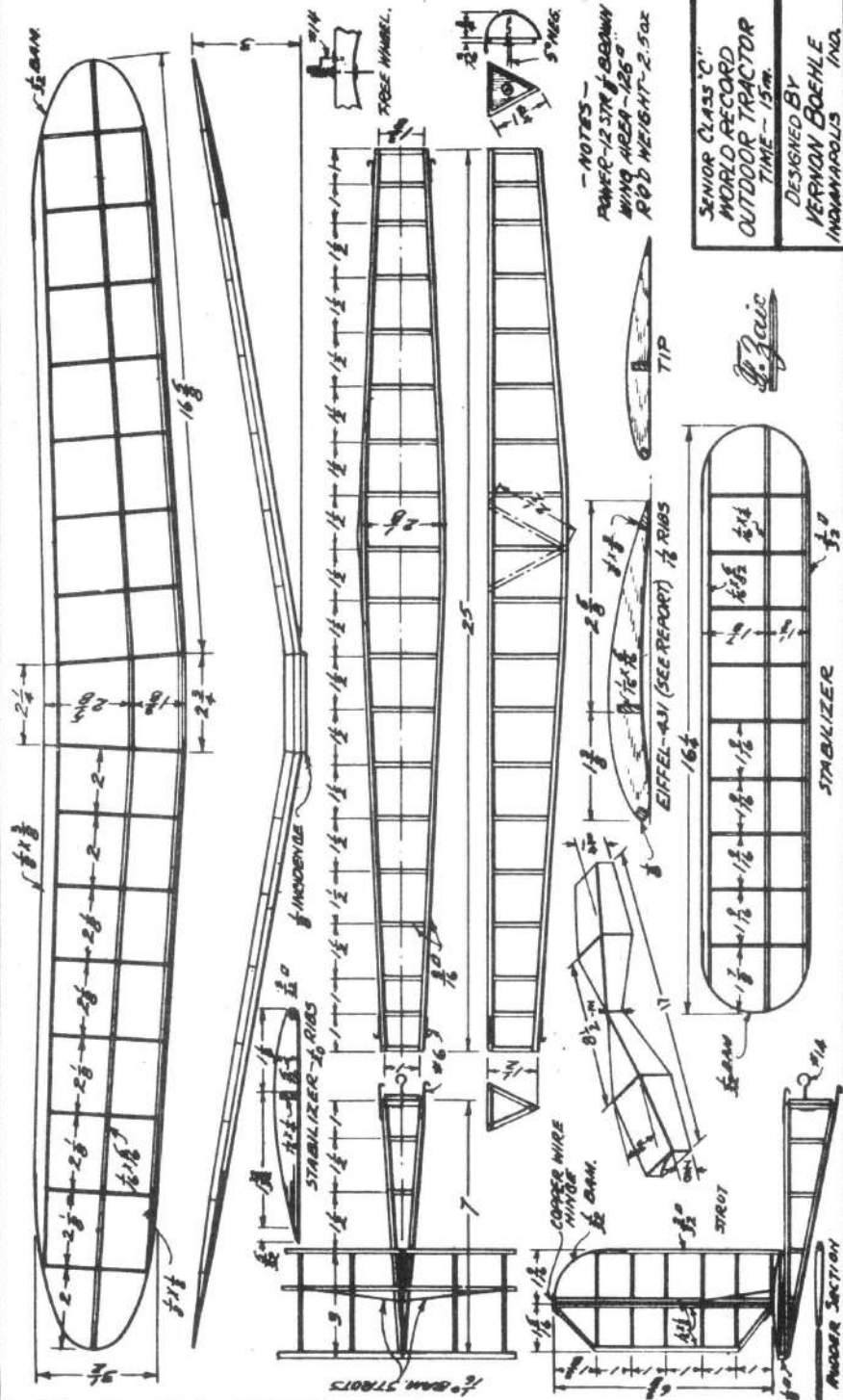


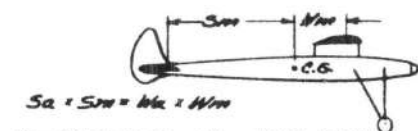
CABIN FUSELAGE

The name, Commercial, has been changed to Cabin Fuselage by the N.A.A., to differentiate between the scientific models and those built from commercial flying scale kits.

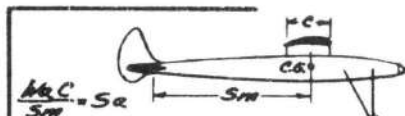
It is much harder to design a stable tractor than a pusher, because of the different surface layout. In a pusher, all the surfaces contribute lift, but in tractors the wing is usually the only support, the exception being the lifting tail design.

A lifting tail has an advantage over the flat tail in that it contributes lift. The same formula that is used in a pusher to find the elevator area, can be applied to the lifting stabilizer. When using lifting tails, be sure to have a high wing, or else the model will be unstable. A more complete treatise on this design is given in the Indoor Tractor Design.





W_a = WING AREA W_m = WING ARM
 S_a = STAB. AREA S_m = STAB. ARM
 LIFTING STABILIZER



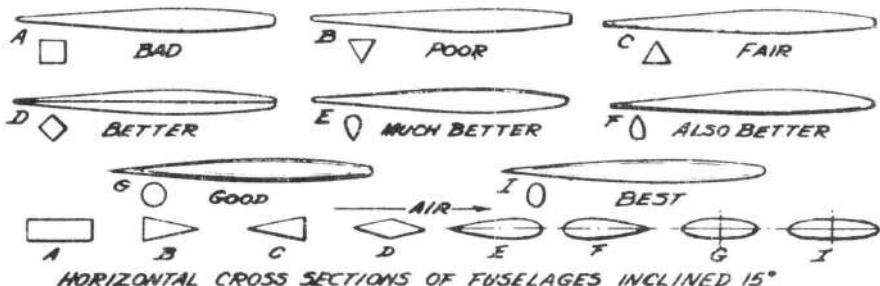
W_a = WING AREA C = AVERAGE WING CHORD
 S_a = STAB. AREA S_m = STABILIZER ARM
 SYMMETRICAL STABILIZER

Up to date we have not found a practical, exact method for calculating symmetrical stabilizer area. The writer worked out an excellent rule which is simple, practical and approximately exact.

A lifting tail should have a negative incidence of 1 to 2 degrees. A symmetrical tail is best at zero degrees. These incidences are in respect to the thrust line. Actually the neg. incidence is about 1 or 2 degrees more, because of wing's downwash. You may use positive incidence in the tail, but you must increase the incidence of the wing so as to keep 2 or 3 degrees difference between them.

FUSELAGE

Most of the resistance in a Cabin Fuselage is in the body. Simple clean lines are the best. The drawing shows several designs and also their cross sections in relation to the relative wind when they fly at an angle



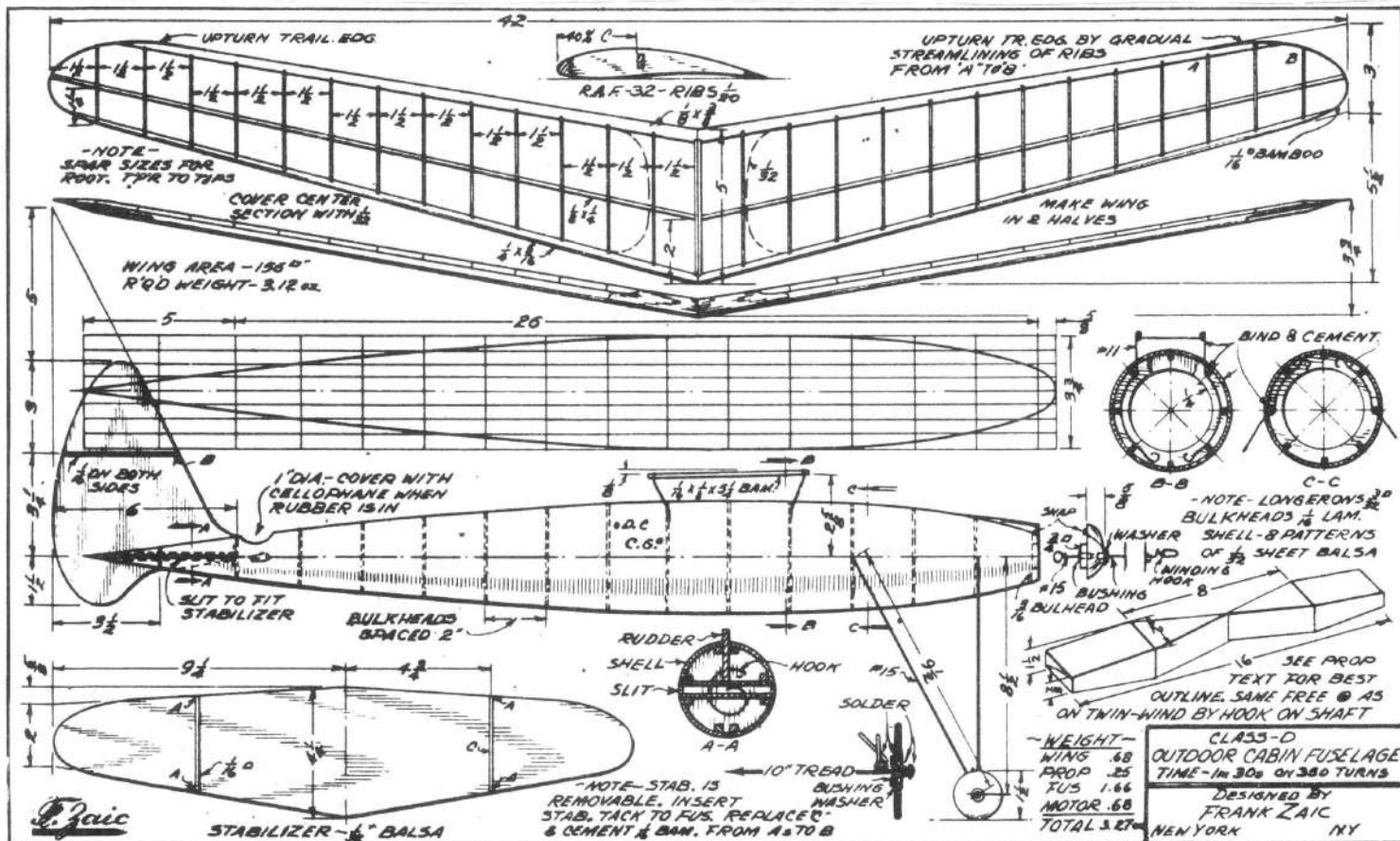
HORIZONTAL CROSS SECTIONS OF FUSELAGES INCLINED 15°

EFFECT OF ANGLE OF ATTACK ON FUSELAGE DRAG

The drag of a fuselage with well rounded section does not change with increase of angle of attack. The drag of a fuselage with square or rectangular section increases with increase of angle of attack. The following table shows the drag, in pounds, of two fuselages, one square in cross section and other elliptical. Both have the same length and cross section area. (From 'Aerodynamics' by Diehl.)

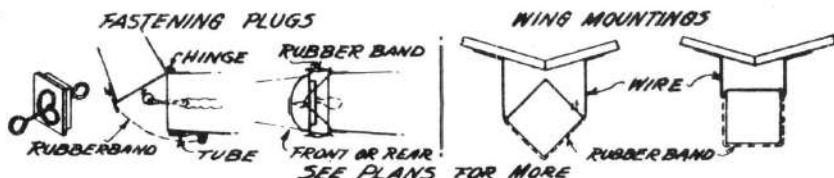
Angle of attack	0°	5°	10°	15°	20°
Square Section	.050	.057	.070	.093	.129
Elliptical Sec.	.012	.012	.010	.014	.022

You can see from above drawings and table that it is a bad policy to point the prop down to obtain a high angle climb. The resistance overcomes all the benefits and actually makes it worse. A much better plan is to increase the angle of the wing and stabilizer and let the fuselage be horizontal in flight. The result is that the decrease of resistance speeds the model with consequent better climb, and on the glide the wing will work at its best L/D.



FUSELAGE CONSTRUCTION

A round monocoque construction is the best. It is not as hard to make one as it seems. The next best is to cover whatever fuselage you use with sheet balsa. The strength will surprise you! Paper covering is fair for flat surfaces, but poor for covering fuselages of round cross sections. The fuselage longerons should be of 1/8 hard balsa, but lighter if motor stick is used.



LANDING GEAR AND TAILSKID

Bamboo or wire--which shall it be? Both have their merits but a wire landing gear is more durable, and does not have to be removable for packing. Thin, laminated and elliptical cross section wheels are best. Do not use heavy wheels to get a low C.G. It is a makeshift way of obtaining stability. Keep away from thick pants. See the Cabin Fuselage plans for landing gear and tail skid designs. A long tail skid is best, because it presents the least frontal resistance of the model at the take-off.

WING CONSTRUCTION, and other factors dealing with general information will be found under their respective headings.

STICK TRACTOR

The same rules that were given for Cabin Fuselage are applicable to single stick tractor. The motor stick construction is the same as in single pusher, except that tail boom is added.

OUTDOOR WINGS

Tapered wings, elevators and stabilizers having aspect ratios of 9 to 11 are best. The taper should be in ratio of 1 to 1/2, that is, tip chord should be 1/2 of that of the center. High aspect ratio wing and elevator, not necessarily tapered, should be used on twin pusher, to get most of lifting surface away from the frame eddies. Sweptback wing may be used on tractor with symmetrical tail to keep the C.G. forward, and, also, to decrease the dihedral and help stability with an upturned trailing edge. Never use more than 30° of total sweptback. A total dihedral of two inches for every foot of span is sufficient. Dihedral may be decreased if the Directional Center (D.C.) is high.

WING CONSTRUCTION

Avoid a multi-small-spar design, husky leading and trailing edges with just one center spar is much better. The multi small-spar wings might be brittle and seemingly strong, but any sudden strain will snap them, while a single spar wing will just bend. See the writer's ships for single center spar type of construction. The future designers will undoubtedly use Jim Cahill's construction except that 1/32 balsa sheet is recommended instead of 1/64. Wing tips should be of 1/16 round bamboo, and should extend for at least two panels along the edges.

The ribs should be of plus 1/32 stock, spaced about 1 1/2" or less to keep the airfoil outline between the ribs. Lightning holes are not essential as they weaken the ribs too much, and since advent of the weight rules cutting weight on vital parts is not necessary. Little notches in the spars into which the ends of ribs are cemented strengthen and line up the wing well. Have the center spar equally spaced between upper and lower surfaces, to prevent the ribs from contracting at the point of attachment. The center spar should be placed about 40% of the chord from the leading edge.

COVERING WINGS

If paper is used, be sure to use many ribs to keep the airfoil section well. The grain of the paper should run from the leading edge to the trailing edge as paper shrinks most along the grain. Use dope to cement paper to the wood, and cement the paper to every rib. Shrink first with water. If a color is desired, mix anyline dye with water. Do not use colored dopes. A coat of nitrate dope will waterproof and shrink the covering for average weather conditions. If model is expected to be flown in rough weather more coats of nitrate dope should be applied, but be sure that the construction is strong enough to take care of extra shrinkage. Decorate with enamels.

Balsa covered wings require fewer ribs, and the spars may also be smaller than those used in paper covered wings. The grain should run from tip to tip. Sheets of minus 1/32" wood are best. Two inch stock may be used by cementing the edges together.

A combination of the above two methods is best for practical purposes. Cover the center panels with balsa and the tips with paper. This improves stability by keeping the weight near the center, and the wing can also be handled better. It is a good idea to use sheet balsa wherever much handling is done. (See writer's Twin Pusher and Cabin Fuselage.)

AIRFOILS

In selecting your airfoils pick those that have a high C_l , a low C_d and a high L/D , at low incidences. (See airfoil reports.) The Clark Y, R.A.F.-32 and Eiffel 400 come under this, but the M6 does not; it has low drag and a high L/D , but the low C_l spoils it. You have to fly the M-6 at 6° incidence, to get the same lift that the R.A.F.-32 has at zero incidence.

It seems that airfoils that are used for gliders and soarers are suitable for model work, as long as they are not too thick. About 14% of the chord is the maximum that should be used. The under camber and the downward droop of the trailing edge are the characteristics of this type. The only objection to their use is that they have a large Center of Pressure (C.P.) movement. However, this can be corrected by having a high aspect ratio, surfaces, high wing, or a larger stabilizer.

The under camber determines at what angle the airfoil ceases to lift--the deeper the camber, the lower the angle. This type of airfoil usually has the best L/D at minus 2°, the ideal gliding angle. However, too much camber increases the resistance. Be reasonable; about 3% of the chord at the most.

Keep in mind that the best gliding angle is at the highest L/D . Soarers glide at this point. It simply means that at this point the least possible amount of weight is used to overcome the drag.

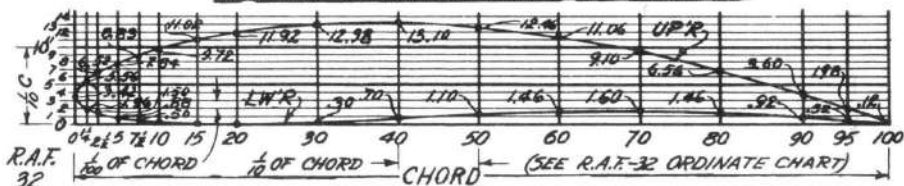
If there is enough lift, and the ship has little resistance, at the highest L/D, we can say that the gliding angle is the same as the L/D. That is, if the L/D is 20, then the glide is 20 to 1.

Consult airfoil report books before using your own section. You can be sure to find something like the one you have, and so you will be able to see just what characteristics your section has. However, it is a better policy to pick an airfoil from the book than to use your own. Besides knowing the characteristics, you can always duplicate the section by using the ordinates; then, too, taper wing ribs can be easily plotted.

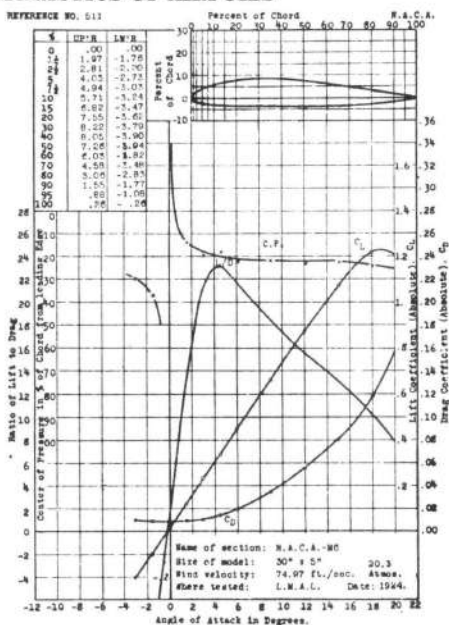
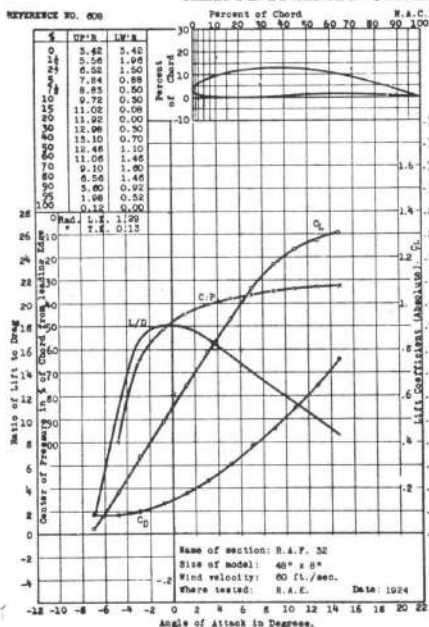
USING THE RIGHT AIRFOIL

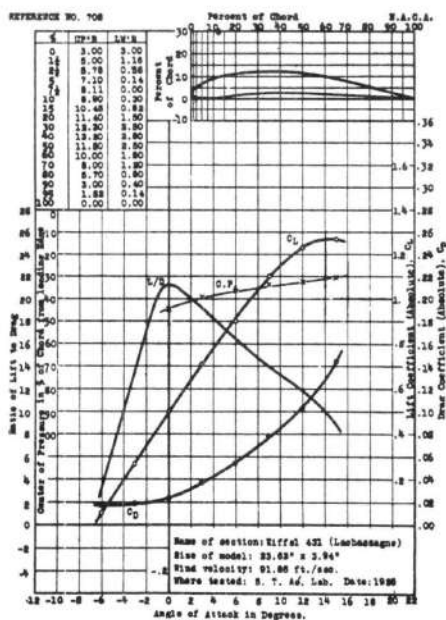
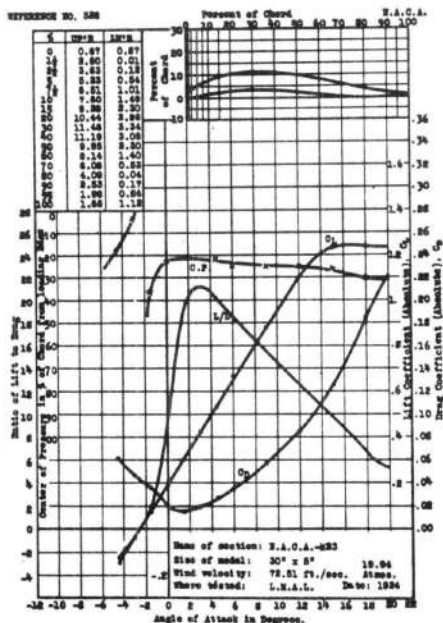
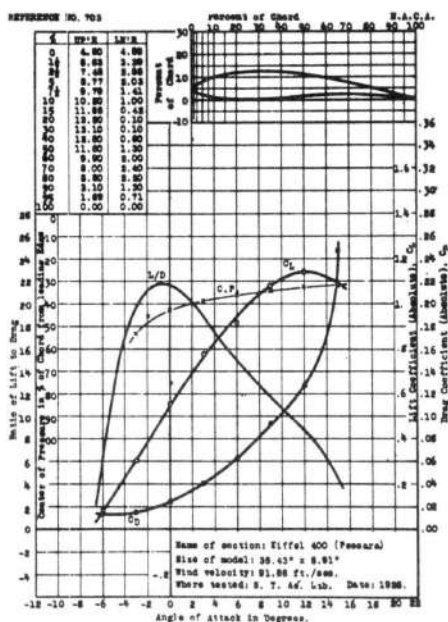
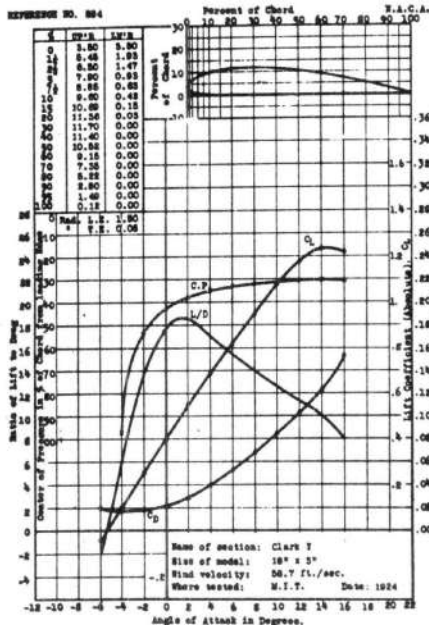
If a high wing is used on a tractor with a flat or symmetrical tail, a glider section can be used. If a lifting tail is used, use a stable section of the M-type. The loss of lift is compensated by the use of lifting tail. Never use under camber on a lifting tail: M-sections are preferable as we do not want the tail to lift in the glide. Set the M-section at a higher angle of attack or incidence. On a pusher, we may use under camber on the elevator and the wing, but that of the elevator should be deeper so that it has more lift than the wing at negative attack. Use M-sections on the tailplane, as they do not lift well at negative angle of attack.

PLOTTING AN AIRFOIL FROM GIVEN ORDINATES



NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS AERODYNAMIC CHARACTERISTICS OF AIRFOILS





ADDITIONAL AIRFOIL SECTIONS may be found in N.A.C.A. Reports Nos. 93, 124, 182, 244, 286, 315, and 460. These reports may be seen in your library or be purchased on application to the --- Superintendent of Documents, ---Government Printing Office, --- Washington, D.C. For further information write to the National Advisory Committee for Aeronautics, Navy Building, Washington, D.C.

OUTDOOR PROPELLERS

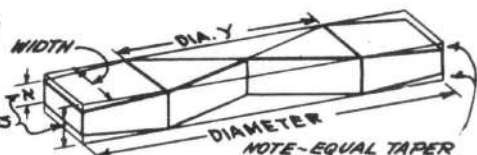
The writer believes that best all around props for outdoor work are carved from blanks having width of 2 inches, and thickness of 1 1/2 inches, and the desired diameter. The pitch is 1 1/2 times the diameter at the tip and about 90% of the pitch where side taper joins plan taper. (See diagram.) Use the pitch formula (A) by substituting the known factors with numerals, as shown in Examples "B" and "C". This method may also be used for true pitch props when blank has to be tapered to secure the desired pitch; just have full pitch, instead of 90%, in "C" equation.

$$A. \frac{3.1416 \times \text{DIAM.} \times \text{THICKNESS}}{\text{WIDTH}} = \text{PITCH}$$

B-EX.

$$\frac{3.1416 \times 12 \times 1.5}{2} = \frac{58.2''}{(24'')} = 2.425$$

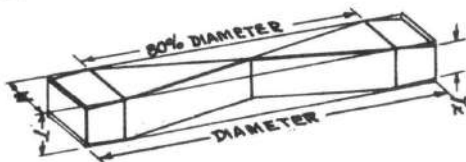
$$C. \frac{3.1416 \times 8 \times 1.5}{2} = \frac{18.8''}{(21'')} = .9$$



If you wish to use other blank sizes, the writer recommends Mr. Keck's method of finding the most efficient pitch-diameter ratio. Mr. Keck found, by tests, that greatest efficiency in foot-ounces of thrust was secured from props having a blade angle at 40% of the blade length from the hub, corresponding to a pitch 20% less than the pitch at the tip. (Information on props, and model designing in general, may be found in "The Model Flyer's Guide", by Charles E. Keck. It can be obtained by sending 10¢ to--Pioneer Model Airplane Supply Co.--Champaign, Illinois.)

$$\frac{3.1416 \times \text{DIAM.} \times \text{THICK.} \times .8}{\text{WIDTH}} = \text{PITCH}$$

$$\frac{3.1416 \times 80\% \text{ DIAM.} \times \text{THICK.}}{\text{WIDTH}} = 80\% \text{ P}$$



PROPELLER OUTLINE

The outline of a prop should be such, that the point that is most likely to hit the ground or obstructions, should be connected to the hub by direct grain.



PROP NOTES

THE ROTATION of props on twin pusher should be convenient for winding. FREE WHEELING: See plans for various free wheeling designs. Make all and decide for yourself which is best. Covering the cupped side of the prop with paper or silk strengthens the blade.

CENTER OF GRAVITY

The Center of Gravity (C.G.) is a very important factor to consider in relation to the position and size of the various surfaces of a model. It is found by the method shown on the drawing. Page,

ESTIMATING C.G. ON NEW DESIGNS

The approximate C.G. is almost always on the center of the rubber motor. It moves back if a heavy tail or a straight wing (no sweep-back) is used, and forward, if the landing gear is heavy. Sweepback does not change the C.G. The C.G. moves forward on a lifting tail designs, as the wing is in the front of it. The amount of movement depends on the weight of the wing, and the distance from C.G. required by certain size of stabilizer. See your Physics book for more information.

C.G. AND THE STABILITY

A low C.G. does not have all the stability features attributed to it. When a strong gust hits a model having very low C.G., obtained by heavy wheels or freaky construction, etc., the low weight has a tendency to swing the model into a stall, and if it recovers, it is usually because of the Aerodynamic stability of the plane. The same applies to the dihedral motion. The fact is that models having a low C.G. take much longer to recover as the weight has a tendency to keep on swinging back and forth, until the motion is finally dampened by Aerodynamic stability.

C.G. AND CENTER OF THRUST

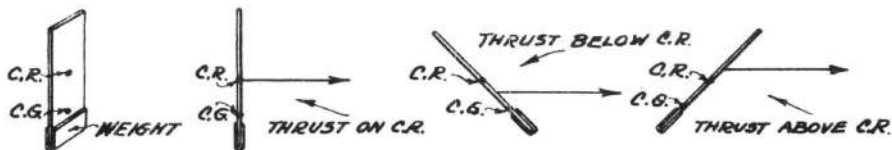
The couple produced by Center of Thrust (C.T.) and C.G. should be disregarded as the model does not turn longitudinally, up and down on the C.G., althought most of the aeronautical text books state that fact. The writer believes that the model turns on a point smewhere between C.G. and Center of Resistance.

CENTER OF RESISTANCE

The Center of Resistance (C.R.) is the point where the frontal resistance is balanced. It varies with different angles of attack.. On a straight flight it is usually above C.G., if a high wing is used

PROVING THAT C.R. IS THE LONGITUDINAL TURNING POINT

The following test was made to prove writer's statement that C.R. is the aerodynamic turning point: A rectangular balsa sheet was weighted on one end until it was just submerged unde water in a tank. The C.G. and the C.R. were marked on the sheet and a string attached to various points, as shown on the drawing, and then the sheet was pulled horizontally through the water. It was also pulled vertically with the same results.



This test proves that turning point depends upon the C.R., but as water has higher viscosity than air, we can compromise by stating that the turning point is between C.R. and C.G., depending on the intensity of each factor.

THE POSITION OF C.T. AND C.G. IN RESPECT TO C.R.

From the experiment we can see that C.T. should depend on C.R. and not on C.G. The best position for C.T. is under C.R., as that will tend to climb the model until the C.R. moves below the C.T. because of the drag introduced by the stabilizer. Then, with the help of lift on the stabilizer and the lower C.R., the model straightens out, until just the right point is reached where the forces are balanced. If C.R. is below C.T. the model dives. A low wing ship is a good example of what happens with this arrangement.

The C.G. should also be under the C.R. as this will make the model assume the best gliding angle. The C.G. over the C.R. makes the model dive. Take as an example a low wing ship.

LOW WING AND C.R.

We can see that a low wing design should have low rubber motor to bring the C.T. and the C.G. below the C.R. A fairly large dihedral will bring the C.R. high. Do not use heavy wheels to bring C.G. down, because of the reasons stated before.



DIRECTIONAL CENTER

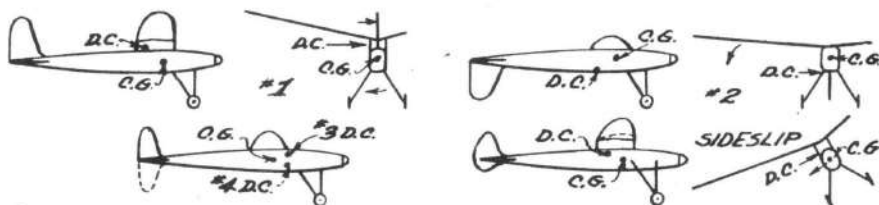
The Directional Center (D.C.) is the center of all side or profile areas. It is the point on which the model tends to turn. Because of the C.G., however, it has to compromise. The rudder or the fin usually determine the D.C. on tractors, and the dihedral of the elevator on pushers, and as the D.C. has a great effect on stability we will show you how to calculate the correct rudder areas and the dihedral of pusher elevator.

PRINCIPLE OF DIRECTIONAL CENTER

The Directional Center works on the weather vane principle. That is, the large areas swing away from the wind and bring the pointer to bear in the wind's direction. The same principle applies to models. When a side gust hits the model the side that offers greatest resistance swings around C.G., and if there is no balancing area in the opposite side, it tends to keep on swinging, with a spin in which the low area side eventually rotates around the larger area as the result. A single pusher with the D.C. way behind the C.G. is a good example of what not to do.

EFFECTS OF D.C. ON STABILITY

There are four possible positions of the D.C. on a model, as shown on the drawing.



Position #1 will give the model a tendency to swing into a side gust with the inside wing high. This is bad for low power ships, but all right for higher power jobs, as they ride the gust. If the D.C. is still higher than shown, the model will fly cross wind, or the familiar "crabbing".

Position #2 will also tend to fly the model into the wind, but with inside wing low. Consequently the model will automatically bank into the gust. However, this feature is bad, in that it makes the model fly always into the wind, and the model must be overcontrolled to have it circle. The D.C. way back will also have this tendency.

Positions #3 and #4 are bad. Such location only could cause "Dutch Roll", that is, the tail swings first to the right, then to the left, each swing becoming more violent until the flight path changes into a spiral dive. Cure - more rudder.

The best position for D.C. is about an inch behind C.G. and just above it. This makes the model controllable, and inherently stable by having area above C.G. the model tends to righten itself in a side-slip.

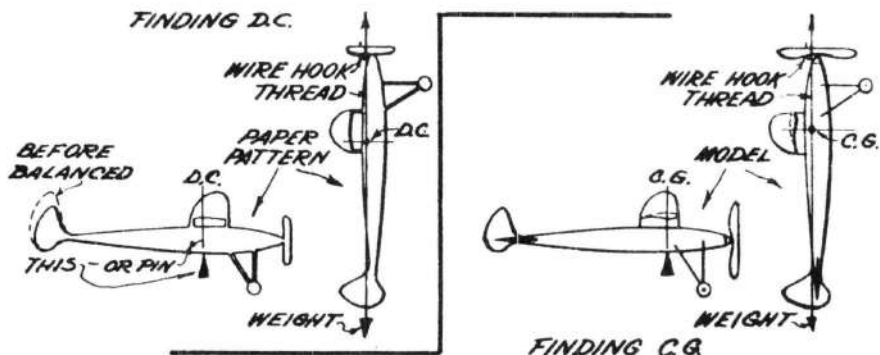
It would be worth your while to try all the positions to see just how they work. Test on gusty days, as unstable models sometimes fly well in calm weather.

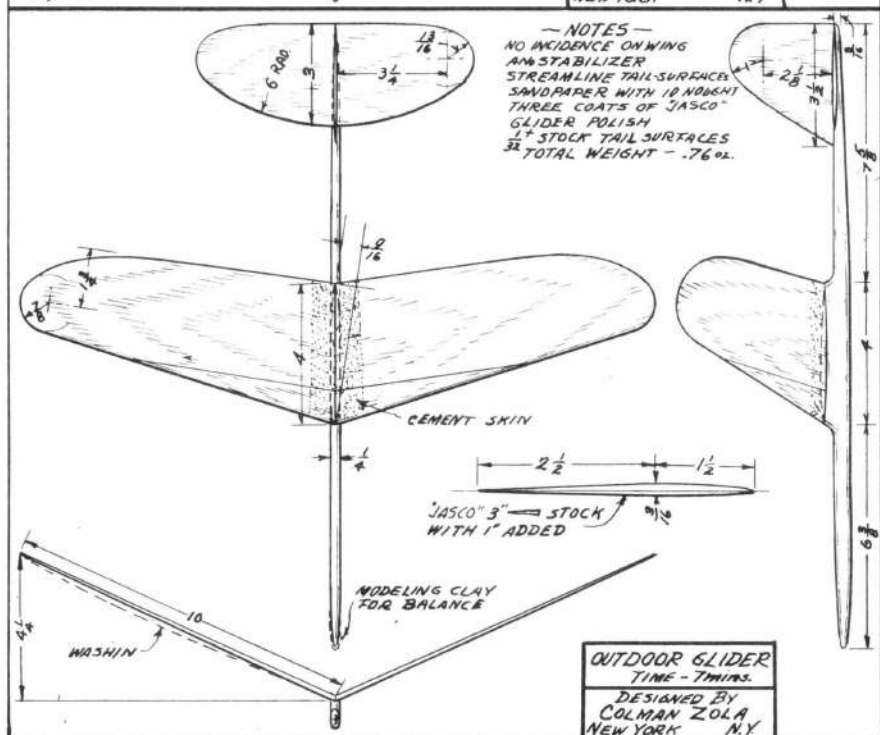
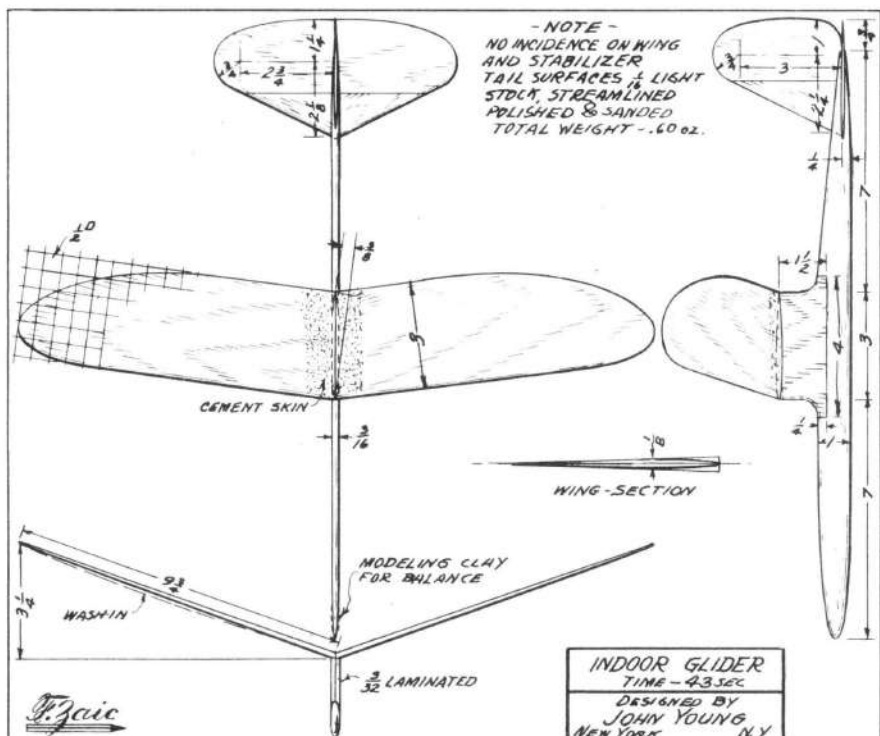
FINDING D.C.

To find the D.C. of a model or a design, the side areas can be computed and the center determined, but it is much easier to cut a paper pattern to scale of the side view of the model, and then by balancing this by method shown, finding the center of gravity of the paper. This center of gravity of the pattern is the D.C. on the model. When finding the D.C. from pattern it is advisable to have a larger rudder which can be trimmed to the proper area. Use only half of the prop for side area.

FINDING D.C. ON PUSHERS

The D.C. on the pusher is found in the same manner as in tractors and it is just as important to have it just behind the C.G. In pushers, the elevator can serve as fin by giving it enough dihedral to bring the D.C. behind C.G. A fin can be used if the dihedral becomes excessive. When testing pushers for their D.C., be sure that the position of the surfaces has been determined before. That is why it is advisable to make the elevator last.





SOLID Balsa GLIDERS

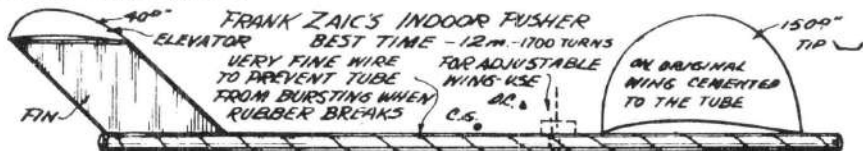
The original handlaunched Sweepback Glider, which is now gaining such popularity throughout the country, was designed by the writer and his brother, John, in the summer of 1930. Since then many improvements have been made on the design, especially by John Young and the New York Aeronauts, which raised the few seconds of before-1930 to the present high time. The main requisite for high performance glider are stability, a minimum resistance, and wings strong enough to withstand the terrific strains of baseball-like launchings. The Sweepback glider meets all these requirements: The dihedral and the sweepback combination give the glider the necessary stability and also the needed strength.

See the glider plans for the general outline and construction details. Notice how sturdy and streamlined the essential parts are made. Besides the profile drag, we must also take care of the skin friction. This is done by using 10 nought sandpaper for final sanding and making the surfaces permanently smooth by applying to it several coats of lacquer, or banana oil, or microfilm solution, that will not warp the thin surfaces, with intermediate sandings of 10 nought sandpaper.

The correct launching and setting is very important, especially indoors, where there are no rising thermals. The glider should be adjusted so that when it is thrown into a right turn, it straightens out and glides into a left turn. This is done by giving the left wing a washin, when looking from the front. This setting is for a right handed fellow, and vice versa for a left hand person. The most elementary throw is to hold the glider vertically, with the above setting, and launch it by swinging the arm in a arc, releasing the glider when the hand is beginning to come towards the body. The glider should go into a fairly tight right turn, gradually increasing the radius until it straightens out and goes into a left turn. The most successful method for record and contest launching was first developed by John Young of New York. He throws the glider into the air as though it was a baseball, except that the glider is banked slightly for a right turn. The height he and his colleagues get is amazing! Over 70 feet indoor! But they feel it for the next few days. Of course, the wings of the first few gliders collapse under this tremendous force, but we soon learned by experience which grade of wood is the best. And, do not forget that good proverb, "Practice makes perfect."

INDOOR PUSHER

Up to date very little has been done to develop Indoor Pushers, because the original indoor models were tractors, and only a few hardy souls dared to build pushers. Their were fruitless, in most instances, however, because in their pusher designs the motor stick used to twist so as to help the torque, and also, the models spun at the slightest provocation. Misplacement of the Directional Center was the cause of the spin; it was too far back of the C.G. The writer has designed an Indoor Pusher, (see drawing), which eliminates all these faults. By enclosing the rubber in a tube, the twist of the stick is negligible, and the fin area in the front brings the D.C. just behind the C.G., where it should be. Of course, a larger dihedral on the elevator, instead of the fin, may serve to bring the D.C. to the right place.



INDOOR ENDURANCE MODEL

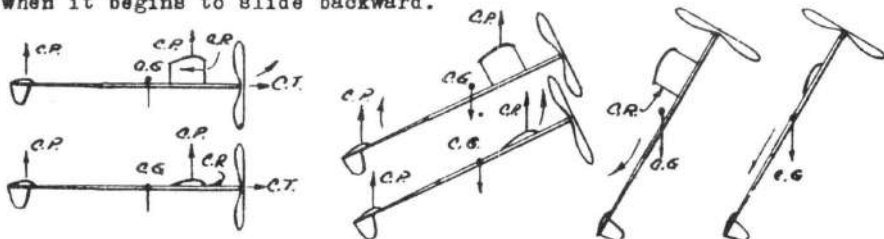
See the Indoor plans for the design and construction details. When making a model from plans, and the weights do not check, the reason probably is that a different grade of balsa was used. If you use 8 lbs. per cu.ft. balsa on a design which was originally built of 4 lbs. stock, your model will naturally weigh almost twice as much.

Indoor balsa should average between 3.5 lbs. to 5.5 lbs per cu. ft. It is preferable to use larger size of light balsa, instead of a small size of heavier wood which comes to the same weight. The larger size can be streamlined easier and is stronger, per weight, because of the larger cross section. Oval-shaped motor sticks, hollow booms, and all tubing, should be made of balsa that does not angle when passed between the thumb and the index finger. Spar stock should be slightly tougher. For cut ribs, use speckled balsa, as it does not straighten out when cut to the rib outline.

STABILITY OF INDOOR TRACTOR

The present trend in Indoor designing is to have a high wing and a cambered stabilizer on a boom. This combination combines stability and efficiency. The cambered stabilizer contributes lift, and the high wing makes the model stable. The formula for calculating the stabilizer area is the same as that of lifting tail Outdoor Tractor.

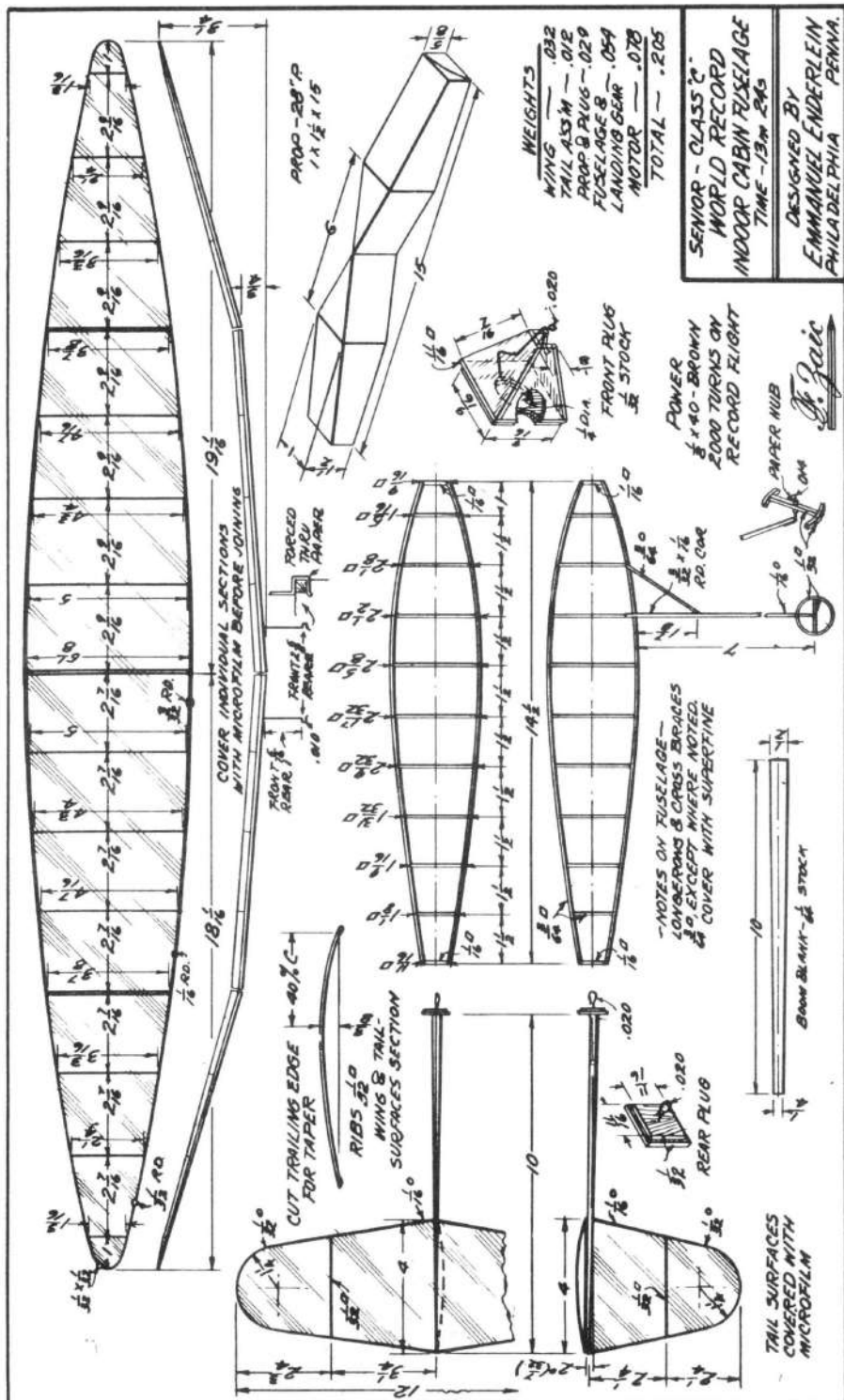
Space does not permit us to discuss the merits of high and low wings. All we can say is that we have tried both systems, and the high wing has proved to be the best from an efficiency and stability standpoint. (See the drawing for comparison of the two arrangements.) It is much easier to adjust a high wing model, as the adjustments can be rougher than on a low wing model, because the Center of Pressure, or Lift, moment arm becomes smaller when the wing is at a high angle of attack or near a stall, and giving the tail a greater lever arm, thus straightening out the ship. In a stall to standstill, the Center of Resistance (C.R.) above the C.G. straightens the model when it begins to slide backward.



INDOOR PROP

The indoor prop outline, as shown in the Indoor plans, is for a high ceiling flying. For a low ceiling use the outline developed by Mr. Walen of Springfield, Mass. Mr. Walen states that with this outline he is able to get 3 to 4 minutes before the model reaches a 60 ft. ceiling and yet comes down dead stick. The principle involved is that the blades increase their pitch when the motor is fully wound. (Some of the old timers will recognize this prop as a modification of that of Joseph Culver of California at the 1929 National Contest.)

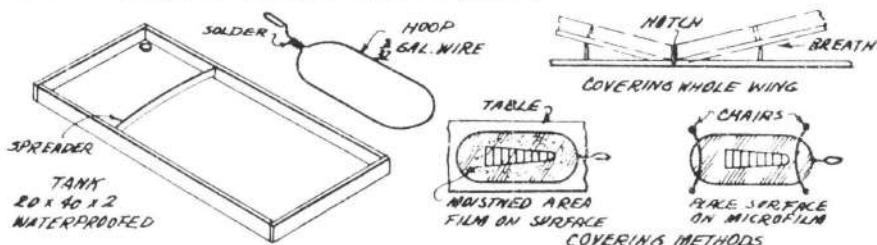




MICROFILM

Almost Any lacquer or dope will serve as microfilm solution if proper amount of flexizer is added to make the film flexible. Castor Oil is the most common, but it should be used in just the right amount as it is liable to make the film tacky if used excessively. Those wishing to experiment in this field should read up on lacquer literature in their library.

Use Red and Greenish colors for tractor wings, and Gold, Silver and Violet for tail surfaces and R.O.G.'s. These colors are used by the N.Y. Aeronauts, who have been working on film ever since it was introduced, and, naturally, have a good solution. If you are just beginning to use microfilm it is advisable to use thicker sheets, but never go out of the color range. Use saliva for adhesive, and hot wire or acetone for trimming. Wings can be covered in one piece by notching the spars for dihedral, and then covering with film. Make dihedral, and blow underneath the wing to crease the stack film. You may find more hints just by experimenting. You know, a day of experimenting on your own will teach you more than you could learn from the most complete treatise ever compiled.



METHOD FOR MAKING ELLIPTICAL WINGS

Developed by Lawrence Smithline

Draw the ellipse. Superimpose spars on the drawing. Hold spars in place with pins. Place and cement ribs. Moisten the spars to keep shape. When dry, remove from the board and add tips, and carry on as on ordinary construction.

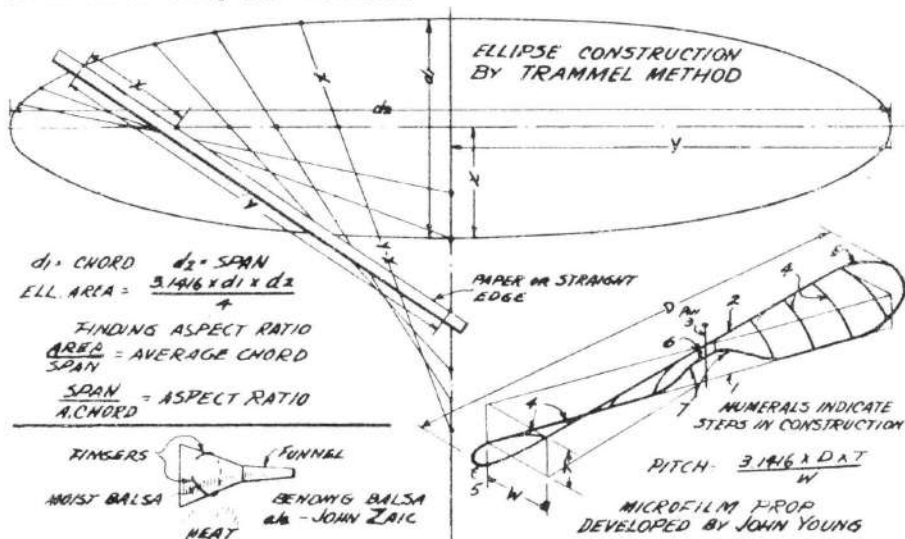


Figure 1 is a plan view of the wing of a 1/2 scale model of a swept-back transport aircraft. The wing is long and narrow, with a series of rectangular panels. The total length of the wing is 35' 4". The span is 10' 0". The chord at the root is 1' 0". The chord at the tip is 1' 0". The wing is swept back at an angle of 35 degrees. The wing is covered with Mikropilum. The diagram includes various dimension lines and labels, such as "10' 0\"", "35' 4\"", "1' 0\"", "1' 0\"", "35°", and "MIKROPILUM COVERED".

A hand-drawn diagram of a ship's hull cross-section. The diagram shows a curved hull shape with a flat deck at the top. Dimensions are indicated by horizontal arrows and vertical lines. The dimensions from left to right are: 2 1/2, 8 5/8, 2 1/2, 2 1/2, 2 1/2, 3 1/8, and 5 1/8. A vertical line on the right side is labeled "PROP. VOLUME 14 1/2 x 16".

MOTOR STICK BLANK - $\frac{1}{8}$ " BEND. STOCK

DESIGNED BY
HERBERT GREENBERG
NEWARK NEW JERSEY

10' 2"

TAIL BOOM - BENDA 370A

P. Paic

SOME TECHNICAL NOTES ON THE PRESENT INDOOR AIRFOIL

Being the results of Aerodynamic experiments
with eight single surface airfoils.

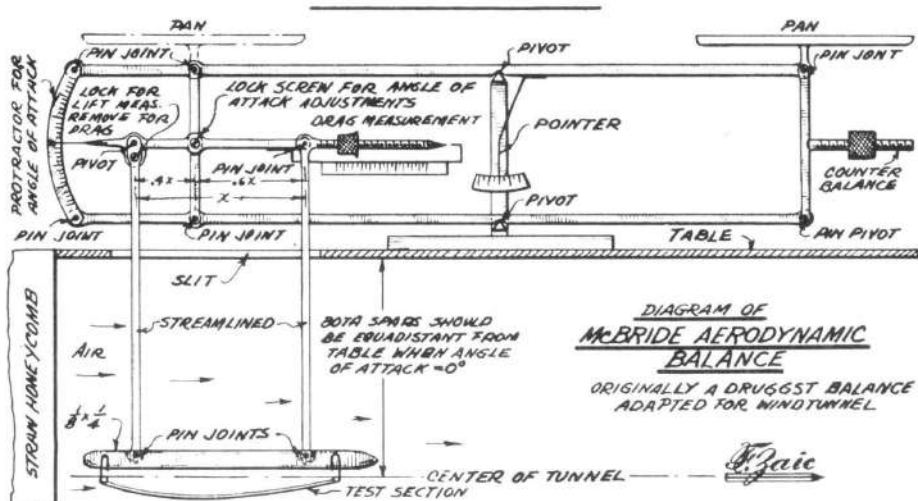
by J. Wallace McBride

The National Advisory Committee for Aeronautics (N.A.C.A.) has published numerous reports on the aerodynamic characteristics of airfoils, none of which are acceptable to the present indoor expert. (R.E.F. 1) Endeavoring to remedy this situation the author began in 1931 to test the single surface airfoils of the "Seven Outstanding Tractors of 1930." (R.E.F. 2) Work was begun using free flight tests but the method was soon abandoned because of the larger number of variables involved. In an attempt to eliminate some of these a small windtunnel was built and placed in operation.

Power for the tunnel was supplied by a one-sixteenth horsepower, rheostat controlled, electric fan. Air was forced through a stiff paper transition piece, going from 13 inches in diameter at the fan to a honeycomb 14 x 5 inches at the entrance to the working chamber. One and one-half inch lengths of soda straw piled and glued on top of one another formed the honeycomb, the purpose of which was to bring the air into the working chamber in parallel streams. (See drawing.)

The aerodynamic balance mounted on the top of the working chamber was of the pin jointed parallelogram type. Lift was measured by an old druggist's balance which had the drag balance mounted on one upright arm. The drag arm was so mounted that its position could be varied at will and then locked in position. The angle of attack which was controlled by this movement was read off a protractor attached to the same upright. Thus one could control the angle of the test section without disturbing it. (See drawing of the balance.)

The test sections were constructed according to current model building practice. Weight being no objection the sections were built very substantially. The tissue covering was supported by, one inch spaced, hard balsa ribs faired into one-sixteenth diameter (being the mean size of the average indoor tractor spar) pine spars. Sag at the tips was prevented by airfoil braces similar to those now used in multiple covered microfilm wings. The very low aspect ratio 3.44 was necessary in order to get a chord large enough to give a Reynold's number approaching that of flight.



The test sections were mounted inverted on the drag balance clip arm (1/8 x 1/4, cross section) by Pond type double grip clips. The lift balance was then counterbalanced for the weight of the section with the power off. The test section was then tested to see if it was on the same plane as the top of the test chamber, by taking offset measurements from the spars, when the angle of attack indicator read zero. The power was then turned on and the airspeed obtained. There being no micro-manometer available the airspeed was obtained by mounting a square flat plate normal to the airstream and then recording the drag. Speed was obtained by solving the equation $\text{Drag} = C_d \frac{\rho}{2} S V^2$ (Use of this type explained later.) with the drag coefficient (C_d) taken as 1.040 for a plate 10 cms. square. (REF. 3 & 4) The test section was then replaced and its angle of attack again checked. Readings were taken for lift with the drag arm locked. The process was repeated for every two degrees throughout the working range. The power was then shut off and the incidence of the test section again checked. If the test section was found to have shifted the process was then repeated.

The tests were carried out either in the mid afternoon or about 4 A.M. in an effort to reduce the error resulting from variations in airspeed due to changes in the power loads on the power line. Comparison of the results with those of the N.A.C.A. have led the author to believe that the airspeed of 7 f.p.s. is a little too great. Although the error may be largely due to the low Reynold's Number. A free flight test with another single surface airfoil gave a C_l of 1.4 at 1% so the error is probably not great. He, however, hesitates to guarantee the accuracy and suggest that the reader test his own airfoil in flight by obtaining speed. It is then possible to calculate the lift coefficient for the angle at which the wing was flying. With this data it is only necessary to transpose the lift curve so it passes through the point obtained by the flight test. The drag curve will also be transposed but the L/D ratio will remain the same. Should anyone carry out such a test the author will be glad to hear the results or if information is desired as to the method he will be glad to be of assistance.

The sections treated were those supplied by the A.M.L.A. in their booklet (Ref. 2). There are in addition two sections developed by the author and two others tested elsewhere that will be of interest, and are included for comparison. The sections are called by the names given them in the booklet although correspondence with some of the gentlemen have shown that the section flown by them were considerably different.* For example, the section shown to be that of Carl Goldberg varied by more than 3/32. The section had a thinner maximum ordinate and was somewhat more bulbous at the entering edge.

The centre section airfoil of Fay Stroud and that of Samuel Balkan were practically identical and gave such a poor showing in the free flight tests that they were left out of the test program. The airfoil known as the B-6 was an airfoil used by the author in 1931 and was the forerunner of the B-7 which was developed as a result of these tests. The aerodynamic characteristics of these airfoils are presented in the standard form. It should be noted though that the Göttingen section and the Flat Plate are plotted to one half the other scale.

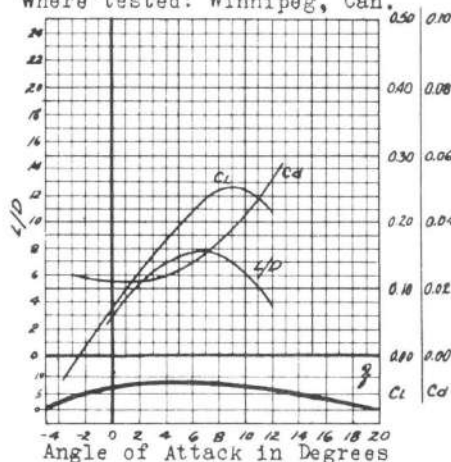
* The author wishes to thank Ray Thompson and Carl Goldberg for their aid and courtesy.

TABLE OF GEOMETRIC CHARACTERISTICS OF THE AIRFOILS

Name	Ordinates and Positions in Percent of Chord											
	0.	5.	10.	20.	30.	40.	50.	60.	70.	80.	90.	100.
Ray Thompson	0.0	2.30	4.00	6.20	7.50	7.75	7.40	6.75	5.75	4.10	3.60	0.0
Carl Goldberg	0.0	2.70	4.60	6.80	8.00	8.40	8.00	7.00	5.90	4.30	2.30	0.0
Fay Stroud (tip)	0.0	3.00	4.60	7.00	8.10	8.20	7.90	7.00	5.70	4.10	2.30	0.0
L. Hankammer	0.0	3.90	4.75	6.80	8.00	7.95	7.20	6.25	4.90	3.50	1.90	0.0
Jack Fisher	0.0	4.25	5.00	7.80	9.00	9.20	8.80	7.20	5.80	4.00	2.30	0.0
Ernie McCoy	0.0	2.70	4.50	6.80	7.90	8.10	8.00	7.20	6.00	4.60	2.75	0.0
McBride B-6	0.0	2.90	5.10	7.40	8.25	8.30	7.90	6.90	5.60	3.90	2.00	0.0
McBride B-7	0.0	2.35	4.40	6.70	7.80	8.30	7.90	6.90	5.60	3.90	2.00	0.0
Göttingen 417a	0.6	2.86	4.28	5.70	6.48	6.83	6.10	5.38	4.38	3.10	1.60	0.0
Flat Plate	0.5	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50

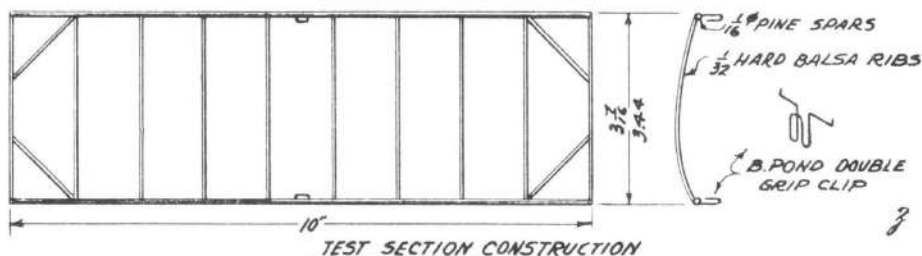
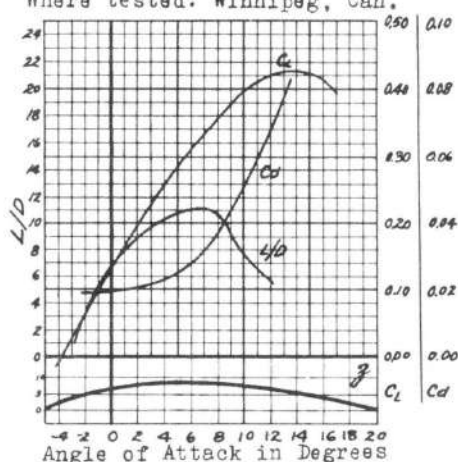
AERODYNAMIC CHARACTERISTICS OF SINGLE SURFACE AIRFOILS

Name of section: Ray Thompson
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by; McBride, March 1932
 Where tested: Winnipeg, Can.

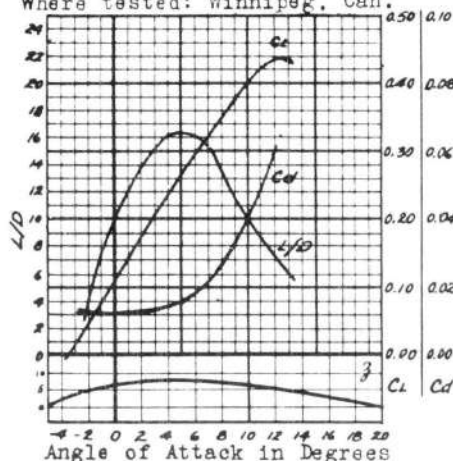


Coefficients are Absolute

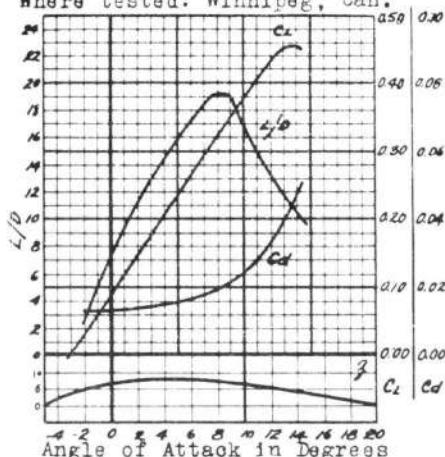
Name of section: Carl Goldberg
 Wind velocity; 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.



Name of section: Fay Stroud
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.

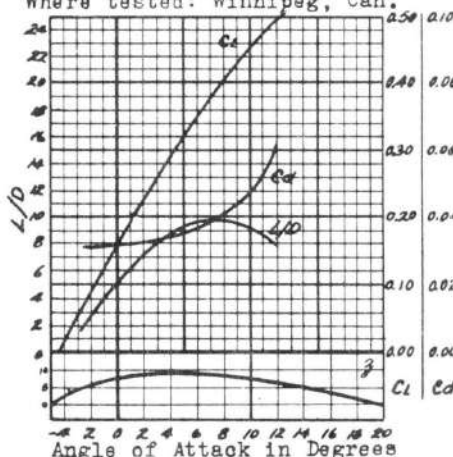


Name of section: L. Hankammer
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.

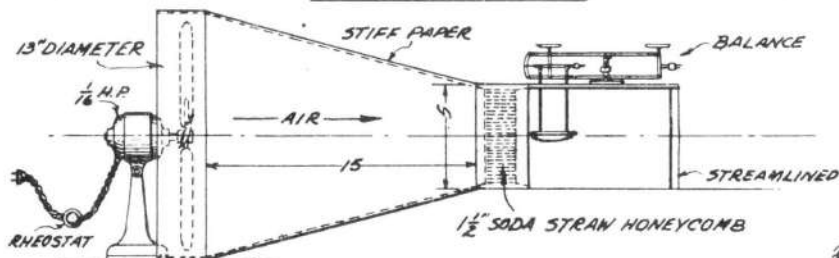
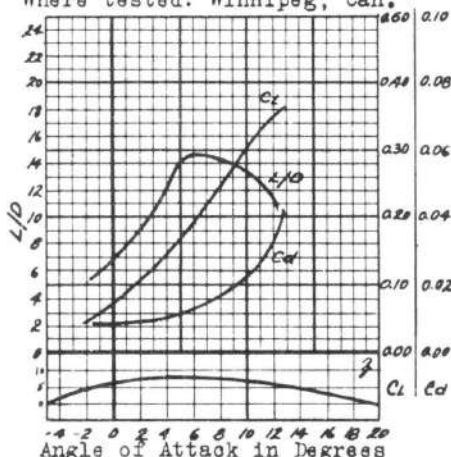


Coefficients are Absolute

Name of section: Jack Fisher
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.

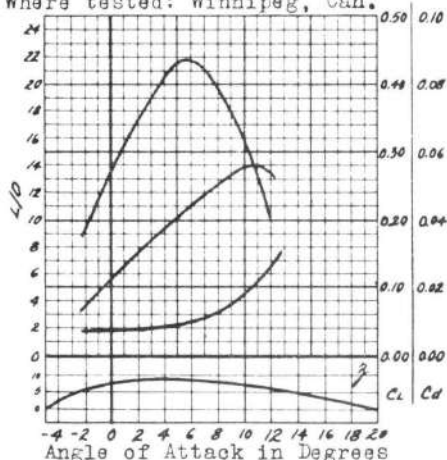


Name of section: Ernie McCoy
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.

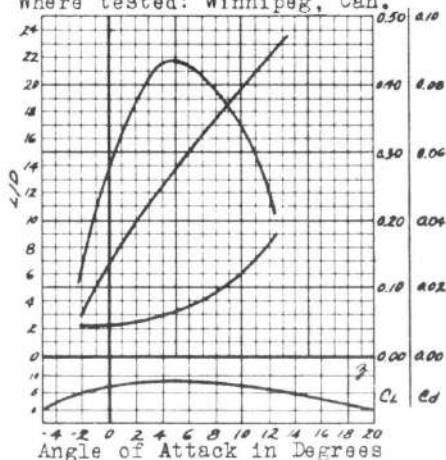


WINDTUNNEL LAYOUT

Name of section: McBride B-6
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.

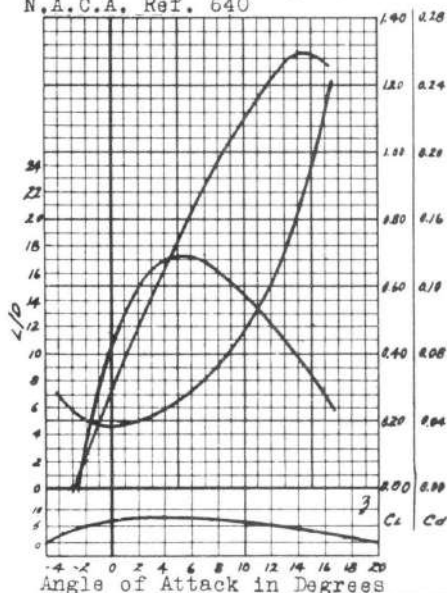


Name of section: McBride B-7
 Wind velocity: 7 f.p.s.
 A.R. test section: 3.44
 Tested by: McBride, March 1932
 Where tested: Winnipeg, Can.

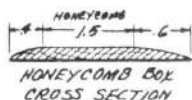
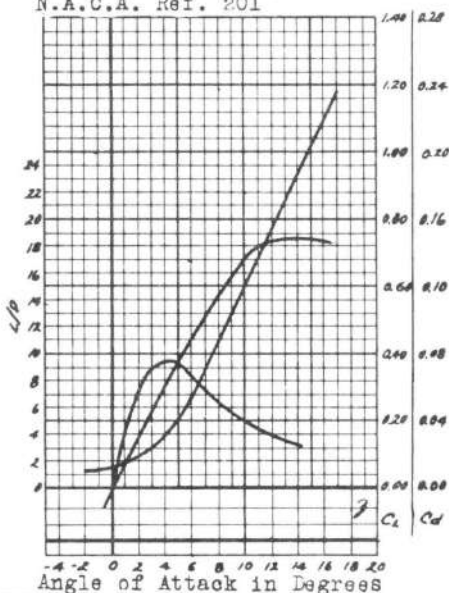


Coefficients are Absolute

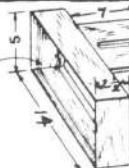
Name of section: Göttingen 417a
 Wind velocity: 98.4 f.p.s.
 A.R. test section: 5/1
 Where tested: Göttingen, 1926
 N.A.C.A. Ref. 640



Name of section: Flat Plate
 Wind velocity: ?
 A.R. test section: 5/1
 Where tested: Langley Field
 N.A.C.A. Ref. 201



FILL WITH 1/2" SODA STRAW



SPLIT FOR LIFT & DRAG ARMS
 STREAMLINED

WORKING CHAMBER

3.

Some of the readers may not be familiar with this system of coefficients. The system is that used by the N.A.C.A. and is known as the Absolute system. The coefficient of lift is denoted as C_L and the coefficient of drag C_D .

The lift equation for this system is: $Lift = C_L \frac{\rho}{2} S V^2$

The drag equation for this system is: $Drag = C_D \frac{\rho}{2} S V^2$

Where $\rho = .002378$. The density of the air.

S = the effective area of the wing, square feet.

V = the speed of the air, feet per second. (f.p.s.)

It should be noted that this system of coefficients hold for any consistent system of units, such as the English or the Metric.

Conversion factors are presented here in case one wishes to compare the airfoils with those published using other systems.

$C_L = 2 L_c = 391 K_L = .01$ German system

$C_D = 2 L_d = 391 K_D = .01$ German system

For the benefit of those not acquainted with the use of Absolute Coefficient Systems the following design is given.

EXAMPLE 1.

Type of aircraft: Indoor Tractor, weight complete .08 oz.

Effective wing area: 100 square inches.

Wing section is. airfoil: Göttingen 417a.

Angle of attack: 8 degrees 40 mins.

Note the angle of attack is the angle of incidence between the wing and the airflow. The angle of incidence is the angle of inclination between the wing and a fixed line in the aircraft usually the line of thrust.

Lift Coefficient by chart: $1.00 = C_L$

Air density 0.002378 at 59 degrees F. and 29.92 inches of mercury.

As the conditions mentioned above are the average of the conditions in the temperate zone one will not be greatly in error if density corrections for change in temperature and pressure are not made.

$$Lift = [1.00 \times .0012 \times \frac{100}{144} \times V^2] = (L = C_L \frac{\rho}{2} S V^2)$$

It is assumed that there is no down or up load on stabilizer at this angle of attack.

$$\text{Therefore- } .08 \times .0625 = 1.00 \times .0012 \times \frac{100}{144} \times V^2$$

$$(.08 \text{ oz.} = \text{weight of the model}) (.0625 \text{ lbs.} = C_d \text{ at } 8^\circ 40')$$

Solving for V one gets:- $V = \text{Root of } 6.26$ or 2.5

Therefore speed in level flight at 8 degrees 40 mins. is 2.5 f.p.s.

Many model builders will question the use of data of this kind in the design of indoor models, and in an endeavor to answer them, these last paragraphs are written.

One of the major uses of scientific information of this kind is that one may compare wing sections and find the effect of making small changes. Thus he will know that flattening out a section between 0 and 30% of the chord will, if carried out within reasonable limits,

increase lift and efficiency, thus producing a better endurance airfoil (B-6 and B-7) while humping an airfoil at the 40% station will increase at the expense of efficiency. (Jack Fisher.) Thus by careful comparison of the characteristics of section one may finally develop a very superior airfoil.

Data of this kind is most useful in design work as it is possible to make preliminary endurance calculations, calculate changes in possible duration due to changes in wing area, incidence etc. An example of its use in this kind of work is given below.

EXAMPLE 2.

An indoor tractor of 100 square inches of area was being flown at 6 degrees attack. A check of values of $\frac{C_d}{C_l}$ (One of the criteria for an endurance airfoil. Should be a minimum. (REF.5) of the airfoil has shown that 9 degrees is a better angle for the airfoil. Would this setting improve duration?

Area: 100 sq. in.
Airfoil: G8tt. 417a.
Flying weight: 0.10 oz.

C_d of stick etc.: 0.0824
(this includes area.)
Available energy: 35.0 ft.oz.

6 degrees attack	9 degrees attack
$V^2 = \frac{(0.10 \times 0.0625 \times 100 \times 2)}{(0.8 \times 144 \times 0.0024)}$	$V^2 = \frac{(0.10 \times 0.0625 \times 100 \times 2)}{(1.02 \times 144 \times 0.0024)}$
$V = 2.12$ f.p.s.	$V = 1.88$ f.p.s.
C_l at 6 degrees being 0.08	C_l at 9 degrees being 1.02
L/D at 6 degrees is 15.2	L/D at 9 degrees is 14.1
Motor and stick drag $\frac{(0.0824 \times 0.0024 \times (2.12)^2)}{(0.0625 \times 2)}$	Motor and stick drag $\frac{(0.0824 \times 0.0024 \times (1.88)^2)}{(0.0625 \times 2)}$
$= 0.00715$ oz.	$= 0.00578$ oz.
Wing drag is $\frac{0.10}{15.2} = 0.00658$ oz.	Wing drag is $\frac{0.10}{14.1} = 0.00707$ oz.
Total drag 0.01373 oz	Total drag 0.01283 oz
Power used for flight $0.01373 \times 2.12 = 0.02911$ ft.oz. per sec.	Power used for flight $0.01283 \times 1.88 = 0.02412$ ft.oz. per sec.
Possible duration $\frac{35.0}{0.01373 \times 2.12} = 1202.4$ secs.	Possible duration $\frac{35.0}{0.01283 \times 1.88} = 1452.3$ secs.

This is an improvement of 20.7% resulting from using the proper wing adjustment. This is an interesting calculation in view of the present trend to reduce the angle of attack in order to reduce resistance coefficient forgetting that the power required depends greatly on the aircraft's speed.

In conclusion the author wishes to state that he believes that flights of an hour or more will be possible in a few years if the model designer pays careful attention to the science of low speed aerodynamics, to which he hopes this article will be a contribution.

REFERENCES

1. N.A.C.A. Technical Reports Nos. 93, 124, 182, 244, 286, 315, 460.
2. "The Seven Outstanding Tractors of 1930." Airplane Model League of America data published by Geo. D. Wanner, Dayton, Ohio. Page 7
3. Eiffel, "Resistance de l'air at Aviation", Hunsakar translation. Page 38.
4. Engineering Aerodynamics, Diehl. Page 65.
5. Simple Aerodynamics, Carter. Chapter on airfoil selection.

RUBBER MOTOR

No attempt has been made to test rubber for its horsepower as such test have to be extensive and made with accurate instruments to be of any use. Besides, knowing the power will do us no good if we do not know just how much power we need for a certain model. However, the author has few ideas and it is possible that we might have this information next year. At present all that can be said is to use enough power to give the ship a steady climb. Of course, the model must be properly adjusted for the most efficient results. It would not do to have a model fight itself.

If a model flies well on first wind and then just sort of mushes on other flights it might be because the rubber was powerful enough on the first winding and then lost its pep. Just add two strands at a time until the model comes down dead stick on 200 turns. Sometimes when the model seems to be perfectly adjusted but still stalls addition of an extra strand will do wonders. It is much better to have the model climb few thousand feet in a minute than to have it flutter just above the ground for two minutes. The chances for a high climber to hook unto a thermal are much better. Of course, the more streamlined a model is; less rubber it needs, and if the same amount of rubber is used on a streamlined model as on the conventional design, the difference in performance will surprise you. The streamlined model will leave its Resistance brother way behind.

The following turn test were checked by three experts, and they represent the number of turns that may safely be put into the rubber. On two strand test the rubber was stretched 5 times, while in the multiple strands it was stretched as much as possible. Two prewinds were given: First; about half of total winds and stretched about a half of the final winding. Second; about $2/3$ turns and $2/3$ stretch. On the final winding the rubber was wound $\frac{1}{2}$ of its capacity at standstill and then slowly coming in. The point is that the rubber should always have some elasticity, about 2 to 3 inches. Just watch an expert wind; he winds for a while, and then feels how tight the motor is. Using this method the maximum winds can be stored as the rubber is kept just under its breaking point. You can only get the feel by experience, but keep the above rules in mind and you will be able to get the number of turns as shown on the table.

Basic Weight:- $1/8 \times 1/30$ Brown, 0.00194 oz. per inch.

$1/8 \times 1/32$ Black, 0.00166 oz. per inch.

Other sizes proportional.

Lengthening coefficient approximately .01 when rubber wound maximum.

RUBBER WIND TESTS FOR TURNS PER INCH

Rubber lubricated, prewound and wound with winder

SIZE	1/32	3/64	1/16	5/64	3/32	7/64	1/8	5/32	3/16
1/32 BLACK	185				103		94		75
1/30 BROWN	215	188	150	140	130	122	115	108	94
STRANDS	4	6	8	10	12	14	16		
1/32 BLACK	55	44	42	40	37	35	32		
1/30 BROWN	65	55	50	48	40	38	36		

THE



END

OFFICIAL MODEL AIRPLANE RECORDS

Approved by Contest Committee of the N.A.A.
Through August 10, 1934

INDOORS

STICK MODEL AIRPLANES, Hand-launched

CLASS B

Junior: Raymond Steinbacher.....Ridgefield, New Jersey.....9m 87s
Senior: Ralph Kummer.....St. Louis, Missouri.....17m 49.8s
Open: Frank Zaic.....New York City.....6m 57.2s

CLASS C

Junior: John Stokes.....Huntingdon Valley, Pa.....18m 53.4s
Senior: Herbert Greenberg.....Newark, New Jersey.....19m 04.6s
Open: Carl Goldberg.....Madison, Wisconsin.....22m 59.4s

STICK MODEL AIRPLANES, R.O.G.

CLASS A

Junior: Joseph Pruss.....Philadelphia, Pa.....10m 25s
Senior: Carl Goldberg.....Madison, Wisconsin.....9m 34.8s

CLASS B

Junior: Louis Shumsky.....Atlantic City, New Jersey.....9m 15.2s
Senior: William Latour.....Philadelphia, Pa.....12m 46s

STICK MODEL AIRPLANES, R.O.W.

CLASS A

Junior: James Shriver.....Philadelphia, Pa.....3m 41.8s
Senior: Paul Karnow.....Philadelphia, Pa.....5m 01.4s

CLASS B

Junior: James Mooney.....Philadelphia, Pa.....8m 37.5s
Senior: Mayhew Webster.....Philadelphia, Pa.....11m 55s

STICK MODEL AIRPLANES, Hand-launched

CLASS C

Junior: Bruno D'Angelo.....Philadelphia, Pa.....8m 29.4s
Senior: Vernon Boehle.....Indianapolis, Ind.....15m 09s
Open: Bernard Collins.....Providence, R. I.....2m 22s

CLASS D

Junior: Fred Stafec.....Akron, Ohio.....8m 21.4s
Senior: Ralph Kummer.....St. Louis, Missouri.....11m 35s
Open: Frank Zaic.....New York City.....1m 27s

GLIDERS, Tow-launched

CLASS C

Senior: Bob File.....Columbus, Ohio.....23m 13s

CLASS D

Junior: Stanley Congdon.....Glen Ridge, New Jersey.....45.2s
Senior: Fred Korn.....New York City.....1m 16.2s

GLIDERS, Hand-launched

CLASS A

Junior: Hewitt Phillips.....Belmont, Mass.....21.4s
Senior: David B. Hecht.....New York City.....24.4s

CLASS B

Junior: Stanley Congdon.....Glen Ridge, New Jersey.....15s
Senior: David B. Hecht.....New York City.....21.4s

CLASS C

Junior: Stanley Congdon.....Glen Ridge, New Jersey.....17s

AUTOGIROS

Junior: Alton H. DuFlen, Jr.....Ridgefield, New Jersey.....44s
Senior: Herbert Greenberg.....Newark, New Jersey.....1m 58s

FUSELAGE MODELS, R.O.G.

CLASS B

Junior: Theodore Golomb.....Philadelphia, Pa.....6m 38s
Senior: Herbert Greenberg.....Newark, New Jersey.....12m 33.5s

CLASS C

Junior: Hyman Oelick.....Philadelphia, Pa.....13m 59.4s
Senior: Emmanuel Enderlein.....Philadelphia, Pa.....13m 54s
Open: Jesse Bieberman.....Philadelphia, Pa.....6m 31.2s

FUSELAGE MODELS, R.O.W.

CLASS B

Junior: John Stokes.....Philadelphia, Pa.....1m 28s
Senior: William Latour.....Philadelphia, Pa.....2m 48.5s

OUTDOORS

AUTOGIROS

Senior: Ralph Kummer.....St. Louis, Missouri.....2m 04s

FUSELAGE MODELS, R.O.G.

CLASS C

Junior: Donald Mertens.....Erie, Pennsylvania.....1m 44s
Senior: Russell Yungbluth.....St. Louis, Missouri.....11m 35s
Open: Bernard Collins.....Providence, R. I.....2m 34s

CLASS D

Senior: Vernon Boehle.....Indianapolis, Ind.....8m 43s
Open: Michael Lichstein.....Philadelphia, Pa.....1m 28s

CLASS E (Gasoline Engine)

Senior: Maxwell Bassett.....Philadelphia, Pa.....21m 57s
Open: Carl V. Carlson.....Chicago, Illinois.....6m 48.5s

LIST OF BRITISH RECORDS, 1934

FUSELAGE MACHINES

		mins.	secs.
Rising off Ground	G. M. MERRIFIELD	9	50.0
Rising off Water	M. E. HUNT	1	46.0
Hand Launched	A. D. PAINE	23	10.0
Speed	C. H. DEBENHAM	33.25	m.p.h.

GLIDER

Hand Launched W. E. EVANS 3 10

FARMAN TYPE

Hand Launched C. A. RIPPON 31.2

PERODACTYL

Hand Launched F. B. BAGGS 1 30.0

PETROL DRIVEN MACHINES

		mins.	secs.
FUSELAGE			
Hand Launched	C. E. BOWDEN	8	42

C.A. MACHINES

FUSELAGE Rising off Ground D. A. PAVELY 1 7.6

Non-FUSELAGE Rising off Ground D. A. PAVELY 1 10.0

SPAR MACHINES

TWIN PUSHER AUTO-GYRO Hand Launched D. A. PAVELY 25.8

TWIN PUSHER

		mins.	secs.
Rising off Ground	S. C. HERSON	4	7.0
Rising off Water	S. C. HERSON	1	5.0
Hand Launched	T. D. C. CHOWN	2	25.0

TRACTOR

Rising off Ground D. A. PAVELY 1 51.2

Rising off Water S. C. HERSON 43.0

Hand Launched P. L. WILSON 2 10

GLIDER

Hand Launched C. J. BURCHELL 53.4

FARMAN TYPE

Rising off Ground C. A. RIPPON 32.4

Hand Launched C. A. RIPPON 37.8

JASCO STORY

The following should be read after you had examined all of the JASCO catalogues. By doing so, you may be able to recreate the image or "facade" of JASCO which the young model builders of the thirties may have formed while reading the catalogues. --The catalogues were sent free to anyone requesting them. A new issue was automatically sent to the list that I had of those who had ordered supplies or the year books. Also, included in the list were names that I had found in magazines or supplied by others. Eventually I had a list of close to 10,000 names. I had read books on advertising and mail order business so that I was aware that if I had a response of 10%, I should be happy. With such a large circulation, it is quite possible that the JASCO catalogues had quite an influence on the model design of that era, although the business obtained through the lists may have been minimal.

Early in 1933, Jack Young and my brother, John, decided to supply the New York Aeronuts with indoor supplies. (Might mention that I coined the "Aeronut" term when the New York club was organized.) I joined them in the venture. Thus, the AERONUT SUPPLY DEPOT was started with a capital investment of \$75.00. Jack's father made a table saw for us. We obtained balsa by walking about an hour to the East River Docks where Monteath Lumber Import was located. We had no trouble carrying on our shoulders the balsa we purchased, much to the amazement of the passerbys. -- Since I was working, and Jack lived 40 blocks from us, John did most of the cutting in our airless, 5 x 8 basement storage room, using DC power from the light socket. -- Later on, Jack resigned for reasons I do not recall now. At the same time, John and I changed the name to JUNIOR AERONAUTICAL SUPPLIES CO., which initialed very nicely to JASCO.

When we started JASCO, supplies for indoor models were not available. Balsa stock had to be sanded down to remove saw marks. Parts or items and microfilm had to be made or formulated by the builder. In a sense, the field was wide open for supply business. -- We had already gone through the microfilm formulation and application period so that we were able to supply a fairly good solution, and instructions how to use it. John had worked out the method of applying the film to the frame by wetting the area around the frame so that the film would be drawn against the frame. For a while we were tempted to sell colored water for adhesive when he discovered that saliva was the best adhesive. -- By trial and error John found out how to cut balsa without saw marks or saw dust digs. (By running the combination saw backwards and sharpening individual teeth.) We made washers by piercing holes in brass sheet with phonograph needle stylus, and then punching out the washer with 10¢ punch found at Woolworth. -- Dural bearings were made by hand drilling holes near the edge of a 3/4" wide dural strip, and then slicing the bearings to width with a type cutter. It seems that no matter what we needed, someone, somewhere in New York had it.

It may not be too far fetched to state that JASCO BEAM SCALE KIT was a major contribution to the art of indoor building. For 50¢, a builder could make a scale which was sensitive to 1/1000 of an oz. (The design was influenced by Bert Pond's article in the Popular Aviation (1928?) in which he used alarm clock escapement bearing.) -- I designed the scale around standard metal stampings produced by Stimpson Co. and which could be obtained in lots of 1M. Believe that all of the metal parts did not cost more than 5¢ per kit. Scale was a very popular item and it was the first product advertised in the Model Airplane News. I have often been asked to resurrect the scale kit, but refrained from doing so as the items are no longer stocked. -- The best I could do was to design one, using paper clips. See the basic layout, but remember, this is a 1980 design. Not the original.

Continued on Page 113.

MODEL AIRPLANE

GUIDE AND LOG

BOOK



**Junior Aeronautical
Supplies Co.**

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328 East 6th Street New York, N. Y.

MODEL RECORDS

These records have been officially
recognized by the N.A.A.
up to April, 1934

JUNIOR RECORDS

INDOOR

STICK MODELS

CLASS	RECORD HOLDER	CLUB or CITY	TIME
"A" ROG	Louis Snumsky	Atlantic City, N.J.	6m 22-1/5s
"B" ROG	Hewitt Phillip		7m 9s
"A" ROW	James Snivler	Philadelphia, Pa.	3m 41-4/5s
"B" ROW	Hyman Oslick	Philadelphia, Pa.	6m 43-3/5s
"B" hand	R. Steinbacker	Bamberger Aero Club	9m 7s
"C" hand	Merrell Malley	Atlantic City, N.J.	13m 42s
Autogiro	Alton DuFlon	Bamberger Aero Club	44s

FUSELAGE MODELS

"B" ROG	Hyman Oslick	Philadelphia, Pa.	5m 32-2/5s
"C" ROG	Alton DuFlon	Bamberger Aero Club	7m 25s

GLIDERS

"A" hand	Stanley Congdon	Bamberger Aero Club	13-4/5s
"B" hand	Stanley Congdon	Bamberger Aero Club	15s

OUTDOOR RECORDS

STICK MODELS

"C" hand	Alton DuFlon	Bamberger Aero Club	7m 2s
"D" hand	Merrell Malley	Atlantic City, N.J.	3m 37-2/5s

GLIDERS

"C" tow	Stanley Congdon	Bamberger Aero Club	45-1/5s
"D" tow	Stanley Congdon	Bamberger Aero Club	40-1/5s

OPEN CLASS

INDOOR STICK MODELS

"B" hand	Frank Zaic	New York Aeronuts	6m 34s
"C" hand	Frank Zaic	New York Aeronuts	8m 45s

SENIOR RECORDS

INDOOR

STICK MODELS

CLASS	RECORD HOLDER	CLUB or CITY	TIME
"A" ROG	Carl Goldberg	New York Aeronuts	9m 34-4/5s
"B" ROG	Bruno Marchi	Boston, Mass.	9m 24-3/5s
"A" ROW	Paul Karnow	Philadelphia, Pa.	5m 1-2/5s
"B" ROW	William Latour	Philadelphia, Pa.	5m 41-2/5s
"B" hand	Mayhew Webster	Philadelphia, Pa.	8m 35-3/5s
"C" hand	John Bartol	Roxbury, Mass.	17m 47-3/5s

FUSELAGE MODELS

"B" ROG	Harry Broder	Philadelphia, Pa.	5m 14-1/5s
"C" ROG	John Young	New York Aeronuts	10m 45-2/5s

GLIDERS

"A" hand	David Hecht	New York Aeronuts	34-2/5s
"B" hand	David Hecht	New York Aeronuts	31-3/5s

OUTDOOR RECORDS

STICK MODELS

"C" hand	August Ruggeri	Bamberger Aero Club	7m 36s
"D" hand	David Hertzson	Rock Beach, N.Y.	7m
Autogiro	Ralph Kummer	St. Louis, Mo.	2m 6s

FUSELAGE MODELS

"C" ROG	Vernon Boeale	Indianapolis, Ind.	8m 43s
"D" ROG	Joseph Kovel	New York Aeronuts	2m 30s
"E" Gas	Maxwell Bassett	Philadelphia, Pa.	28m 18s

GLIDERS

"C" tow	Fred Korn	Bamberger Aero Club	1m 16-1/5s
---------	-----------	---------------------	------------

RUBBER WIND TESTS & HINTS.

LENGTH RUBBER →	10 inches	15 inches	20 inches	25 inches	30 inches	35 inches	40 inches	RUBBER HINTS		
4 strands	654	961	1308	1635	1962	2289	2625	How to increase power:- 1. COOL rubber before winding. 2. Wind as <u>fast</u> as possible. 3. After rubber is wound, run your hand over the knots and separate them.		
6 strands	570	855	1140	1425	1710	1995	2283			
8 strands	510	765	1020	1275	1530	1785	2041			
10 strands	476	714	962	1190	1430	1658	1912	How to increase winds:- 1. WARM rubber before winding. 2. Wind as <u>fast</u> as possible. 3. Prewind twice instead of once. DON'T 1. <u>Wind</u> or keep in sun. 2. Use without lubricant. 3. Ever stretch rubber less than 5 times length.		
12 strands	408	612	816	1020	1224	1428	1634			
14 strands	384	576	768	960	1152	1344	1560			
16 strands	368	552	736	920	1104	1288	1480			
IMPORTANT NOTES REGARDING TESTS:- These tests do <u>not</u> represent the maximum winds that may be put into the rubber. They represent the number of winds that an <u>experienced expert</u> may <u>safely</u> put the rubber for a maximum <u>energy</u> per unit weight. MRL SPECIAL BROWN RUBBER with MRL LUBRICANT was used. Rubber was first stretched 3 times its length, then prewound to 3/5 max. capacity, then stretched 5 times its length and fully wound. URNS PER INCH ON TWO STRANDS OF:-										
1/32"x1/30	3/64"x1/30	1/16"x1/30	5/64"x1/30	3/32"x1/30	7/64"x1/30	1/8"x1/30	9/64"x1/30	5/32"x1/30	11/64"x1/30	3/16"x1/30
215	188	150	140	130	122	115	113	108	100	94

HINTS FOR EXPERTS

LATEST BALSA BENDING METHOD:- On modern indoor endurance planes, bending the small diameter balsa tips is really a problem. About the best way to do it is to bend them around a heated metal funnel. Because of the wide range of diameters of any funnel, any desired tip size may be gotten. The funnel should be mounted on a "Sterno" stand over a candle so that the funnel is heated from the interior. The funnel should be soldered to the stand for ease in bending.

FINDING WEIGHT PER CUBIC FOOT OF A PROP BLOCK:- Multiply length x width x thickness of block. Weigh block in ounces. Application of following formula will give the answer in pounds per cubic foot:-

$$\frac{\text{Volume of block}}{\text{wt. in oz./16}} = \frac{1728}{x}$$

CALCULATING STABILIZER AREA:- J. P. Glass formula

If:-

$$\frac{(\text{Stab. area}) (\text{Distance between C. P.'s of wing and stab.})}{(\text{Wing area}) (\text{Average wing chord})} =$$

at least .5, plane should be stable.

FOR PROPELLER SHAFTS:- When rubber is lubricated and heavily wound, it has the nasty habit of slipping up on the prop shaft and causing the propeller to wobble badly. A little rosin carefully placed on the shaft and rubber at this point before winding will correct this.

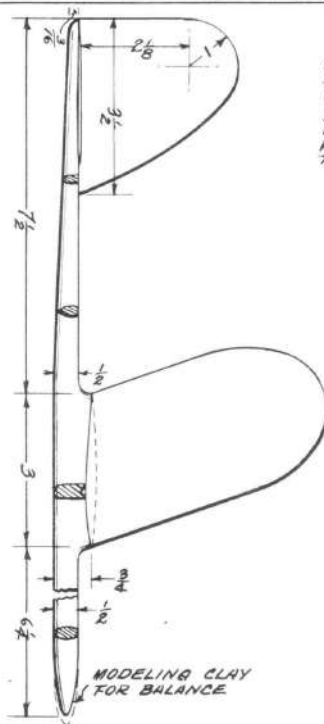
ON COVERING PLANES WITH PAPER:- When covering the wing of an indoor model with paper, be sure that the grain lines run fore-and-aft, not from tip to tip. Tests with the finest grade of superfine show that the coefficient of linear shrinkage with an increase in temperature is three times as much along the grain as across the grain. Tightening up fore-and-aft won't warp a wing as easily as tightening up from tip to tip will.

WING and TAIL SHAPE:- For a given area and span (aspect ratio) an ellipse is the most efficient aerodynamical shape. Area of an ellipse = $\frac{(\text{span}) (\text{chord}) (\pi)}{4}$

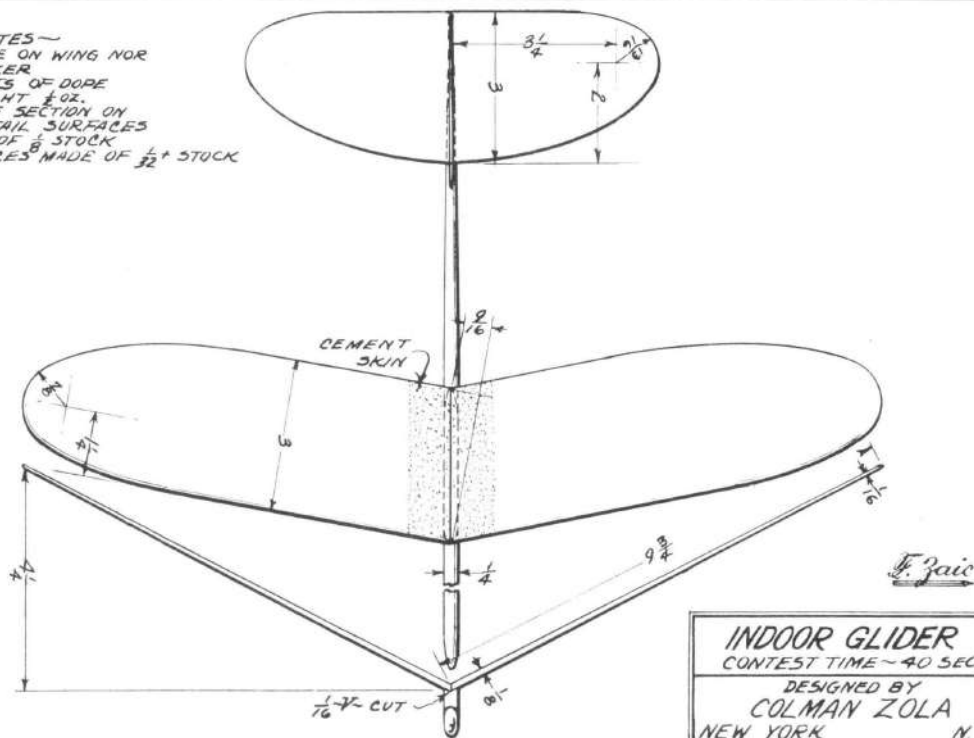
USEFUL DECIMAL EQUIVALENTS:-

1/64"	.015625
5/128"	.0234375
1/32"	.03125
3/64"	.046875
1/16"	.0635
5/64"	.078125
3/32"	.09375

MICRORIM WHEELS FOR BABY R.O.G.'s:- About the lightest possible wheel is made by taking the .003" copper wire from a Ford spark coil (also used in radio work), bending it into a circle, and joining the ends. A single strip of balsa will serve as the rim. The weight of wheels such as these is practically negligible.



~NOTES~
 NO INCIDENCE ON WING NOR
 ON STABILIZER
 THREE COATS OF DOPE
 TOTAL WEIGHT $\frac{1}{2}$ OZ.
 STREAMLINE SECTION ON
 WING AND TAIL SURFACES
 WING MADE OF $\frac{1}{8}$ STOCK
 TAIL SURFACES MADE OF $\frac{1}{32}$ STOCK



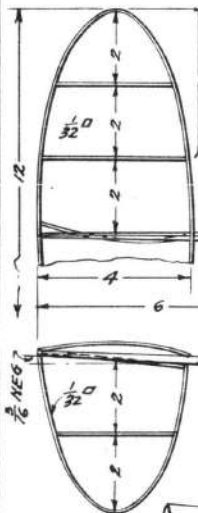
INDOOR GLIDER
 CONTEST TIME ~ 40 SEC.
 DESIGNED BY
COLMAN ZOLA
 NEW YORK N. Y.

~NOTES~

MAKE FULL SIZE ELLIPTICAL CARD-BOARD TEMPLATES FOR WING AND ELEVATOR. THEN BENT MOIST SPARS ON THE OUTLINE.

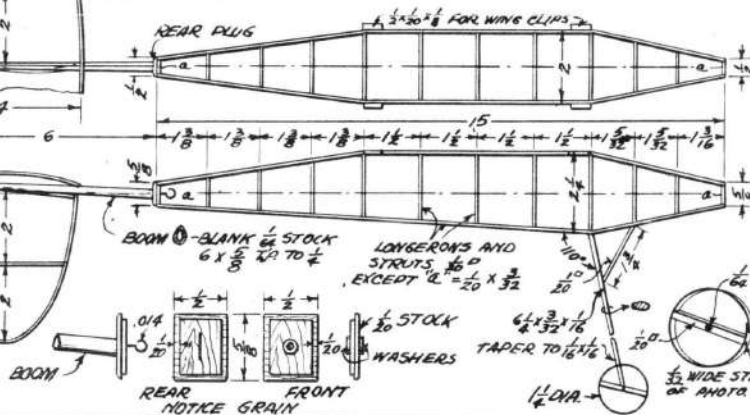
~NOTICE-SPECIAL TAPER ON~

~COVER ANTIPODAL SECTIONS BEFORE JOINING~



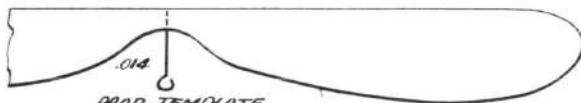
Duplicate this section for rudder.

NOTE - CEMENT RUDDER TO BOOM AND STABILIZER TO TURN LEFT.



COVER WING AND TAIL SURFACES WITH MICROFILM. RISELAGE WITH SUPERFINE DOPED WITH H₂O

WING RIB
STABILIZER RIB



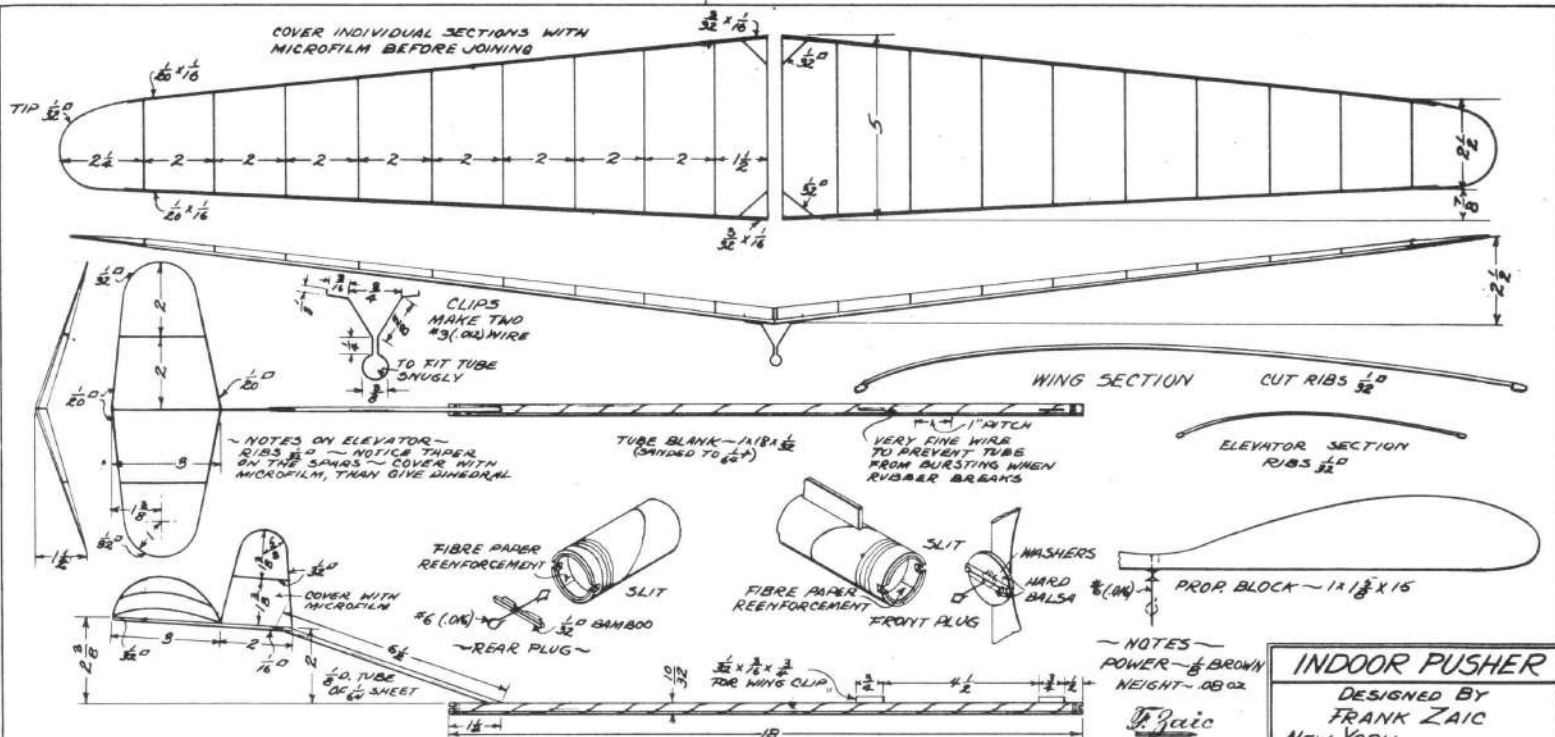
PROP TEMPLATE
PROP BLOCK 1 1/2 x 5/8 x 13

POWER
2 STRANDS 1/64 BROWN
WEIGHT
.10 oz WITHOUT MOTOR

J. Zeic

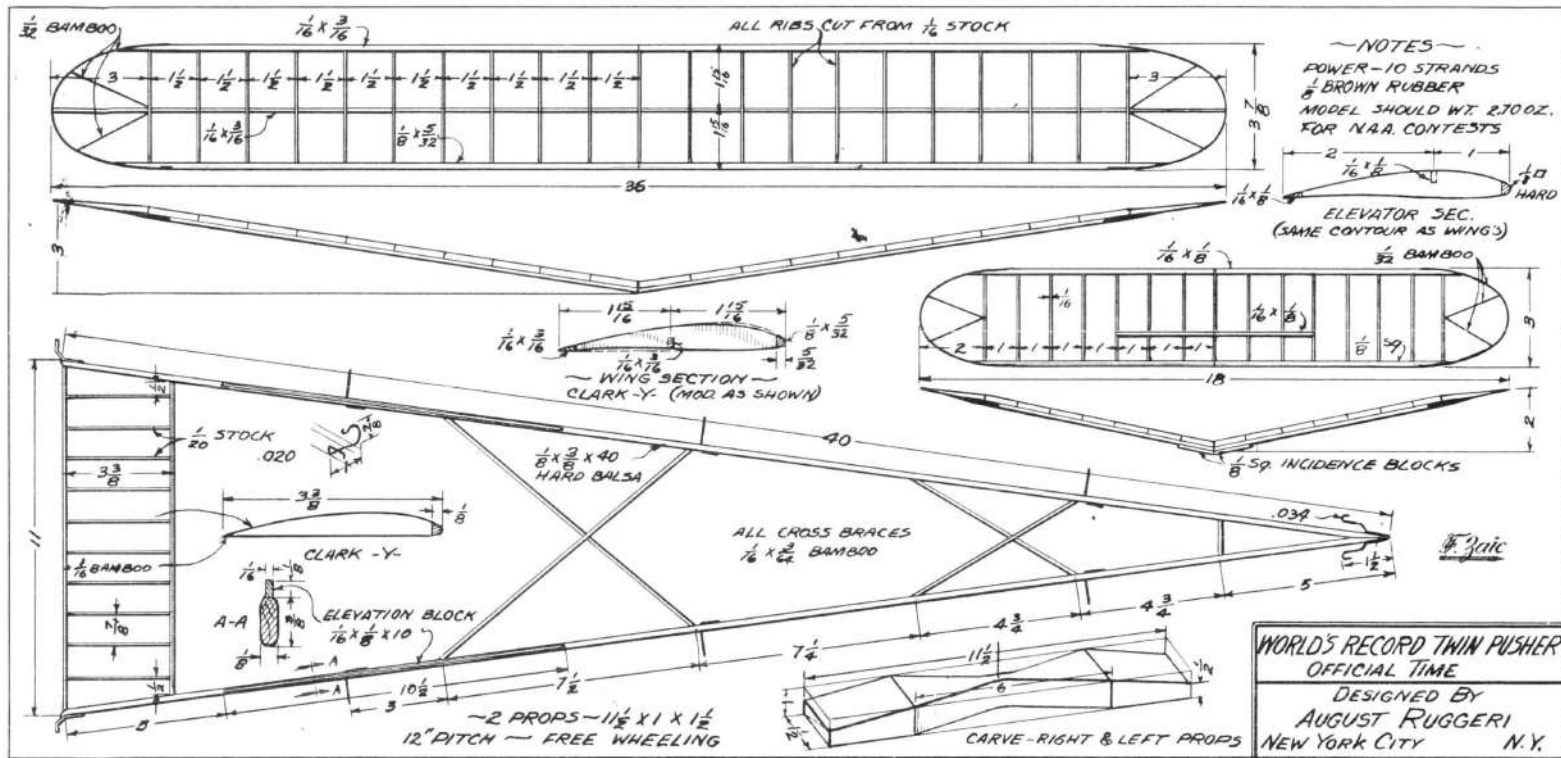
WORLD'S RECORD
INDOOR COMMERCIAL
OFFICIAL TIME 10min 5 SEC
DESIGNED BY
ALLAN B. PENN
NEW YORK CITY N. Y.

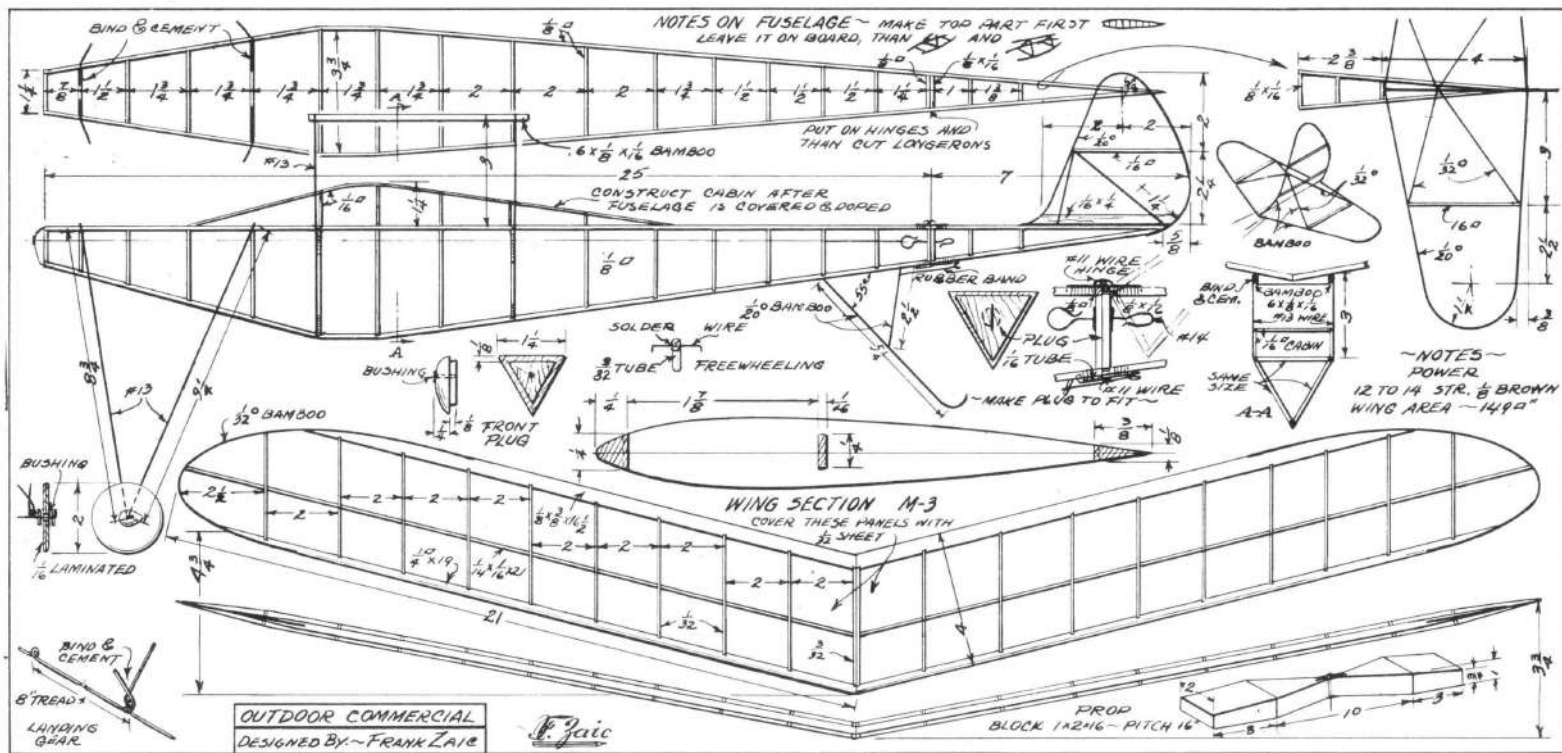
COVER INDIVIDUAL SECTIONS WITH MICROFILM BEFORE JOINING



INDOOR PUSHER

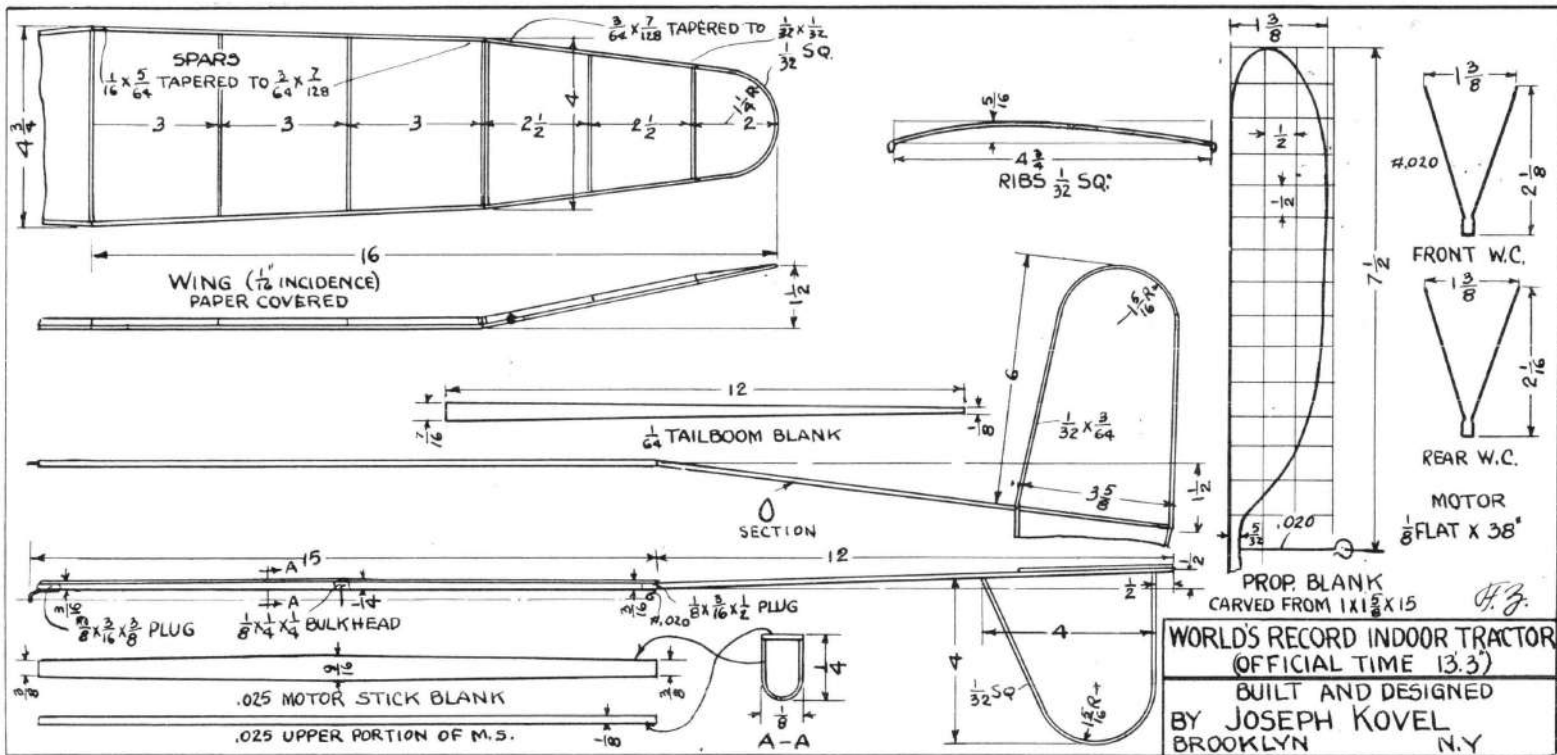
DESIGNED BY
FRANK ZAIC
NEW YORK

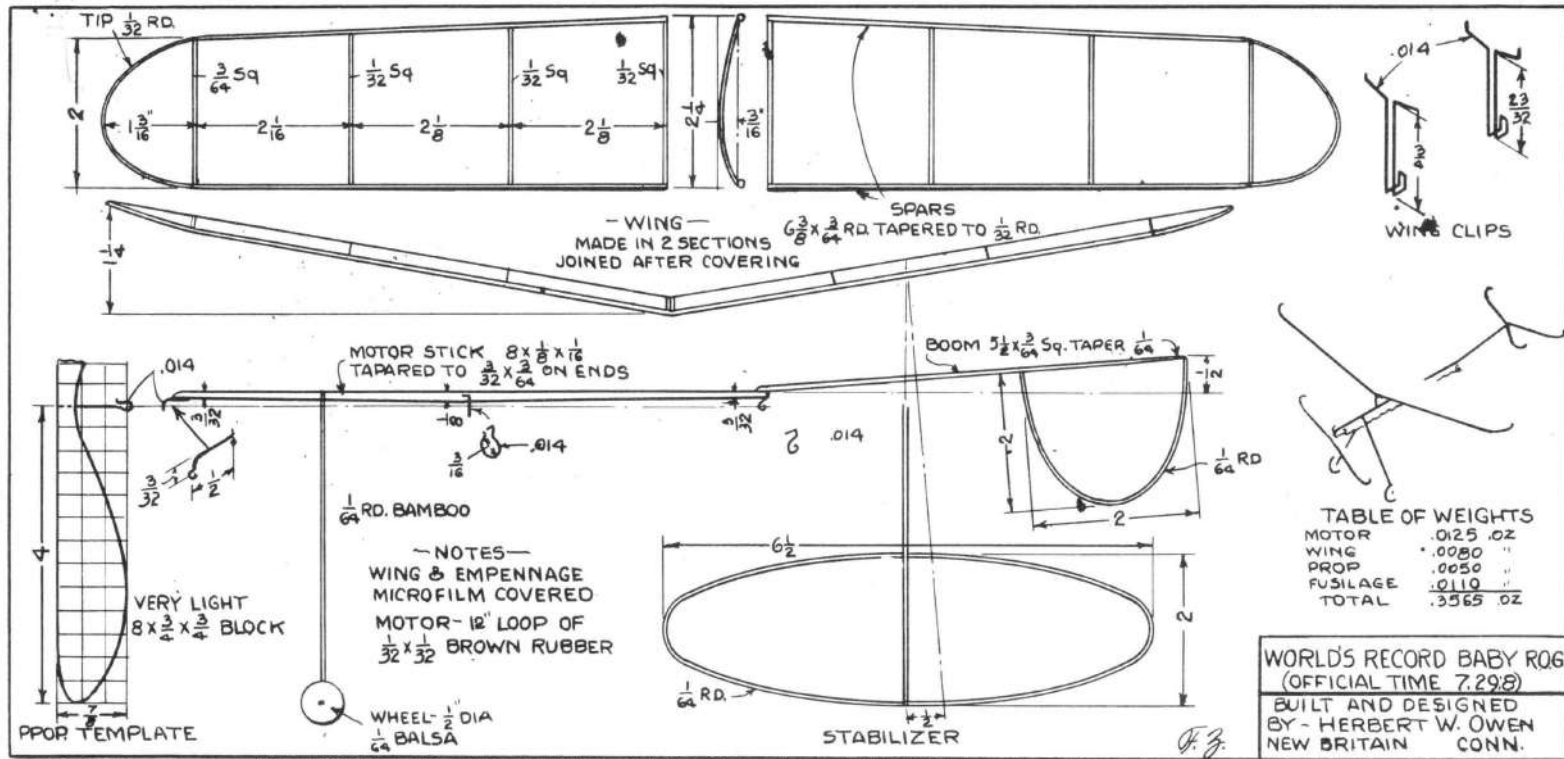


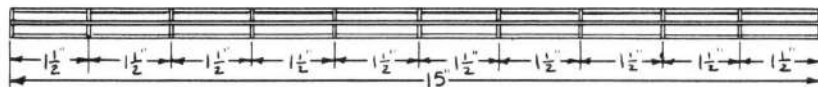


[illegible]

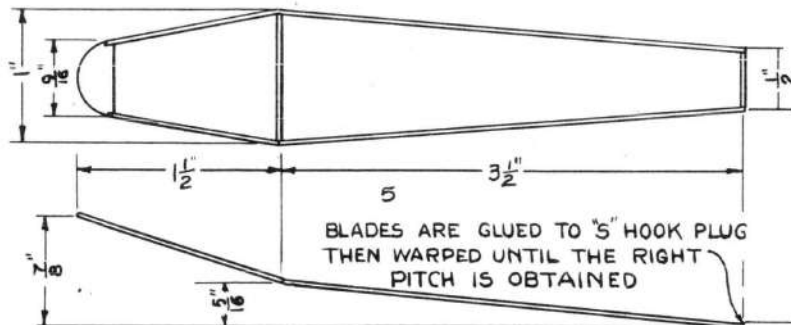
The original LOGBOOKS had three pages ruled for recording flights.







TRIANGULAR FUSILAGE
MADE OF $\frac{1}{20}$ SQ. HARD Balsa, COVERED WITH
JAPANESE TISSUE, DOPED WITH WATER



BLADES ARE GLUED TO "S" HOOK PLUG
THEN WARPED UNTIL THE RIGHT
PITCH IS OBTAINED

— BLADE —
THE BLADES ARE MADE OF $\frac{1}{20}$ SQ. STOCK,
COVERED WITH JAPANESE TISSUE

— MOTOR —
ONE LOOP OF
 $\frac{7}{64}$ " FLAT RUBBER



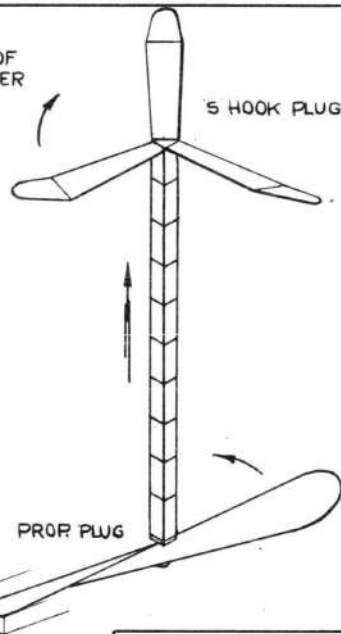
"S" HOOK PLUG
 $\frac{1}{16}$ STOCK



WASHERS
PROP PLUG
 $\frac{1}{16}$ STOCK

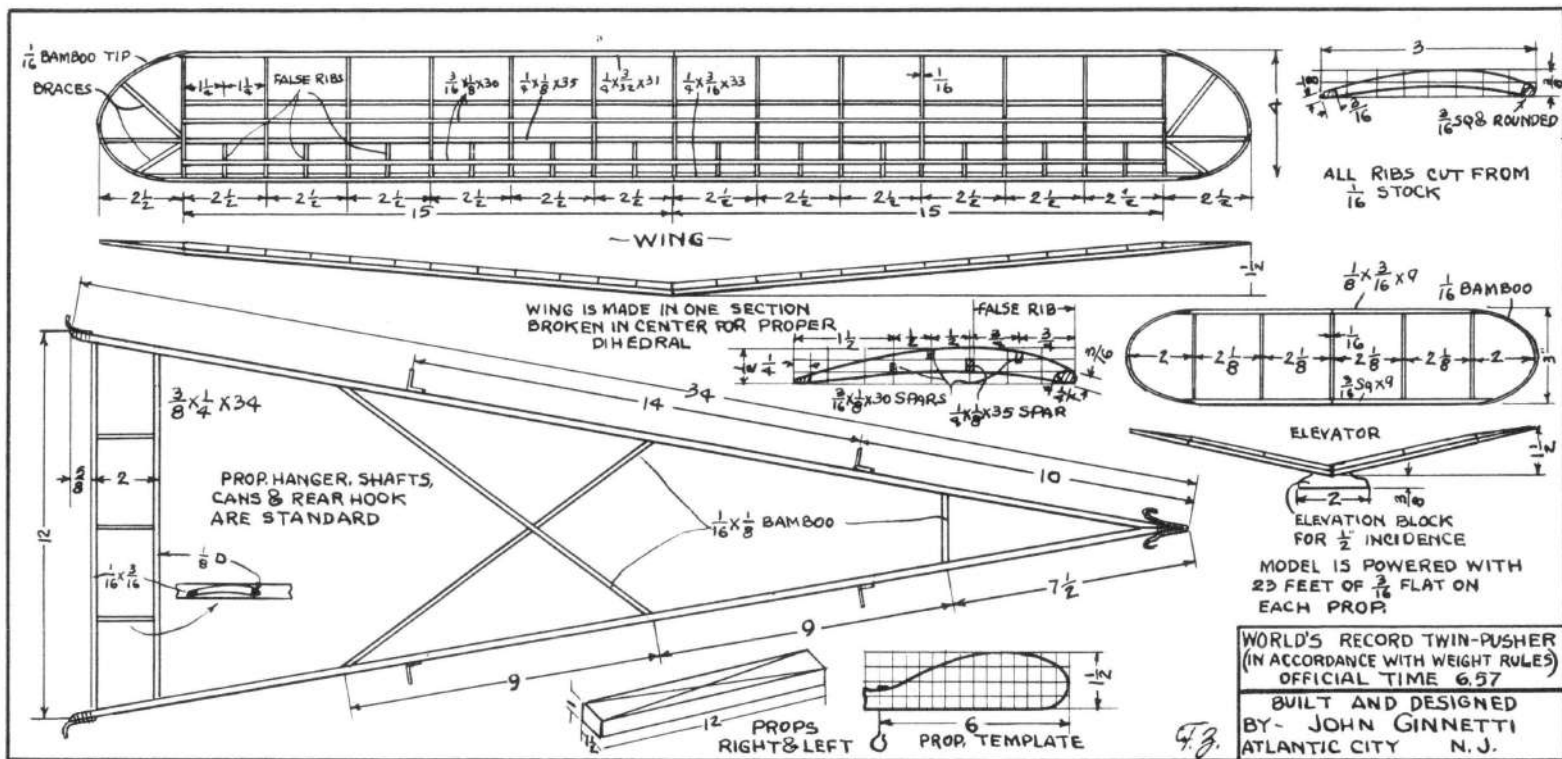
"S" HOOK PLUG
"S" HOOK

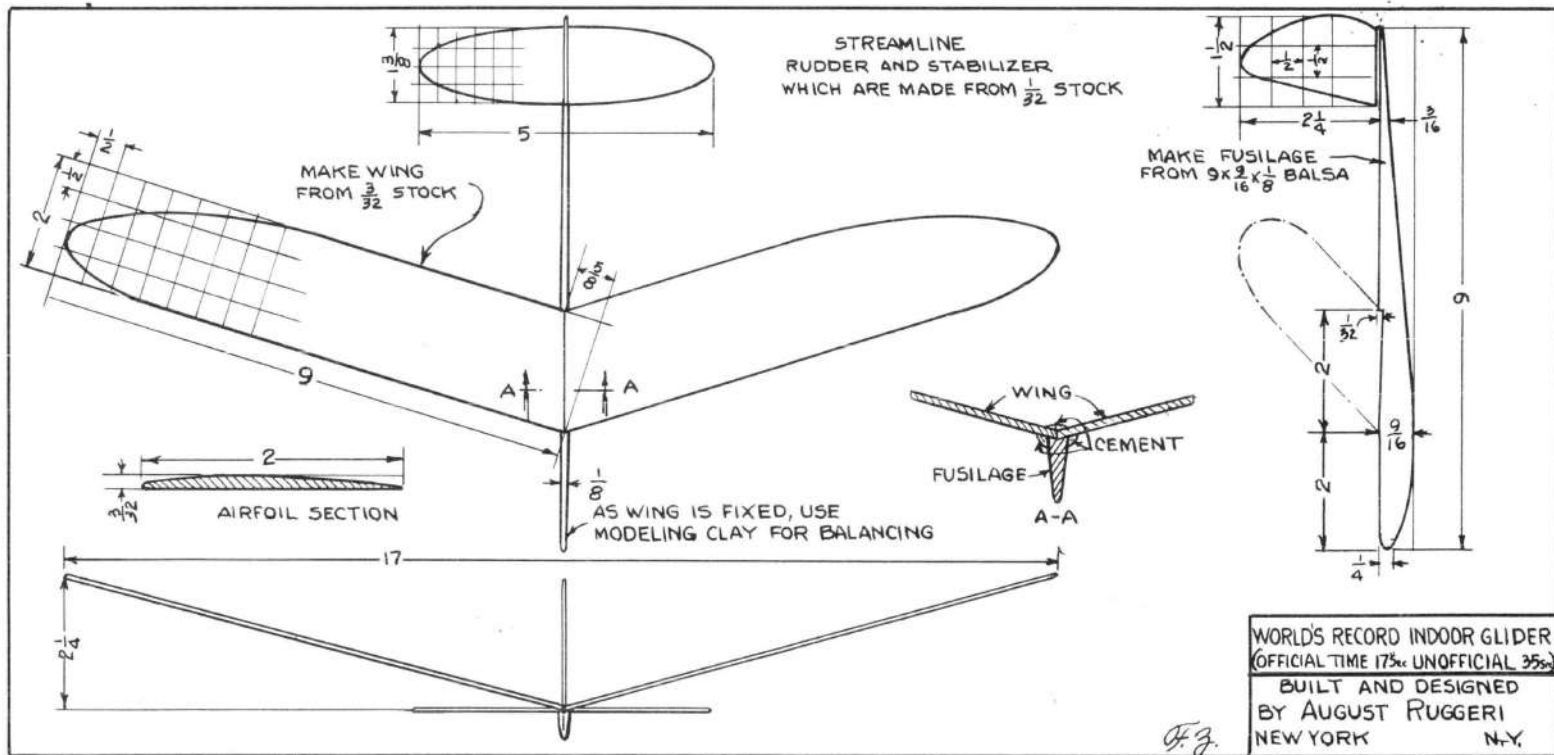
— PROP —
CARVED FROM
 $9" \times 1\frac{3}{8}" \times \frac{5}{8}"$ BLOCK



WORLD'S RECORD HELICOPTOR
(OFFICIAL TIME 2.26)
BUILT AND DESIGNED
BY BLAIR BENNETT
WASHINGTON D.C.

F. J.





MORE HINTS FOR EXPERTS

THE CLARY DURATION FORMULA:- Not an empirical formula. It is one that takes every factor into account in its proper proportion.

Propeller efficiency x Energy in rubber = Duration in seconds.
sinking rate x weight

Factors:-

1. Prop. Eff. expressed as a pure number. (%)
2. Energy in rubber in gram-meters.
3. Sinking rate in meters per second. (one meter equals 39.37")
4. Weight in grams. (28.335 grams equal one ounce)

Typical application:-

$$\frac{40\% \times 2000}{.166 \times 6} = 800 \text{ seconds}$$

How to use formula:-

1. If propeller is well made, smooth, etc., assume 50% for eff., if blade angle 2/3 out from hub is less than 30°. If near 45°, assume from 35% to 45%
2. If MRL Rubber is used and wound to limit, assume 1000 gram-meters for each gram of rubber weight. Multiply 1000 by rubber weight in grams to get energy in rubber.
3. You can find the sinking rate by launching the model with the propeller off, but with a weight on the nose equivalent to sum of rubber and prop weights, by launching from 2 meters (78") and timing the flights (glides), and dividing the time by 2.

FOR TRANSPORTING MODELS:- A big flower box is very useful for this purpose. A standard size is 43" x 14" x 9". Any florist will give you one. For a more permanent box, go to a fibre sample case company. They will make you one to order at a surprisingly reasonable rate.

FOR STORING SMALL PARTS:- Use an artists paint dish for this. The writer has one with 38 compartments, all 3/4" deep, which is very handy for this purpose and cost only 40¢.

FOR LIGHTENING MOTOR STICKS 35%:- Use a bamboo filament or thread outrigger strung on two supports 1 1/2" above the motor stick. The writer has made sticks using this method that stand 1/8" x 1/30" brown rubber much better than ordinary sticks and that only weigh .017 ounce. The stick used by Carl Goldberg, in contrast, on his 14:49 indoor job weighed .033 ounce, both with fittings. This is a good example of what may be gained by a braced motor stick.

FOR HOLLOW MOTOR STICKS:- Wing clips crush the walls of hollow sticks very easily. Breakage generally ensues if much torque is put on the rubber. This condition may be corrected by the use of small balsa pads on each side of the clip to protect the walls. These pads may have a tendency to slip easily, if so, use a little rosin on them.

FOR MICROFILM:- If your microfilm covered wings have a tendency to warp, this may be corrected by putting a little more dihedral into the already covered wing, or by making a thinner sheet of microfilm.

COPPERFILM & SILVERFILM -- METAL PLATING

The development of the technique for the application of copperfilm (copperplating) and silverfilm (silverplating) to wooden objects such as balsa wings and fuselages may be ranked as one of the most progressive steps ever taken in the advance of solid exact scale models. Heretofore, models of the Northrop Alpha, Beta, and Gamma, and many other airplanes with a metal stressed skin covering were only within the range of experienced metalworkers and entirely out of the field of ordinary modelbuilders, if a realistic finish was desired. But by simple plating methods, any one of average skill may truly reproduce the shining metal skin coverings of these planes, as well as propellers, etc. for all planes.

The materials needed are as follows:-

One $1\frac{1}{2}$ volt dry cell.

One storage battery metal clip.

One glass bowl - as large as possible.

One pure copper sheet - 4" x 4" x $\frac{1}{32}$ ".

One half pound copper sulphate.

One ounce sulphuric acid.

Wood filler, lacquer, and high grade lacquer thinner.

Package finest copper bronze powder.

Any of the silver plating compounds sold in hardware stores.

The steps in the application are as follows:-

1. The wooden object to be plated should be given a very smooth finish. Fill the pores up with woodfiller, sand carefully, and finally waterproof the object with several thin coats of lacquer.

2. In order to electroplate, the surface of the object must be made electrically conductive by coating it with a paint composed of copper bronze powder mixed to a brushing consistency with 10 parts thinner and one part lacquer. Apply two coats with a soft camels hair brush, brushing only in one direction.

3. Fill the glass bowl $\frac{3}{4}$ full with water, then add enough copper sulphate until a deep blue color is obtained. Add a few drops of sulphuric acid for better conductivity.

4. With the aid of some wire and the metal clip, connect the object to be plated to the negative side of the battery and then immerse it in the solution. Connect the copper plate to the positive side, and immerse it also, being sure that it does not touch the object. In about 15 minutes a flesh pink film will form on the object. When a film of the desired thickness is obtained, take the object out and wash it. A buffer, emery paper, and powdered pumice all can be used to good advantage in finishing the object to the proper sheen.

Note:- If a dirty brick mud-like deposit is formed on the object, it is an indication of either too strong a current or of too weak a solution of copper sulphate. First try adding copper sulphate, then, if this doesn't correct the condition, reduce the voltage by a reostat in series with the hook-up.

5. If an imitation aluminum or duralumin finish is desired, this may be done by merely rubbing the already copperplated object with any of the silver plating compounds or pastes sold in hardware stores. A coat of clear lacquer will prevent the silver from tarnishing and will preserve the lustre.



**SPECIAL SUPPLIES
FOR INDOOR MODELS**

**Junior Aeronautical
Supplies Co.**

328 East 6th Street New York, N. Y.

THE INDOOR SPECIALISTS

A PAT ON THE BACK FOR "JASCO".

The art of making INDOOR MODELS is the most exacting division of Model Aeroplane building. The work put into an INDOOR MODEL must be of a superlative nature. Designing ingenuity is another factor of prime importance, but workmanship and skill are given a bad setback if the material used is of wrong nature. Imagine using 12 lbs. balsa for an indoor propeller.

We have a sneaking suspicion that the average Supply Shop has a horror of this fastidious class of builders that build INDOOR MODELS. These builders have made the following phrases famous the world over; "No, I don't want this piece, it is too darn heavy."--"Well, this one looks a little better, but I can't use it. Just look at that grain. How can you expect me to bend this for a motorstick? There, what did I tell you. It split before I had a chance to test it."--By this time the dealer has a purple face, and to ease his egoism he shoots his customer. What is more, the Jury frees him because he pleaded self-defense. So, young fella, be carefull where you buy your supplies.

We have the pleasure and the privilege of serving this discriminative buyer. How can we stand the constant heckling? Well, here is the secret; It just so happens that "JASCO" Wood is almost perfect in every respect, and the customers instead of using the above phrases usually exclaim, "Gee, I didn't know that there was such a wood in the world." Another factor worth considering is that we are Indoor Builders ourselves.

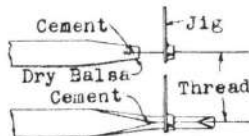
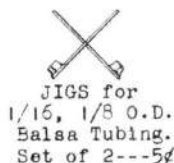
It may interest you to know that the Official Indoor N.A.A. World's Record Indurance Model was constructed from "JASCO" Wood. Time; 17 min, 47 3/5 sec. The new N.A.A. Indoor Commercial Record ship also used "JASCO" Wood. Time; 10 min. 5 sec. The only two models that have reached 19 min. indoor, were made of "JASCO" Wood. We are pleased to say that Seven present N.A.A. records are held by the users of our wood and supplies. The wood that these builders used was just our ordinary INDOOR stock.

In this Catalog you will find all the necessary material to construct ships that are capable of unbelievable duration. It is up to you to work out a design that will make you the Word's Champion.

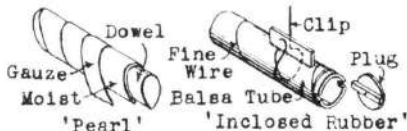


INDOOR BALSA WOOD ranges in weight from about 3.8 lbs. to 5.5 lbs. It is really cut smooth with saw and not sanded to the right size. The following sizes are of the same per cu.ft. weight, but the wood has been cut so as to be applicable to the different parts of the model.

- 1/64 X 2 X 12--5¢ (Hollow tailbooms, motorsticks, wing spars--)
- A--1/32 X 1 X 18--3¢ (For tractor hollow motor sticks.)
- B--1/32 X 1 X 18--3¢ (ROG wing spars, wing tips, etc.)
- C--1/32 X 2 X 6--3¢ (Excellent grain for cut ribs.)
- 1/16 X 1 X 18--3¢ (For tractor wing spars, tapered booms, etc.)
- 1/20 sq. X 18--3 for 1¢ (Indoor Commercial longerons.)



BALSA - TUBE - CONSTRUCTION





MICROFILM

MICROFILM is our pet child. We consider it to be one of the most important milestones in Indoor Model Building. It has made dreams come true. It is because of it that we have such high records. We have been working on MICROFILM ever since it was introduced to the Indoor family. We are responsible for such major improvements as; Making it flexible; Water for adhesive; Using shallow tanks; Hot wire for trimming; determining the thickness; how to apply it to the models; And many other small but vital features that are only discovered while making extensive experiments. The fact is that we have made it practical for popular use.

Our present MICROFILM SOLUTION has all the desirable features. It is flexible but not tacky. It is strong enough to run a finger across it. It will withstand power nose dives, or a drop of a small coin. Our INSTRUCTIONS are the results of several years of constant research work. They will save you a lot of useless work. To the beginners we recommend to use our ADHESIVE, instead of water, on their first few models.

2 oz. of MICROFILM SOLUTION and INSTRUCTIONS---30¢

Additional Solution---10 per oz.

ADHESIVE----10 per Oz



PAPYRUS

Lightest JAPANESE SUPERFINE paper obtainable. Weights .0001488 oz. per sq. in. Used wherever extremely light paper is necessary, such as the Indoor Commercials. It is strong enough to be used on the Outdoor and Flying Scale models. When properly doped it has that transparent quality so admired in soarers. Coloring it by water soluble Anyline Dye give it that rich looking effect that can never be equaled by colored dope. Use this procedure to get the utmost perfection in your models; First, spray the ship with clear water; Let it dry; If color is desired it should be sprayed at this point; Dry; Apply, with cotton, about 2 coats of our Glider Polish or clear dope. Glass can be effected by using tain varnish instead of dope.

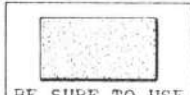

JAPANESE SUPERFINE----18 X 24----8¢



BEAUTY

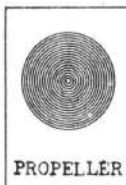
ANYLINE DYE should be used by Outdoor Builders to obtain a contrasting color combination which will facilitate in following a flying model. For example; Half of a wing may be RED and the other YELLOW. RED is an excellent contrast against the sky, and YELLOW against the dark background, such as trees. YELLOW Flying Scale model with BLUE lacquer outline is a very pleasing combination. Scallop and insignias can be easily made by using suitable stencils while spraying the color. This dye is soluble in water and it should be sprayed with 10¢ sprayer. Of course, the intensity can be varied by using more or less water.

ANYLINE DYES-----RED and YELLOW----5¢ per capsule.



BE SURE TO USE
THE RIGHT SIDE

10 Nougat-----SANDPAPER-----2¢ a sheet.
An extremely fine sandpaper. It gives a very smooth finish. Necessary for the final touch on all Indoor and Outdoor work. It should be used to polish the Glider surfaces. This will decrease skin friction and so reduce the sinking speed.



INDOOR PROP BLOCKS:- Efficient Indoor Propellers are of greatest importance if the present records are to be broken. Utmost care should be used to obtain perfect symmetry in balance and in blade outline. Do not rush while carving. It does not pay. It takes an expert on average of 5 to 6 hours to carve a tractor prop. Naturally all the care taken would be useless if the wood used is not perfect. So, why not use "JASCO" Wood? The blocks are cut from balsa averaging from 3.8 lbs. to 5.5 lbs., and they are uniform in texture, grain and softness.

ROG----3/4 X 1 1/8 X 9---8¢
Comm----7/8 X 1 1/2 X 13--14¢
Tractor- 1 X 1 5/8 X 15--17¢

Note:- These sizes are subject to + or - 1/32. They will be cut to any smaller size on request.



SPECIAL BLOCK:- Diagonally or quarter grain cut.--14¢ This type was used on the first 19 min model. Instructions how to carve this prop are given with the first order. The pitch is equivalent to 1 X 1 5/8 X 16.

If you are an experimenter and sometimes require a special size, please send us the dimensions and we will quote prices.



JASCO INDOOR WASHERS----Weight .00015 oz.----5¢ a doz. These wasner are 5 times lighter than the regular small washers. Semicupped to reduce friction area.

JASCO INDOOR DURAL BEARINGS--Weight .0008 oz.--5¢ each. About 6 times lighter than the ordinary small iron bearings. The face of JASCO BEARING is polished to minimize friction.

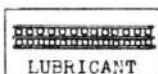


We all know how important RUBBER is to the model airplane builders. To get the last bit of power out of it, it is necessary to know something about it. Some learn by experience, while the rest trust to luck to stop winding before the RUBBER breaks. If we knew more about the composition and manufacture of RUBBER we would know just what to expect from it. It would be a good

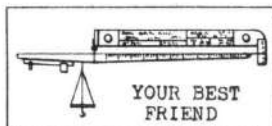
idea if some of you would read up on this subject, and so find out what is injurious to it and how to determine its quality. We all know that RUBBER should be kept in a light and air tight container, that grit is a taboo, and that acids are bad for it. If you keep used RUBBER you should wash it with lukewarm water to clean it from LUBRICANT and grit, and then powder it with some fine powder.

We have M.R.L. BROWN RUBBER. Its composition is excellent. It has been proven to be the best. It holds every existing Indoor Record. That is all that needs to be said about it. May we suggest the use of our LUBRICANT with it?

The following sizes are 1/30 in. thick.
1/32" ----15 Ft.-5¢ (Baby R.O.G.) 5/64"----10 Ft.-5¢ (Tractor)
3/64" ----15 Ft.-5¢ (Baby R.O.G.) 3/32"----10 Ft.-5¢ (Tractor)
1/16" ----15 Ft.-5¢ (Baby R.O.G.) 7/64"----15 Ft.-10¢ (Tractor)
1/8" ----15 Ft.--10¢ (Tractor and commercial)



This LUBRICANT was compounded for the sole purpose of LUBRICATING the rubber. It is not injurious to the rubber, but it is best to wash it off the motors when through with flying, as there is bound to be some grit lodged in it. It is sold in tubes for the convenience in application.
JASCO LUBRICANT-----10¢ a tube.



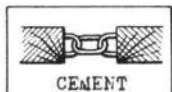
A SCALE of some sort is a necessity to all scientific builders. In the past it was all-right to be without one, but nowadays-----. You just aren't up to date if you don't have one. Everything is a guesswork without a SCALE. You cannot duplicate a record model, or find out how much lighter a certain part

can be made without breaking. For Indoor work you need a SCALE that is very sensitive. Of course, the ultra sensitive Lab SCALE is just the thing, but it is kind of expensive. Don't feel low-down if you can't get one. JASCO BEAM SCALE is surprisingly sensitive. Simple as the design is, variation of 1/10000 oz. causes the beam to swing. It is accurate to +or- 5/10000. With a fair and intelligent treatment it is almost exact. It can be constructed in less than 1/2 hour, as all the metal fittings are already formed. The KIT consists of weight "A", a simple oilless bearing [not wire], printed graduations, instructions, conversion tables, cement and wood.

JASCO BEAM SCALE KIT---50¢ Postpaid. In 1/2 doz. lots --39¢

The following weights may be purchased at 10¢ a piece.

Weight	"A" (1/100 oz.)	"B" (1/10 oz.)	"C" (1/2 oz.)
Range	5/10000 oz. to 1/10 oz.	5/1000 oz. to 1/10 oz.	5/100 oz. to 5 oz.



This CEMENT has been used by foremost model builders of this city for past year. It has proven to be satisfactory in every respect. It forms an even tough skin, and it is always transparent regardless of climatic conditions.

CLEAR CEMENT----- 1 oz. 10¢ 2 oz.--15¢



MODEL AIRPLANE GUIDE & LOG BOOK.

This BOOKLET speaks for itself. It has the following contents; World Records, Rubber Winding Tables, Hints for Experts, Electroplating of Wooden Objects, Ruled space for recording your flights, and SIX detailed plans of the most advanced duration models. Some of

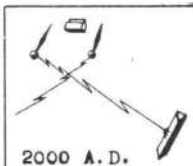
the models are the present World Record holders, while the rest have been carefully selected from the local contests, such as the 40 sec. Indoor Glider. An Indoor Pusher of novel design is also included.

You are the judge. Don't you think that this BOOKLET is worth---25¢.?



STRAIGHT POLISHED PIANO WIRE--3 Ft. Lengths--3¢

#3 (.012) For Baby R.O.G. Tractor wing clips, cans.
#6 (.016) For Tractor prop shafts and rear nooks.
#11 (.026) For models using not more than 8 strands.
#13 (.031) For models using not more than 12 strands.

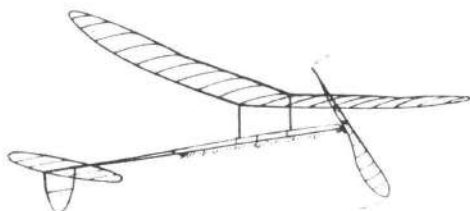


SHIPPING FACTS:- You may be sure of receiving your order in almost perfect condition as all MAIL ORDERS are packed in TRIANGULAR BOXES. The strongest shape known. As all orders are carefully packed we are not responsible for damages occurring during the transit.

MAILING INSTRUCTIONS:- Add 15% to all orders under \$1.00. 10% on orders over \$1.00. Orders over \$5.00 are postpaid and insured. Washers, bearings, weights, and sandpaper. If ordered alone, require a 3¢ stamp. Scale Kit and Logbook postpaid.---Please do not send stamps.---Remit by Postal or Express Money Orders.++Payable to++JASCO * 328 E 6 St.* New York, N.Y.



Special Supplies for Indoor Models



1935

Junior Aeronautical Supplies Co.
328 East 6th Street New York, N.Y.

THIS HOBBY OF OURS

According to our mailing list it seems that this catalogue will reach many of you who expect to be in the model airplane game for a long time to come. Such being the case it might be well for us to look around and see what the present and the future have in store for us.

As we all know, the main reason for our riding this hobby is to pass our leisure time pleasantly and at the same time learn something about aerodynamics, and also to cultivate friendships through the same interest in model building. It is understood that every model builder tries to better himself and to add something to the general knowledge of Model Aeronautics. We might say that these are the ideals towards which we are all striving, but the whole rub is that we are handicapped in spreading the results of our experiments and findings to others so that there may not be repetition of the same tests. Most of the present model airplane publications do not seem to be sympathetic towards the scientific builders, and it is our job to make them change their opinion.

We are sure that most of you will agree with us that when we say that magazines featuring model airplane articles are becoming monotonous with their sameness, and that it seems that their main items on the bill of fare are plans of flying scale models. Very seldom do we find a worthwhile article that has anything new in it for the old timers, or even for the beginners. It is not because there is nothing new being done but because the policy of the magazines seems to be controlled by the advertisers and the visionary type of readers who crave for battle stories and etc. To us it seems a shame to spend all this money on useless stuff when it could have been easily used for construction of low speed wind-tunnels and laboratories. But no! It seems that they have no plan for the future, and they live from day to day. Of course it might not be none of our business to butt in like this, but the whole trouble is that we model builders have to depend on these magazines to keep the fraternity together. Such being the case we had better do something about it. Here is a plan that was suggested to us.

Get your friends and relations to write to the publications and demand a New Deal for the scientific model builders, and if this does not bring the desired change write to this Company and we will try to get a monthly bulletin started among ourselves. Please try to do something about this. We might say that the future course of Model Aeronautics depends on you. We personally tried to win the editors over to our side but without results. Perhaps if we get together on this we might be able to accomplish something. You know, if a few thousand readers should decide to cooperate the results would be astonishing. So, fellows, lets go to it and see what we can do.

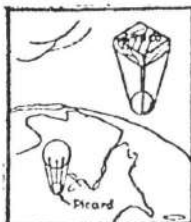
Please remember that we are not propagandizing for ourselves. You see, we manage to keep up to date as to the happenings in model circles as we have quite an extensive correspondence all over the world. It would be the average model builder who would benefit by the change.

Now that this is off our chest we would like to give a little toot for this Company. Did you know that since 1932 every Tractor that won the National Contest was made of JASCO Balsa? And did you know that since this Company was founded almost every Indoor Record has been doubled, and in almost every case by our clients? We can quote testimonials galore to show you that no matter what we say about our products we never exaggerate. If we are just becoming acquainted, we feel sure that a trial order will give you a pleasant shock, and your only regret will be that we have not met sooner.

February, 1935
New York, N.Y.

JUNIOR AERONAUTICAL SUPPLIES CO.





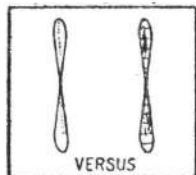
JASCO SPECIAL 3.8-5.5 lbs. per cu. Ft. INDOOR BALSA
 Good INDOOR BALSA is very rare, and it is because we are in New York City, the shipping center of the world, that we are able to get enough of it for the indoor model builders. Just think, in 1000 bd. ft. of balsa there are approximately only about 15 bd. ft. of good indoor balsa! You can imagine the lovely time we have in getting it. But we get it, and that is all that matters. The secret? Just patience and persistence bother.

Light as the balsa may be it would still be useless to the indoor builders unless the wood is properly cut and graded. We are able to cut the balsa evenly, smoothly and to exact size because we have installed special sawing equipment. As to the grading---. Believe it or not (Ripley) before JASCO balsa is ready to be sold it is inspected at least four times and not until then is it stamped with JASCO Trade Mark. Naturally all this takes time and attention of experts, and it is because of this that we are unable to sell it to the dealers at a discount.

We believe that the following sizes will meet all of the requirements. Please read the "uses" notes carefully and order accordingly.

- 1/64 x 1 1/8 x 18---3¢ (Tubular spars, tailbooms, ROG motorsticks, etc.)
- A--1/32 x 1 1/8 x 18---3¢ (Tractor motor sticks, tubular bending stock.
- B--1/32 x 1 1/8 x 18---3¢ (ROG Spars, wing tips, outline bending stock.
- C--1/32 x 2 x 12---4¢ (Special grain cut for sliced or cut ribs.
- 1/16 x 1 1/8 x 18---4¢ (Tractor spars, tapered solid tailbooms.
- 3/32 x 1 1/8 x 18---4¢ (Tractor spars, tapered solid tailbooms.
- 1/20 Sq. x 18---3 for 1¢ (Longerons for fuselage models. 6 lbs. grade.

If the balsa does not come up to your expectations and our statements, return the wood and we will gladly refund the money.

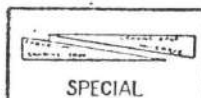


TWO YEARS ago, in our first catalogue, we disclosed the fact that microfilm props were good and that they would be used extensively in the future. Although this prop has yet to make a record, test flights have shown it to be just as good, if not better than the balsa design. Their low weight, .004 oz. for ROG's up to .01 oz. for 16" tractor size, have an appeal that cannot be ignored. However, there are certain advantages that are enjoyed exclusively by the balsa props. They are sturdier and can be handled without fear of ruining the blades. But we believe that even these shortcomings of the microfilm props will be overcome by some persistent experimenter. If you find out anything along this line, we would appreciate a word from you so that we may spread the news. In conclusion, it seems advisable to use balsa props in testing a new ship until the bugs are cleared up, and then substitute the microfilm type. We would also recommend that beginners work with balsa props as it seems that one has to be a good and experienced builder to be able to make an efficient microfilm prop.

Efficient props are very important now-a-days with the records approaching thirty minutes. Utmost care should be exercised to be obtain perfect balance in symmetry of blade outline and weight. If you expect to make time--take your time in carving. Naturally all the trouble and care would be useless if the balsa used is of poor quality. So, why not use JASCO PROP BLOCKS? These blocks are cut from our regular 3.8-5.5 lbs. Indoor Stock balsa. They are uniform in grain, softness and texture. The following sizes are carried in stock. Some of them are larger than the commonly used ones so as to give the builders a little leeway in designing their props without making it necessary for us to carry a large assortment of sizes.

ROG-----1/2 x 1 1/8 x 9---8¢
 Fuselage---1 x 1 1/2 x 15---15¢
 Tractor----1 x 1 5/8 x 16---18¢

Note--These sizes are
 subject to plus
 or minus 1/32" from 1 to 2



QUARTER GRAIN PROP BLOCKS--The purpose of this block is to take advantage of the balsa grain so that both prop blades will have the same characteristics. This is done by cutting the block in a special way. Carving directions are printed on the block. Be sure to make the notches for the prop shaft before cementing the two halves. The dimensions of the block are such that its pitch is equivalent to a 1 x 1 5/8 x 16 block.

QUARTER GRAINED PROP BLOCK---14¢

P.P. 4¢ from 1 to 3 blocks

MICROFILM

"And I was sure that
it was covered
when I left home"

Most of us know that MICROFILM is about the fines and the best covering for indoor models yet devised. It is hard to imagine what will replace it. Besides its use on the models it has quite a psychological effect on the public. We have a secret suspicion that many a colonel, captain, or caretaker in charge of an armory or large space has succumbed to its dazzling brilliancy and aroused his curiosity so that the model builder was allowed to test his models. So, the next time you go space hunting be sure to take few MICROFILM jobs along to hypnotize the above mentioned persons. Besides showing its brilliant colors these models will also show that model building is a serious and worthwhile science.

We have been working with MICROFILM ever since it was introduced to the model building family. We were not satisfied to merely follow the crowd but we have done our bit in making it what it is today. Our visitors are shown the famous pan on which most of the present improvements have been discovered. On this pan we and our friends have poured gallons on gallons of different mixtures only to find that when we did have a satisfactory combination its origin was lost. We wonder we are gray today! However, we slowly recognized the important ingredients and their proportions. We found out that it is necessary to make a large quantity of solution to be able to control the proportions of the critical chemicals. We also devised a special mixing process so that the solution is uniform throughout. That is why we are able to duplicate our present formulae in every lot.

Our present MICROFILM SOLUTION has all the desirable features for perfect MICROFILM: No Castor Oil; it is dry, flexible, tough and economical. What else can we say? Perfected as the present solution is, we are not satisfied to rest on it but we are always experimenting with new formulae. However, this next mixture is not placed on the market until it is proven to be better than its predecessor.

Use the following precautions in making you film to obtain perfect results: Try to have a special tank. Bathtubs are all right but they have to be very clean as a slightest trace of soap will break up the cohesion of the water molecules. Have at least six inches of clear space all around the hoop. Divide the tank when making small size film sheets. Get a measuring device, such as a teaspoon, so that you will be able to duplicate the colors once you determined the amount of solution and space used. Never dilute JASCO MICROFILM with acetone as it weakens it. Use saliva instead of plain water for adhesive. Trim with hot wire, electric soldering iron or acetone, but be careful when you use acetone. On difficult jobs use benzine diluted rubber cement for adhesive. And if you are a beginner you should expect to waste a lot of solution before you catch on.

Because of postal regulations JASCO MICROFILM SOLUTION is mailed in 2 oz. cans. As it is inconvenient to use it from a can it is advisable to place it into a clean bottle for use.

JASCO MICROFILM---Sold in 2 oz. cans only---20¢ per 2 oz. can. P.P. 6¢

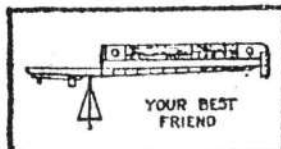
SPECIAL INSIDE INFORMATION

Just received a word that Frank Zaio is writing a booklet on microfilm. The booklet will have all of the latest dope on microfilm formulae, its use, precautions, microfilm model and prop constructions, hints, how to pack microfilm models, and everything else that has to do with microfilm. Truly a worthy companion to his JUNIOR AERONAUTICS YEAR BOOK. The estimated price is 15¢, per copy, Postpaid. Watch for the announcement!

PARTNERS

3/32" Dia. JASCO INDOOR BRASS WASHERS--Wt..00015 oz.--5¢ doz. These washers are five times lighter than the regular small washers. They are semicupped to reduce friction area.

JASCO SPECIAL INDOOR DURAL BEARINGS--Wt..0008 oz.--5¢ each The finest bearings ever made. They just have no equal--just as light as #20 wire bearing but far superior to it. Take no chance of having your bearing rip off the motor stick just when you are ready to break a record. Use JASCO BEARINGS! Plenty of cementing surface to keep it in place. The bearings are carefully made by hand, and the -1/64" hole is accurately centered. The face of the bearing is polished to minimize friction. It is shaped just right for tractors, if you have to change its shape use round nose pliers as dural is brittle and it should not be bend on corners. (P.P. on washers and bearings is 3¢ for unlimited number.)



When one considers how fine, exact and light indoor models have to be built to have a chance of breaking a record, one would think that every model builder's bench would have a scale to weight the parts of the model as he goes along. A little questioning soon disclosed the sad fact that very few of us avail ourselves of the benefits derived from having an accurate scale. Why? It is as an important item to have as anything else you could think of! Experts would have nightmares if they had to set along without it! And no wonder, everything that an experienced builder makes has to come to certain weight limit. If it is overweight it is discarded and a new part made. Now, when such care is taken to have everything as light as safety permits, it is no wonder that records are raised by such a large margin every year. And we are pretty sure that scales are in part responsible for that.

We designed a simple but an accurate BEAM SCALE, and to put it within reach of every pocketbook we made up a kit of it. The construction is very easy as all the metal parts are all ready formed. All you have to do is to assemble. The surprising part of this BEAM SCALE is its accuracy considering the rugged and simple design. Variations of .0001 of an oz. cause the beam to swing. All we can say is that this is the best buy you will ever make.

The JASCO BEAM SCALE KIT consists of weight "A", a simple oilless bearing, wood, cement, and printed graduations, instructions and conversion tables. BEAM SCALE KIT-----50¢, Postpaid.

The following weights may be purchased at 10¢ each, Postpaid.
 Weight "A" (1/100) "B" (1/10) "C" (1/2)
 Range 5/10000 oz. to 1/10 oz. 5/1000 oz. to 1 oz. 5/100 oz. to 5 oz.



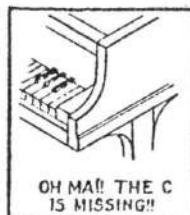
In keeping with our policy of having the best supplies, we carry only MRL Brown Rubber in stock. Our tests have shown it to be superior to standard black rubber, although certain people would have us think otherwise. Of course, the condition of rubber has a great deal to do with the performance of the model. If rubber is exposed to the air or sunlight, it will naturally lose energy. It is therefore, advisable to find reputable and responsible dealers who keep their stock protected. The rubber, as it comes from manufacturers, is fresh and it can be kept in such condition if proper precautions are taken. We take these precautions and keep the stock in condition in which we receive it. The following sizes are carried on stock. Please remember that MRL Rubber is 1/30" thick and not 1/32", and that as a rule the black rubber is almost all ways 1/32" thick.

1/32"---15 ft.--5¢ (Baby ROG 5/64"---10 ft.--5¢ (Class B Tractor
 3/64"---15 ft.--5¢ (Baby ROG 3/32"---10 ft.--5¢ (B ROW, C Tractor
 1/16"---15 ft.--5¢ (Paper ROG, ROW, 7/64"---15 ft.--10¢ (C Tractor
 1/8"---15 ft.--10¢ (Tractor, Fuselage, and as a last resort.



JASCO LUBRICANT was compounded for the sole purpose of keeping the rubber lubricated under all conditions. We have had this formulae for the past two years and have yet to receive a complaint. Undoubtedly this is because the ingredients in JASCO LUBRICANT are chemically pure, and have no injurious effects on the rubber. Only neutral chemicals are used. Also a special mixing process is employed to keep the ingredients in permanent suspension. Although this LUBRICANT is not harmful to the rubber, if you expect to use the motors over again, it is advisable to wash it off as there is bound to be some grit sticking to the lubricated rubber, and as you know, grit is taboo. JASCO LUBRICANT is sold in collapsible tubes for convenience in application.

JASCO LUBRICANT-----1 oz. tube-----15¢ P.P. 3¢



We carry the following sizes of polished piano wire in stock. The sizes marked with * are cut into three foot lengths from coils. However, as time goes on, we will endeavor to have all the sizes in straight stock as it is easier to use.

* #1 (.010) ROG wing clips. Prop shaft and hook with 1/32 Rb
 * #2 (.011) ROG prop shaft and rear hook with 3/64 rubber.
 * #3 (.012) ROW baby, paper ROG, for fittings using 1/16 Rb.
 #5 (.014) Class B tractor fittings using 5/64 or 3/32 Rb.
 #6 (.016) Class C tractor fittings using 7/64 or 1/8 Rb.
 #7 (.018) and #8 (.020) For models using motors from 1/8 to 3/16, or mutiple strands.

POLISHED PIANO WIRE-----3 ft. lengths-----3¢ each. P.P. 3¢ from 1-9



JAPANESE SUPERFINE PAPER: The finest and the lightest paper obtainable. It is the only thing to use on unstressed indoor fuselage jobs, takes water doping wonderfully. It is strong enough to be used on outdoor models, and its glazed surface make it an ideal covering medium. When properly doped, it has that transparent quality so admired on Soaring Gliders. Here are some covering hints:

Use regular dope for adhesive. The grain of the paper should run chordwise, and the paper should be stretched as much as possible on the wing frame. Water dope it by use of a sprayer or absorbant cotton. If you wish to color your planes, use WATER SOLUBLE ANILINE DYES. Just dissolve the dye in the doping water, and you will get a color job that can never be equaled by regular dope considering the weight saved. After the water has evaporated apply about two coats of JASCO GLIDER POLISH or regular model dope with brush or cotton. If you want a transparent job that will look like microfilm use thin varnish instead of dope. (P.P. 3¢ from 1 to 5 sheets)

JAPANESE SUPERFINE PAPER--Wt..0001488 oz. per sq. in.--8¢ per 18 x 24 sheet.

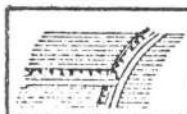
WATER SOLUBLE ANILINE DYES should be used by the outdoor model builders to obtain a contrasting color combination on their model which will make it easier to follow their flights. For example; half of a wing may be RED and the other half YELLOW. RED is an excellent contrast against the clouds and skies, while YELLOW can be easily seen against dark and green background of the countryside. YELLOW fuselage models with BLUE enamel streak lines and scallops make dandy looking ships. The same applies to Flying Scale models. Scallops and insignias can be easily made by using stencils while spraying on the color. About 1/3 of a capsule in a glass of water of a ten-cent size sprayer is just about right.

ANILINE DYES---RED and YELLOW---5¢ per capsule. P.P. 3¢ from 1-10
We will stock other colors if there is enough demands for them.



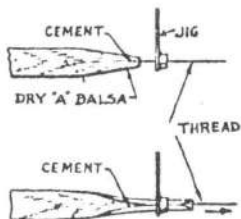
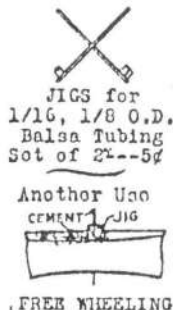
You will be surprised at the fine and smooth surface you will get if you use 10 NOUGHT SANDPAPER to finish up a job. once you get used to it, you will simply not be able to do without it. It is an absolute necessity for finishing gliders, in fact, for all models.

10 NOUGHT SANDPAPER--2¢ per sheet. P.P. 3¢ from 1-10.

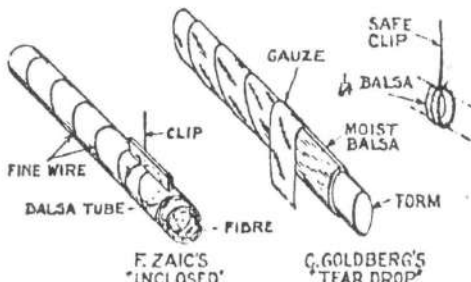


After a two years trial we still have to find a better cement than the one we now have. It has proven to be satisfactory in every respect. It forms an even tough skin, and it is always transparent regardless of climatic conditions.

JASCO CEMENT-----15¢ per 2 oz. can.-----P.P. 5¢



BALSA TUBE CONSTRUCTION



TO THE BEGINNER

Do not despair. Remember that the MIGHTY AERONUT was once a little NUT like you.

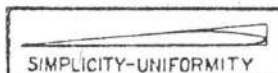
GLIDERS

Our last catalogue and the JUNIOR AERONAUTICS YEAR BOOK have spread the secrets of record gliders throughout the country. We are receiving reports of records being unofficially shattered all over the country, and it looks as though New Yorkers has better get busy if they should expect to keep their prestige in this field for long. Well, you know, the more competition we have the merrier.

By strange coincidence the record time began to climb soon after we put JASCO TRIANGULAR WOOD on the market. Wonder if there could be any connections between the two. Kind of funny too, all of the records were made by fellows who at one time or other purchased some of this special wood. Oh well, it must have been the glider design, not the baseball arm that did the job. What do you think? Of course we would like to say that the wood had something to do with it too. See this special triangular balsa is very carefully graded, and only balsa of certain quality and grain is cut into triangular cross section stock.

Undoubtedly this TRIANGULAR cut is a boon to those having very little spare time. The nice part of it is that all one has to do to get a perfect airfoil shape is to round off the corner of the leading edge. What could be simpler? This special balsa is not limited only for gliders, but it can be used for constructing a four foot tow-launched soarer, or a high speed all balsa job, or for wings on solid scale models. Just a little tickling of your brain will bring forth many other uses.

Won't you please remember that we originated this triangular balsa? We are bound to be imitated, but we would like to caution the imitators to look up the patent laws and find out the consequences of patent infringement. The following sizes are carried in stock. The 3 x 24 piece is cut in half to facilitate mailing. The thickness given on the wing stock is about 30% from the leading edge.



SIMPLICITY-UNIFORMITY

Wing 3 x 1/8 x 24---10¢ (Cl.B Gliders, Soarers, etc.)
 Stock 2 x 3/32 x 18---5¢ (Cl.A Gliders, Solid Wings.)
 Tail surfaces 1/32 x 3 x 18---5¢
 Fuselage 1/4 x 1 x 18---3¢--2 for 5¢



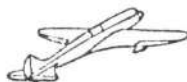
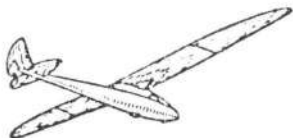
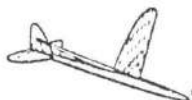
HIGHLY RECOMMENDED
BY MR. AIR MOLECULE

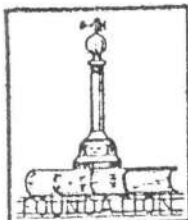
No matter how good a streamline form a glider may have, it will not perform most efficiently if the skin friction is neglected. Windtunnel tests have shown that two coats of JASCO GLIDER POLISH over a smoothly sanded glider reduced the total drag by 6%, and four coats 15%. This gain in efficiency make it possible to throw the glider higher, and the glider will also have a flatter glide. Just the characteristics we are looking for all the time.

A polish to be suitable for glider work must be flexible, leave a glossy and smooth surface when it dries, and at the same time straighten the wood. JASCO GLIDER POLISH meets all these requirements. It is not advisable to use ordinary dope or banana oil as they warp the thin trailing edges and the tail surfaces of a glider.

The best method for applying JASCO GLIDER POLISH is to let the first coat sink into the pores, and when it dries to sand the surface with 10 Nought Sandpaper. All succeeding coats should be rubbed in. That is; pour a small amount of POLISH on the surface and spread it with a flannel or cotton cloth all over the surface, and keep on rubbing until the glider is dry and smooth. Some builders recommend that when all the coats are applied and dried to rub the surfaces with chamois skin or smooth paper.

JASCO GLIDER POLISH---Sold in 2 oz. cans only---20¢ per 2 oz. can.--P.P.5¢





1934 JUNIOR AERONAUTICS YEAR BOOK----by Frank Zaio

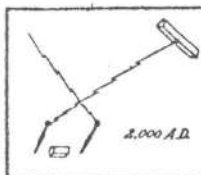
At this writing the book is in its second printing. If you do not yet have a copy you are missing; we quote, "You certainly deserve congratulations on the JUNIOR AERONAUTICS YEAR BOOK. It is just packed full of ideas. Lets hope you will publish another like it next year." Reinerick Doyle, Calif." We could fill the rest of this catalogue with equally good backslapping testimonials but that would not be keeping with our principles.

We have heard that some boys who have a copy of the BOOK keep it a secret from their best pals just to have an edge and a chance to win the next contest. Now, when something like that happens there must be something to the BOOK. Here is a short resume of its contents.

Detailed plans of World Record Models: Carl Goldberg's 23m Indoor Tractor; Vernon Boehle's 15m Outdoor Tractor; Herbert Greenberg's 19m Indoor Tractor, and 12m 23s Class B Indoor Fuselage; Emmanuel Enderlein's 13m 24s Class C Indoor Fuselage. Also plans of Jim Cahill's Outdoor Fuselage, National Contest Winner; Frank Zaio's streamlined Outdoor Fuselage and Twin Pusher; John Young's 43s Indoor Glider; Colman Zola's 7m Outdoor Glider. And windtunnel test of Indoor Airfoils by Wallace McBride.

There are paragraphs devoted to construction of Indoor and Outdoor Models. Simple explanations of Model Aerodynamics that are absolutely necessary on models. There are discussions of new and important aerodynamic forces which are seldom discussed by other writer. In fact, the book is a record of personal observations and only facts that are useable are presented. Frightening and long formulae are conspicuous by their absence. In other words, if you expect to keep up to date in this fast moving hobby you had better get a copy of

1934 JUNIOR AERONAUTICS YEAR BOOK----for only 35¢ per copy, postpaid.



When we began to fill mail orders we saw a necessity for a light and strong box. And as "Necessity is the mother of inventions," we developed a special triangular box. Its past performance has shown that it can stand under most terrifying abuses. This box is just another one of those little things that show the progressive spirit of this company.

Lessons learned during last year make it necessary for us to change our postal arrangements slightly. We would appreciate if you would comply with the following mailing instructions. MAILING INSTRUCTIONS:- On orders of under 50¢ add 10¢ postage. On orders from 50¢ up to \$1.50 add 15%. On orders of \$1.50 up to \$5.00 add 10%. Orders over \$5.00 are Postpaid and Insured. Some of the items are Postpaid as indicated on the price line. Letters "P.P." and a sum mean the amount of postage required if the article is ordered alone. If more than two items are ordered and their total cost is under 50¢, total their P.P.'s if they amount under 10¢, and if the P.P.'s total over 10¢ just send 10¢.---Small denomination stamps are accepted for orders under 40¢.---It is risky to send coins unless well padded.---Postal or Express Money Orders are preferable.---Please make out all such Money Orders Payable to---JASCO---328 East 6th Street, New York, N.Y.

SPECIAL NOTES

This catalogue cancels all previous price and discount arrangements. Discounts given only to bona-fide Clubs and Dealers. Quotations on request.

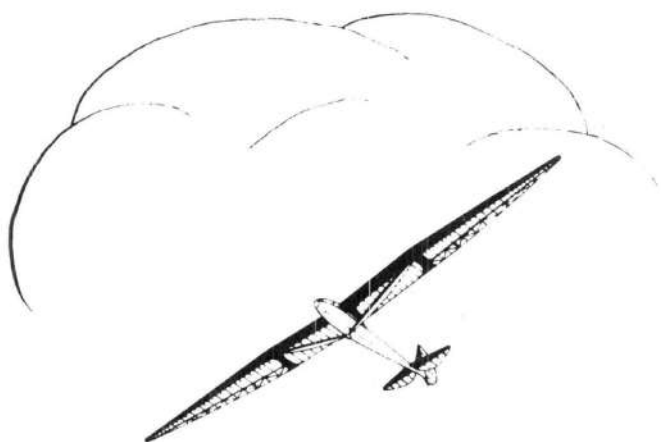
Our service is as fast as reasonably possible considering the special items carried in stock. We try to get the orders into the mail within a day or two at most. However, before nation wide contest you should count on a delay of four or five days. We must have time to restock otherwise the quality will suffer. Weather conditions also control deliveries.

We attempt to have all the orders complete, but sometimes we are short on certain items. In such case we mail you the incomplete order and a post card telling you when you may expect the remaining part of the order. If you miss something without hearing from us, please let us know and we will rectify the mistake if it is through our negligence.

Because of many aeronautical activities occurring during the end of June that are attended by the personnel of this company, it is impossible to fill mail orders between 22nd of June and 8th of July. Please cooperate.

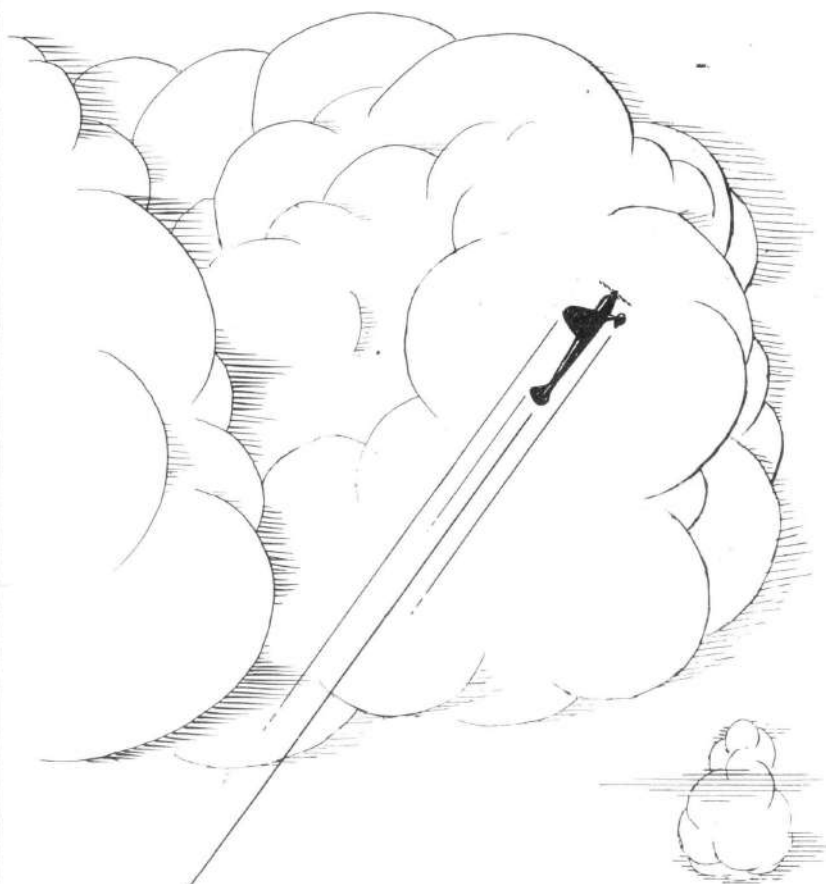
LOCAL SUPPLY DEPOT is at 106 East 7th Street, bet. 1st and Ave. A. No local orders filled at 329 East 6th Street as no stock is carried at this address. Business Hours at 7th Street Branch are as follows: Tuesdays and Thursdays, from 10 A.M. to 5 P.M.--Saturdays from 10 A.M. to 2 P.M. Would appreciate if you would observe these schedules.

Do not forget that our arms are allways wide open for bougets, but we also appreciate constructive criticism.



THE INDOOR SPECIALISTS

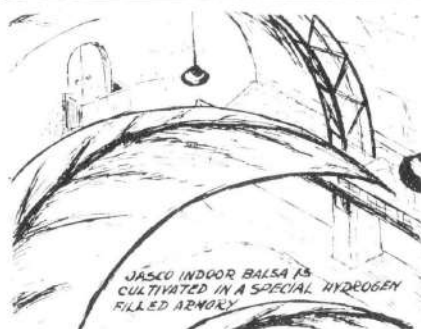
F. Zaic



JASCO PRODUCTS

1938 CATALOG

Junior Aeronautical Supplies Co.
83 East 10th Street New York, N.Y.



JASCO Special Indoor Balsa

JASCO Special Indoor Balsa is an established item, used throughout the world. There can be no doubt as to its contribution to the science of indoor building. It enables experts to continuously break the existing records, while beginners can easily achieve what was formerly considered a very creditable mark, within a short time. In using this special balsa, all that we ask is that you try to conserve it as much as possible, so that we can keep on meeting the steady growth in demand.

Special Indoor Balsa

SHEETS 18" Long--Cut for special use from 3.8 to 5.5 lbs. Light Balsa

GRADE	SIZE	PRICE	USES
A-B-C	1/64 x 1 1/8----	4¢	A ROG sticks, Tailbooms, O Spars, C sp. B&C stick
A	1/32 x 1 1/8----	3¢	Regulation B & C Motor Sticks, Tubular Stock.
B	1/32 x 1 1/8----	3¢	ROG Wing and B&C Tail Spars. Stringy for Outlines.
C	1/32 x 2 x 12----	4¢	For cut or sliced Ribs. Will not warp after cutting
B	1/20 x 1 1/8----	3¢	Tapered B Spars, tail outlines, Longerons. Mk. prop
B	1/16 x 1 1/8----	4¢	Tapered B&C wing tip and mike prop spars. Tailboom
B	3/32 x 1 1/8----	5¢	C Spars, Tapered tailbooms, Large mike prop spars

STRIPS 18" Long--Cut of "B" Stock--Sold in Sprays only.

SIZE	Spray Price	USE	SIZE	Spray Price	USE
1/32 x 1 1/2	22 for 12¢	Tips, ROG Spars	1/20 x 1/20	18 for 8¢	Longerons
1/32 x 1/16	22 for 10¢	Tails, Outlines	1/20 x 3/32	18 for 11¢	Sp.-1d, Gr.
1/32 x 3/32	22 for 12¢	Prop Spars	1/16 x 1/16	14 for 14¢	Spars

Indoor Propellers A perfect Indoor Prop was a lucky accident before JASCO began to specialize in Indoor Supplies and stress the importance of balsa graining and grading. Now any handy beginner can duplicate record props by following basic carving principles and using the best balsa foundation such as only JASCO can keep on producing year after year.---A prop should never be rushed. If it cannot be finished, put it aside. Carve and complete the concave side first. Carve with very sharp knife in long thin slices. Constantly inspect for thinness. Use every bit of will power to sand AWAY! Try your utmost to have both blades of same pattern, thickness, taper and bend under power.---Lightest Props are carved from quarter grained stock (C). Therefore, JASCO Machine Cut Blades Cut side by side and close as possible to perfect quarter grain they cannot be matched closer under any circumstances!

INDOOR TWO PIECE MACHINE CUT PROPELLERS

Dia.	Thick.	Price	Dia.	Thick.	Price
7----	9/16----	5¢	13----	15/16----	13¢
8----	5/8----	6¢	14----	1----	16¢
9----	11/16----	7¢	15----	1 1/16----	20¢
10----	3/4----	8¢	16----	1 1/8----	24¢
11----	13/16----	9¢	17----	3/16----	29¢
12----	7/8----	11¢	18----	1 1/4----	34¢

The above machine cut propellers may be had in 1:6 and 3:6 Pitch/Diameter Ratio. Right is reserved to substitute in case of shorts.

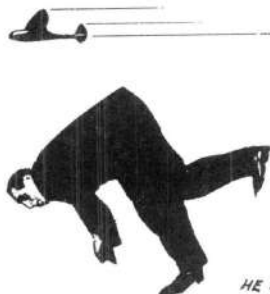
INDOOR PROPELLER BLOCKS

Dia.	Size	Price
7----	9/16 x 7/8----	3¢
8----	5/8 x 15/16----	4¢
9----	11/16 x 1 1/16----	5¢
10----	3/4 x 1 1/8----	8¢
11----	13/16 x 1 3/16----	9¢
12----	7/8 x 1 5/16----	10¢
*12----	1 x 1 5/8----	12¢

*Special block for diagonal cut balsa block prop.

We are especially careful to grade JASCO Indoor Balsa as closely as possible to the grain line. The "Uses" chart should be followed to the letter by the beginners. The more experienced builder can take advantage of the "C" or quarter-grained characteristics for tube construction. This grain is very hard to bend, but it is possible to do it if the wood is sanded to 1/64" or less, soaked thoroughly in hot water, and held in constant tension while it is being bent over the form. The slightest lessening of pressure will allow it to crack. The reasons behind the "Uses" chart will be apparent after examining the log cross-section. It will be noted that beside the "A" and "C" grains there is an additional grade "B". This grade is somewhere between "A" and "C" and should be used for spar work where grain structure is not so important. It is carried in a slightly heavier grade than the tube stock, since it has been discovered that spars must have a certain strength for practical use. Most of the "B" stock has a slight stringy structure which makes it especially adaptable for tip and outline work.

The sizes listed will fill all standard requirements. The weight of balsa varies from 3.8 lbs. to 5.5 lbs. per cu. ft. The weight grading is done in accordance to the final use, that is, items requiring a large amount of balsa are cut from the lightest balsa stock. Whenever in doubt as to the grade that you should use, just mention your requirements and the correct grade will be sent. Sand indoor balsa as little as possible, and use 10-0. A coarse sandpaper will tear too deeply into the fibers and will weaken the structure.



HE USES "Y"

JASCO Tungsten Wire

At the moment there are two schools of thought in the indoor field. One believes in fine, light construction, to enable it to use a small-section rubber motor, and a propeller to suit the conditions. The other side goes in for rugged construction, and a large-section and long looped rubber motor with a very large propeller. At the time of writing, the light weight school seems to have the edge in

No.	Wt. per in.	Stress	10 ft.	25 ft.
1	.0000024 oz.	1½ oz.	25¢	50¢
2	.0000054 oz.	3 oz.	20¢	40¢
3	.0000097 oz.	6 oz.	20¢	40¢
4	.000022 oz.	13 oz.	20¢	40¢
5	.000061 oz.	37 oz.	25¢	50¢
6	.000155 oz.	96 oz.	30¢	60¢
7	.00035 oz.	16 lbs.	40¢	80¢

the record list, but the rugged class seem to pull in most of the cups. However, no matter which side will eventually reach the pinnacle, tungsten wire will undoubtedly contribute greatly to the final result.

Tungsten wire has almost twice the strength of ordinary steel wire. It is rustproof, does not stretch under strain, and can be obtained in gauges small enough for use on indoor models. It weighs less than any other rigging material, strength for strength, and it has only about 1/10th the drag of the finest thread. The method of application is a bit difficult at the first, but if the wire is kept tight and above white paper, no difficulty should be experienced. The first step in bracing is to double the end of the wire to provide a large cementing surface. When the cement has set, tighten the wire either by tying the loose end to a fixed post or having it under tension. Several used and methods are shown in the sketches. For use on fuselages, be sure that you do not pull the wire too tight, thereby forcing the construction out of line. Just lay it on the edge and cement it. When rigging a wing, cement the loose end of the wire to balsa strips to allow easy handling. The wire comes wound on machined fiber spools. Be sure to replace the loose end in the notch when you are finished.

USES

Almost invisible; 1/5 hair; For magical and electrical surprises. For small models. Recommended for use after experience. Clearly visible: Wing rigging. Low power motor stick overrigger. Single wire overrigger. Identical to wire used by Boston group. Too large for indoor use except wheels. Hair size. For Scale job. For Flying Scales. Uses which do not exceed the given stress point. Radio Control Wires. Twin X bracings and extra strong rigging.

You remember Jack, the 1945 Indoor Champ. Well he quit models, since that memorable day when he found out that his record ship had never been covered. He is now an ardent believer in spiritualism and has joined the local chapter of the Napoleon Club.

JASCO Microfilm Solution

Quietly and gradually, JASCO Microfilm has assumed the leadership of its field. It has passed severe tests throughout the world. Because we have carefully checked every batch of mixture, and because we have improved each succeeding one, we have a uniform formula, which we can reproduce time after time. We are still on the lookout for improvement, however, and we experiment constantly in our own workshop.



THIS IS ABSOLUTELY THE LAST TIME

JASCO Aluminum Wire

One of the most exasperating things of a model builder's life is a microfilm hoop that simply will not keep its needed shape. If one uses aluminum wire instead of the

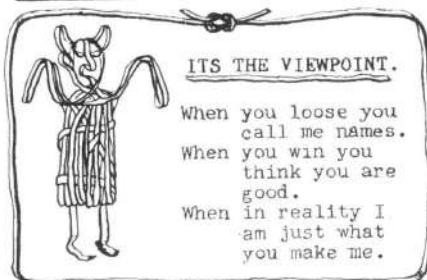
Our formula gives a fairly flexible film without tackiness. Where extreme flexibility is required for compound curves, the addition of a few drops of Tricresyl Phosphate or Castor Oil will give the required result. Be sure to mix this new solution well, and let it set for a few hours before using. The choice of the color, or the thickness of the film depends upon the framework to be covered. Extremely light work should be covered with a very thin film, to prevent the frame from warping. Our solution is fairly concentrated so that it will be ample for a large number of sheets. It is placed in cans for your safety and convenience.

Although fair results will be obtained on soap-free water regardless of its temperature, unless the water is extremely cold or the room is drafty, the best film and control of its thickness will be obtained if the temperature is between 70° and 80°, and the water absolutely soap-free. The spreading on the size of the film is determined by the surface of the water. More explicit instructions, hints, and color charts will be found on the label.

Can Size	2 oz.	4 oz.	8 oz.	16 oz.
Price	20¢	35¢	60¢	\$1.00

usual steel or galvanized wire, a hoop can be bent to any shape with the assurance that it will remain in that shape. The advantages of aluminum wire are especially appreciated if the hoop must be bent for dihedral, or even twisted for microfilm propeller covering and patching. When removing the film from the water, place the hoop on top of the film, instead of underneath. Press the hoop slightly below the water surface, and let the fringe film fold over the wire. Pat the film to wire and remove with a side and upward swing. JASCO Aluminum Wire can be obtained in any length up to 12 feet. It is rolled for packing.

Aluminum Wire 1/8" Dia.—3¢ per ft.



ITS THE VIEWPOINT.

When you loose you
call me names.
When you win you
think you are
good.
When in reality I
am just what
you make me.

Special Brown Contest Rubber

We stock only the original **Brown Contest Rubber**. It has been definitely proved through several years of gruelling contest work to be the one most suited to our needs. Be-

Special Brown Contest Rubber

SIZE	PRICE	USE
1/32 20 ft.-5¢ sk.-20¢		Baby ROG
3/64 20 ft.-5¢ sk.-25¢		Baby ROG
1/16 15 ft.-5¢ sk.-30¢		Paper ROG

The above sizes are for indoor work:

SIZE	PRICE	USE
5/64 15 ft.-5¢ sk.-35¢		CL B Trot
3/32 12 ft.-5¢ sk.-45¢		B-ROW C-Tr
7/64 12 ft.-5¢ sk.-55¢		C-Tr & Fus

Packed in footage indicated for 5¢

Outdoor Rubber Sizes: Cut to ordered lengths: sk--Skein--225 feet

1/8 10 ft.-5¢ sk.-60¢	Indoor C Tr. & Fus.	Outdoor limit 18 Strands
5/32 15 ft.-10¢ sk.-75¢	For 20" Indoor Props:	Outdoor limit 18 Strands
3/16 15 ft.-10¢ sk.-90¢	For 24" Indoor Props:	Outdoor limit 20 Strands
1/4 10 ft.-10¢ sk.-\$1.10	Holding Gas Surfaces:	Outdoor unlimited strands



JASCO LUBE is guaranteed to make any rubber wild! It contains Triatomic Alcohol (Glycerine) to make to motor forget itself & provides the slipperiest green soap to slide on!

JASCO Rubber Lubricant

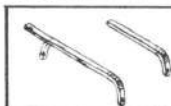
JASCO Lubricant is a veteran of many years. It is a concentrate of chemically pure non-injurious ingredients. You can thin it with oiled or distilled water if you wish.

It is now sold in cans with the spout type of cover, which makes application much more simpler. It also eliminates messy model boxes, caused by spilled lubricant.

In applying the lubricant, be sure to cover the entire rubber surface. Rub it in well and remove the excess. Check after every flight, and re-apply the lubricant if necessary. Also make certain that the rubber has no nicks or tears which will develop into points of breakage when winding to capacity.

NOTE: Rough wool or cotton socks will be handy in keeping your hands clean.

Lubricant 2 oz. spout can --25¢



WHO MADE US FIRST?

JASCO Indoor Washers

JASCO Indoor Washers are the lightest flat washers obtainable. They are made of the thinnest brass that is practical to use. They are 3/32" in diameter with a minus 1/64" drilled shaft hole. JASCO Indoor Washers are highly polished and all shaft holes have the burrs removed. For best results, use two washers, and be sure to oil them often. Oiled flat washers have less friction than cupped ones, but they must be oiled, or the friction will be greater. Check your washers often for possible grit, which spoils their purpose.

Washers Wt..00018 oz.--1 doz.--5¢

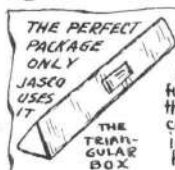
JASCO Indoor Bearings

One of the small things that has contributed a great deal to the success of indoor flying is the JASCO Special Indoor Bearing. Although it weighs no more than one made of .020 wire, there is no comparison between the merits of both. A dural bearing with its larger cementing area

will stay in place under repeated maximum wind-ups. The large bearing surface steadies the propeller and holds it in the correct thrust adjustment. If a model glides well, but stalls under power, a slight bend for down thrust will correct it, a bend for up thrust will be the correction for a diving model. A slight side thrust may also be obtained by careful bending. The single bearing will allow fair adjustment, but a double bearing is much better for fine adjustments. A double bearing can be made by using an extra wire adjuster, two standard bearings, or the special double bearings. Naturally, the special bearing is best because it shows the relative adjustments at a glance, and also prevents any possible misadjustments due to weakened cement joint.

Both types of bearings are made of the smallest gauge of metal that it is practical to use. The width is just the right size to take 1/8" rubber at the maximum turns. The shaft hole is carefully drilled to a minus 1/64". The contact area is burr-free and highly polished. The double bearing is bent at one end only. When bending the other end to your requirements be sure to bend it in a gradual arc. Do not bend it too often or the dural will crack. The bearings may be filed thinner for a smaller size of rubber, when re-using the bearings be sure that the hole has not been worn too much to one side.

Bearings = Single-Wt..0008 oz.--5¢
Double-Wt..0012 oz.--15¢



—EXTRA— MYSTERY SOLVED

After a month of most careful investigating, it was found that Joe, the packer, was color blind, thereby disrupting JASCO's Color Coding Plan.

JASCO Color-Coded and Grain-Graded Outdoor Balsa

In our attempts to bring some semblance of scientific designing into the model game, we very often strike out into new and unknown paths of supply production. So it was with our latest experiment, the color-coding and grain-grading of outdoor balsa. The response from scientific builders during the short time that we have had this service, has definitely convinced us that we are correct in our assumption that color-coded and grain-graded balsa can do a great deal towards increasing the average flight time, as well as increasing the record possibilities. Since this is a new idea in the balsa industry, the mechanics of the job are known only to the small circle of scientific builders who have been with us since we started our pioneering program for better supplies. Therefore, a more explicit explanation of this new development will not be amiss.

The usual method in converting balsa planks into sheets and strips, is to buy balsa at the lowest possible price, to cut it up as fast as possible, and then to advertise it at the lowest permissible price. This is all well and good, as the exceptionally low prices of model supplies have attracted many newcomers to the game. They usually start by whitening balsa for the fun of it, and by building replica models, without a thought towards flying or contest activities. However, when we consider balsa to be used for flying and scientific work, the specifications for quality take another aspect. For this type of work, the balsa must be of the best to take

Wt. Ft. ³ in lbs.	COLOR CODE	SUGGESTED USES:--Keep color record on all models.
6	Yellow	Planking, filleting
7	Lt. Green	Stringers, multi longs.
8	Orange	Light Spars & longs.
9	Lt. Blue	Spars, Longs up to 14-st
10	Red	Sp. & long. lt. mot. stk.
11	Green	Large Sp. & long. to 200"
12	Blue	Heavy mot. stk. Sp. & long

advantage of the "Lightness with Strength" maxim. The wood must be perfect in every respect, as each part is serving a definite purpose, at its smallest possible dimensions. Then again, some parts may be lighter than others and yet be strong enough, other parts of the model must be covered in curves, and some parts need to withstand forces in one direction only. In all, every engineering problem is encountered in the building and flying of contest models, and the sooner we realize this, the more enjoyable and lasting will be this scientific hobby.

How can we hope to take care of these varied requirements with material whose specifications change with every piece? We have eliminated as much of this guesswork as possible, by introducing a new method in producing sheet balsa and strips: This is done by color-coding by weight every piece of balsa to be used in outdoor and gas model work, the moment that it reaches the plant. This balsa is then segregated according to the different grains. This grading is simple in principle, but it involves extra time and the service of experienced men. In the first place, we assure ourselves of the highest quality of balsa by paying a premium price for the privilege of picking out the stock we want. Then the balsa is cut into small segments, which are individually weighed and the ends are colored. From that moment on, no matter what is done to the wood, the tell-tale color of the end will identify it. After the color is applied, the grain grading begins, and not until then is the balsa ready for cutting. The cutting is done with saws designed by ourselves to assure a polished surface with few saw marks. After the cutting the finished sheets or strips are again checked for defects and finer grading.

From this short resume of our work you can realize that we have a job on our hands, especially with competitive prices at such ridiculously low figures. However, our stand-by customers appreciate this special service, and they are amply repaid in their faith by their constant record flights and winning contests.

The following color and grain charts were compiled after a series of experiments to determine the maximum strength that the balsa can be counted upon to produce.

SHEETS		STRIPS	
"A" Covering, "C" Flat sides		"C" Flat sides, ribs, "A" tubes	
"C" Flat sides, ribs, "A" tubes		Edge cover, tips, 200" Ft. Sds.	
"C" ribs, box spars, "A" tubes		"C" gas ribs, bx spars, tips	
"C" gas ribs, bx spars, tips		"C" bulkheads, "A" motor tubes	
"C" bulkheads, "A" motor tubes		Strong parts mostly for gas	

36" Balsa Strips

The strips are so cut that the "C" grain is on the widest dimension, for extra strength.			
1/16 x 1/16---2 for 1¢	1/8 x 1/8---7 for 5¢	1/4 x 3/8-----3¢	
1/16 x 1/8---3 for 2¢	1/8 x 1/4---2 for 3¢	1/4 x 1/2---2 for 7¢	
1/16 x 3/16---4 for 3¢	1/8 x 3/8-----2¢	1/4 x 5/8-----4¢	
1/16 x 1/4-----1¢	1/8 x 1/2---2 for 5¢	1/4 x 3/4-----5¢	
1/16 x 3/8---2 for 3¢	5/32 x 5/32-----1¢	3/5 x 3/8---2 for 7¢	
1/16 x 1/2-----2¢	3/16 x 3/16---2 for 3¢	3/8 x 1/2-----5¢	
3/32 x 3/32---3 for 2¢	3/16 x 1/4-----2¢	3/8 x 5/8-----6¢	
3/32 x 3/16-----1¢	3/16 x 3/8---2 for 5¢	3/8 x 3/4-----6¢	
3/32 x 1/4---2 for 3¢	3/16 x 1/2-----3¢	1/2 x 1/2-----5¢	
3/32 x 3/8-----2¢	1/4 x 1/4---2 for 5¢	1/2 x 3/4-----8¢	
3/32 x 1/2---2 for 5¢	If you are in doubt as to the correct color to use, write us the requirements		

JASCO Outdoor Sheet Balsa

It is now possible to make the entire model using sheet balsa, without increasing the weight beyond that of an ordinary paper covered framework. But there simply is no comparison between the two in strength. The all-balsa or monocoque construction simply does not know when it has had enough. Half of its structure may be torn away by a broken motor, without impairing the strength.

Since special grain cuts are mostly used in sizes up to 1/8" in thickness, we do not have special grain cuts in larger sizes. However, all thicker sheet are cut as close as possible to the "C" grain. The physical difference in grain is given on Page 2. For ordinary work, where slight bending

and fair compression resistances are needed, order the "B" grain, which is between the two extremes: "A" and "C".

36" Sheet Balsa

Size	2"	3"	Size	2"	3"
1/64	6¢	xx	5/32	8¢	12¢
1/32	5¢	9¢	3/16	8¢	12¢
1/20	5¢	9¢	1/4	10¢	15¢
1/16	5¢	9¢	5/16	12¢	18¢
3/32	6¢	10¢	3/8	12¢	18¢
1/8	7¢	12¢	1/2	15¢	20¢



YOUR BEST FRIEND - IT TELLS THE TRUTH

JASCO Beam Scale

The progress of a model builder is marked by the use he makes of a scale. His early efforts are mainly concerned with keeping the parts together, but as his construction skill increases, he begins to cast his eyes towards records, and he soon realizes that the weight of the rubber in proportion to the total weight of the model, is an important factor in its performance. Constant use of his scale will give him an uncanny skill in using just the right sizes of balsa for the particular uses. The use of a scale is especially recommended to those whose occupation is such as to be of a heavy nature, which tends to dull the weight sensitivity of the hands. In such cases just prepare a weight chart of every item, and then cut or sand to your requirements. A flight test will show whether or not you may increase or

decrease the weights of the various parts in your next design.

The JASCO Beam Scale Kit was developed to bring an accurate and sensitive scale within the reach of every builder. The beauty of its design lies in the fact that it incorporates standard stamped metal parts in such a clever combination, that the sensitiveness is of a 5/10,000 nature. A 1/10,000 ounce variation can be easily detected.

The kit consists of ready-formed and shaped sheet metal fittings, including a knife-edge balancing point. Screw counterbalancing adjustments are used. There is a balsa beam and base, cement, and a carefully planned and drawn full-size plan, including a double scale reading, ounce to gram, gram to ounce, and grain to ounce conversion tables; and examples. It is complete with 1/100 and 1/10 ounce weights which countercheck the complete scale for correct alignments. For work over 8 ounces, bind and cement the fittings. Use a one gram weight for direct metric system readings. The construction time is about one hour.

JASCO Beam Scale Kit --Complete--50¢ P.P.

EXTRA WTS. --1/100, 1/10 oz.--10¢ each

JASCO Special Glider Sections

JASCO Special Glider Sections have helped to make history, in the last few years. Besides helping considerably towards raising the hand launched glider records to heights undreamed of before 1930, they have also been the cause of requiring other companies to produce these sections. Although this has undoubtedly increased glider activity, we would like to have you know that there are several other things besides the section, which make JASCO Sections outstanding. We have the experience of a pioneer which enables us to know just what grain, weight, and thickness are best for the season. In addition to stocking the best grade for the particular time of the year, we also have a large assortment of grade for individual requirements. We have so often repeated that mechanics of hand launching gliders in these pages, that for the time being we refer you to any good current magazine article dealing with gliders.

The glider sections shown need very little finishing in order to obtain accurate and efficient airfoils. Just sand off the corners. The stock used is from the "B" to the "C" grade in grain, and is of 6-8 lbs. per cu. ft. weight. This grain will take a certain amount of bending for adjusting, but do not be too forceful. If a coat of cement is applied above and below the adjusting point, it will prevent cracking and will help to also keep the adjustments. Do not cement the thin trailing edge, as it may warp. The fuselage stock is a heavier grade, so that it may be well streamlined and still have the needed strength. The tail stock is also of the "B" to "C" grade grain. Be sure to make the tail surfaces strong enough to keep their shape, and cement them well. (For finishing instructions see the sections dealing with Glider Polish and Wood Filler.)

WING SECTIONS

3/32 x 2 x 18--5¢
5/32 x 3 x 24--10¢
3/16 x 3½ x 24--13¢
1/4 x 4 x 24--16¢

18" FUSELAGES

3/16 x 3/4--2¢
3/16 x 1--3¢
1/4 x 3/4--3¢
1/4 x 1--3¢
5/16 x 1--4¢

TAIL STOCK-----1/20 x 3 x 18---5¢

JASCO Outdoor Propeller Blocks



The propeller is the most important part of the model. It is the only means of converting the energy stored in the twisted rubber into forward motion. The performance of the model depends upon the propeller more than anything else, especially when we consider that the torque is responsible for most of the spiral stability problems. Since torque is a subtraction from the useful work (the thrust), we must strive to decrease the torque as much as possible. This can be accomplished by taking more care when shaping, carving, and finishing the propeller. The shape should be elliptical, the camber should be a regular airfoil, (deeply cambered for heavy work and almost Clark Y for the stream line models.) and finally, the finish of the blades should be very smooth. The final finish and the general propeller layout are especially important after the power is exhausted and freewheeling takes place. It is in the freewheeling

stage that imperfections are manifested in terms of increased propeller drag with a consequent poorer glide. More explicit explanations of propeller theory, recommendations, and instructions, will be found in the 1937 Year Book.

The block sizes were selected after consulting the plans of a large number of contest and record models, as well as relying upon our own personal experience. Note the generous sizes of the small diameter propeller blocks. Although color coding is not used for selection, your preference of texture will help us in filling your order. Also mention the fact when the blocks are to be used for twin motor jobs, so that we may match the blades.

MACHINE CUT PROPELLERS

Machine Cut Props are recommended for beginners since very little work is needed to finish them into efficient blades. Also for models having a high Power/Weight Ratio. There is nothing like a machine prop when you are in a hurry!

OUTDOOR PROPELLER BLOCKS

Dia.	Block Size	Price
5----	5/8 x 7/8----	2¢
6----	5/8 x 1 1/8--	2½¢
7----	3/4 x 1 1/4--	3½¢
8----	7/8 x 1 3/8--	5¢
9-----	1 x 1 1/2--	6¢
10-----	1 x 1 5/8--	9¢
11--1	3/16 x 1 3/4--	12¢
12--1	3/16 x 1 7/8--	13¢

Dia.	Block Size	Price
12-----	1 x 1 1/2--	8¢
13--1	1/8 x 1 5/8--	13¢
14--1	1/4 x 1 3/4--	14¢
15--1	3/8 x 1 7/8--	16¢
16--1	1/2 x 2----	18¢
17--1	5/8 x 2 1/4--	22¢
18--1	3/4 x 2 1/2--	25¢
Larger sizes on request		

MACHINE CUT PROPS

Dia.	Thick.	Price
9----	13/16----	4½¢
10----	7/8----	5½¢
11----	19/32----	6½¢
12----	1 1/32----	8¢
13----	1 1/8----	10¢
14----	1 3/16----	12¢
15----	1 1/4----	14¢
16----	1 7/32----	17¢



BALSA LAMENT

Scratched by tiger's paws,
Crushed by coiling boas,
Crunched in the deep Amazon
By jaws of scaly amphibians,
Torn apart by steely teeth,
Shipped 3,000 miles over briny deep,
Parched to dryness by terrific heat,
Haggled over by a pair of Scrooges,
Bought by a couple of stooges,
Who turned out to be balsa butchers.
Tis a sad and pitiful end for me,
The lightest of the jungle trees.

Gasoline Models

"Just a word to let you know that my dad is starting a gas job!"

Momentous words, these! It means that the grown-ups have at last succumbed to the spell of the model's uncanny flying. But it also means that many persons will try to make their models purely with luck as their guide, as their experience with aerodynamics is nil, as they have not benefited by the flying of rubber-powered models. To help these newcomers, the following points are presented:

The most important fact to remember is that a half-hearted job can be the most exasperating object imaginable, as the adjustments simply will not stay put. Make up your mind to make the model of clean lines and sturdy construction. Your first model should be simple. Use just a four longeron, paper-covered framework fuselage, and a straight wing and tail. Shun all doodads, as the model must be fairly light to have a 1/2 lb. (or less) wing loading per sq. ft. A heavier wing loading will necessitate higher speed,

with consequent finer adjustments, and also greater damages in collisions. Keep in mind that you must first learn how to make and fly a model before you venture on a more difficult job.

Another important point that you should heed is to try not to be influenced too much by full-size power planes, or by any special fetish advocated by someone. Just be sensible. Use a Clark Y airfoil, a 1/2 lb. or less wing loading, and 1" to 1 1/2" dihedral for every foot of span. The stabilizer area should be as per formula. There should be strong motor and landing gear mountings, accessibility to all parts, the thrust line should go through the center of the fuselage, and correct rudder area.

Except for the motor, most of the trouble will be caused by spiral instability, resulting in disastrous spins. This is caused by a rudder that is too large, not enough dihedral, or too much torque. It is almost impossible to give an exact formula for the rudder area, as there are too many variables to account for. A good rule to follow is to have the center of the side area of the model about 3 or 4 inches behind the C.G. If your model persists in spinning, increase the dihedral or decrease the rudder, but first make certain that a warp or a poor thrust line is not the cause of the spinning.

All models rather glide or fly into the ground. This makes the position of landing gear very important for good landings. It has been found that by placing the wheels well forward of the C.G. the model is more likely to make three-point landings. This can be easily explained by the diagram. Note that the wheels are the first contact with the ground. If they will roll, the C.G. will set the tail down gently as the speed decreases. A poor roll, or a landing gear that is too far back will give the ship a chance to continue to move, with a consequent turning-over, in which almost anything can happen.

Gas Model Balsa

Most of the early gas models were made of hard wood, but at present the all-balsa type of construction predominates and is expected to hold its place. The balsa used for gas model work must necessarily be of the "hard and heavy" variety. We make certain of having only the suitable grade by continuing our color coding scheme into the gas model division. This special service will enable you to use balsa of equal strength and weight whenever balancing is required, such as in the two halves of a wing, or in fuselage construction. The suggested uses have been flight-tested on many occasions and can be taken as standard.

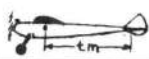
Wt. Ft. ³ in lbs.	COLOR CODE	SUGGESTED USES
10	Red	Stringers, Outlines.
11	Green	Lead. & Trail. edges
12	Blue	Light Spars & Longs.
13-14	Brown	Spars, Long., Braces.
15	Black	Strong Long., & Spars.
Over	White	Large and Heavy work.

Gas Model 5 Foot Balsa Strips

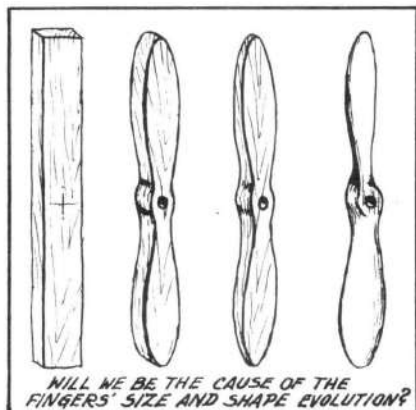
The strips are so cut that the "C" grain is on the widest dimension, for extra strength.

3/32 x 3/32-----2¢	1/8 x 2 -----14¢	1/4 x 3/4-----8¢
3/32 x 3/4-----7¢	3/16 x 3/16-----3¢	1/4 x 1 -----10¢
1/8 x 1/8-----2¢	3/16 x 3/8-----4¢	1/4 x 1 1/2 -----14¢
1/8 x 1/4-----3¢	3/16 x 1/2-----5¢	1/4 x 2 -----18¢
1/8 x 3/8-----4¢	3/16 x 5/8-----6¢	5/16 x 5/16-----3¢
1/8 x 1/2-----4¢	3/16 x 3/4-----7¢	3/8 x 3/8-----8¢
1/8 x 5/8-----6¢	3/16 x 7/8-----8¢	3/8 x 3/4-----14¢
1/8 x 3/4-----7¢	3/16 x 1 -----9¢	1/2 x 1/2-----10¢
1/8 x 7/8-----8¢	3/16 x 1 1/2 -----12¢	1/2 x 3/4-----12¢
1/8 x 1 -----8¢	3/16 x 1 1/2 -----14¢	1/2 x 1 -----15¢
1/8 x 1 1/4 -----10¢	1/4 x 1/4-----4¢	3/4 x 3/4-----20¢
1/8 x 1 1/2 -----12¢	1/4 x 1/2-----6¢	1 x 1 -----25¢

When ordering, be sure to specify the color needed. If in doubt state specifications and the correct grade will be sent. Also read special shipping instructions for long lengths.---Special Note; COLOR CODED is Jr. Aero. Supp. Co.'s Reg. App. for TRADE MARK and infringements will be persecuted.



WING AREA \times AVE CHORD \approx 70 . SA
tm



JASCO Propellers for Gasoline Models

In the search for better gas model stability, many builders overlook the propeller. Most of them are under the impression that as long as the blades are set at an angle, the matter can be forgotten, but they wonder what the trouble is when the model is not controllable after everything has been double-checked. It has been found that a poorly made, poorly designed propeller develops considerable torque without increasing the thrust, and also places extra strain on the motor. To overcome this excessive torque, the wing has to have a strong sideslip effect upon the dihedral, to keep the torque under control. This situation is clearly shown by the steep power banks which sometime develop into spins when side areas are incorrectly proportioned. Corrective adjustments usually lower the overall efficiency.

The torque is proportional to the propeller diameter. It can therefore be readily seen that the diameter should be determined by the size of the model. It is surprising what a difference a substitution of a smaller propeller for the regulation sizes makes on the controllability and stability of a small model. The chart below lists the recommended combinations. Just keep in mind that it may be necessary to reduce the torque, even at a sacrifice of the thrust, where controllability is important. Luckily, small models, where stability and controllability are difficult to achieve, can get along on very little thrust. A decrease in the diameter will not affect the r.p.m.'s of the motor if the propeller weight is kept about the same.

To meet all the propeller requirements, we stock a large assortment of propeller materials, from the block to finished laminated propellers. Specific description and instructions will be found under each item.

	C.C.	A	B	C	D	E
Brown	10	x	13	14	14	16
Flush	10	x	13	14	14	16
Ohlsson	8.7	x	13	14	14	x
Bunch Ser.	8	x	13	13	14	x
B.Cyclone	5.8	x	13	13	13	x
5/8 x 5/8	3	11	12	x	x	x
Chun	2.6	10	11	x	x	x
Elf	2	11	12	x	x	x

NOTE: Use C.C. displacement as a guide to probable power. Numerals under letters are recommended prop diameters for model noted below.

Wt. of Model	Wt. of Model
"A" 2 lbs.	"D" 5 lbs.
"B" 3 lbs.	"E" up to 8 lbs.
"C" 4 lbs.	

The above figures are based on 1 lb./ft.² wing loading. For heavier loading increase diameter if motor can turn it at sufficient speed.

PROPELLER BLOCKS: Basswood or like.
3/8 x 1 x 12--10¢ 1/2 x 1 3/8 x 13--12¢
5/8 x 1 1/2 x 16--15¢

PROP OUTLINE BLANKS with shaft hole. Basic dimensions same as Fin. Props 10, 11, 12---20¢ 13, 14, 16---25¢

SEMI-FINISHED PROPS: Carved to correct pitch and airfoil section. Just needs final sanding and balancing.

FINISHED PROPS: Completely finished including balancing and polishing.

	LOW POWER		HIGH POWER	
	Sem. Fin.	Fin.	Sem. Fin.	Fin.
10"	35¢	50¢	13"	50¢ 75¢
11"	35¢	50¢	14"	65¢ 90¢
12"	35¢	50¢	16"	75¢ \$1.25

SPECIAL 16" LAMINATED PROP. Walnut and Basswood. Beautifully finished. Semi-Fin.--\$1.00 Finished--\$1.85

JASCO GAS MODEL PROPS are manufactured exclusively for us here in America. We can therefore specify special P/D Ratios to suit particular motor. Please mention motor when ordering finished props as well as weight and wing area of the model.



3 1/2" & 4 1/2" Gas wheels.
—weight 2 1/2 and 3 oz. per pair.
Now only \$2.75 per pair, postpaid.

M & M Super Heavy
Duty Wheel

M & M's for LARGER GAS MODELS.
Size 6" x 1 1/2". Price \$4.50 per pair

M & M 3 1/4" \$1.50

with improved M & M axle housing for 8-1440-00 No. 28 motor and scales. Designed for light weight gas models. Weight approximately 3 1/2 oz. per pair.

M & M Super Heavy Duty Wheel for Rubber Powered Models.
3 1/2" x 1 1/2" x 1 1/2" —PRICE
\$2.50 per pair, postpaid. 3 1/2" x 1 1/2" x 1 1/2" —PRICE
\$3.50 per pair, postpaid. 3 1/2" x 1 1/2" x 1 1/2" —PRICE
\$4.50 per pair, postpaid.

GAS WHEELS



Two Sizes—
3 1/2-inch and \$1.75
4 1/2-inch, Only 1 Pr.



STREAMLINED
OHLSOHN AIR
WHEELS

3 1/2" per pair \$1.75
4 1/2" per pair \$2.50

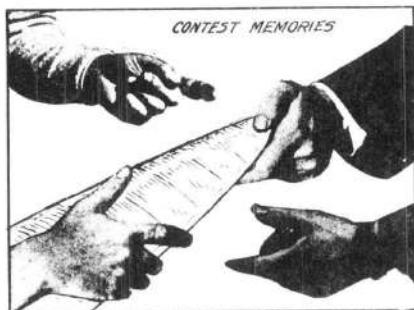


PNEUMATIC RUBBER
WHEELS

3 1/2" in. size for Models
3 to 8 ft. diam. rubber
plumbers, colored rubber,
Per Pair \$1.50

DOUGHNUT RUBBER WHEELS
For Tail Wheels

1" diam.	pair \$1.50
1 1/2" diam.	pair 1.80
1 3/4" diam.	pair 2.00



JASCO Covering Material

Most experienced builders have their own method of covering. The beginner should be prepared to go through his quota of wrinkles before he gets the knack of covering perfectly. Here are a few pointers that might be of help to him: Always keep your paper rolled and tidy. Allow about an inch all around the outline for handling. Use regular dope for adhesive on outdoor models and castor-oil-plasticised banana oil for fine work, where the paper is not to be doped. When trimming, leave an excess on bamboo tips or any other small outline. A fine mist spray is better than soaking. Use a good brush for doping. Lacquers and enamels are preferable for trimming because of their richer colors and their even spread. Keep your eyes open for warping tendencies, and correct them as soon as they are noticed. When covering round surfaces, much more area can be covered at a time if the paper is slightly moistened just before it is applied. The dope will hold it in place even if it is moist.

Doping and Finishing

A good finish, besides creating a favorable impression, gives the model a personality, and as such it receives special care in handling and flying, and is remembered longer. The preliminary finishing steps are explained in the section devoted to "Covering Material".

Light Models, and Flying Scale Models: Use one or two coats of Banana Oil or thinned dope. It is assumed that colored paper is used for color reproduction. It is not advisable to use colored dopes on these models, as the additional weight will require the use of more rubber, with a consequent lower duration. If colored dope must be used, use it fairly thin, as full-strength colored dope will very probably give a splotchy appearance if applied in one coat.

Contest Models: One coat of full strength clear dope will usually be sufficient for tightening the paper. An additional coat of slightly thinned Glider Polish will give the desired high gloss for reflected visibility. Trim with lacquer or enamels.

Bamboo Paper and Silk Covered Models: Use one full strength primary coat. Sand off the fuzz with fine sandpaper. (For extra good finish apply two thin coats of JASCO Wood Filler with intermediate sandings.) Apply two thin coats of colored dope with a good sable brush. Thinned dope flows smoother and gives a more even color, and is also easier to apply. For a final coat, use Banana Oil or thinned Glider Polish for Gloss effect. Use Scotch Tape for striping. Work in a dust-free place, and avoid drafty and humid air, as they cause the dope to blush. Use thinner to remove blush spots.

Planked, All-Balsa Models: Plain or silk covered models have numerous and deep pores which must be filled in before dope is applied. Therefore, the first step is to brush on one or two coats of JASCO Prepared Wood Filler. Allow it to dry, and sand off the surplus. Now brush on or spray about two coats of thinned colored dope on the surface. Rub down with 320 "Wet or Dry" paper. For

JASCO Outdoor Tissue has a definite grain which should run spanwise. For the best visibility use an orange, a red, or a yellow wing, and a blue, a black, or a red fuselage.

20 x 24 JASCO Outdoor Tissue

COLORS: Red, White, Blue, Orange, Yellow, Black---4 sheets for 9¢

SILVER TISSUE---just clear dope---5¢

JASCO Superfine Tissue is the lightest paper used for model work. It is used mostly on indoor models. It has a glazed surface, and criss-cross fibers which can be tightened in all directions. This makes it especially suitable for the cross braces used on indoor fuselages.

18 x 24---JASCO Superfine Tissue-----5¢

JASCO Bamboo Paper is used mostly on gasoline models. This paper may be used on large outdoor models, especially those with round paper-covered surfaces. Use outdoor cement for adhesive. Strips of bamboo paper, when laid layer upon layer, make very light fillits. Methods of doping, coloring, and finishing are described in the portion of the catalogue dealing with liquids.

24 x 36---JASCO Bamboo Paper-----5¢

JASCO Model Silk should be used on the finer gas jobs. It gives a much finer finish than paper, and is especially good for covering high performance models, as its transparency makes the model visible for a long distance. Solid colors seem to merge into the skies much more readily. Silk should be used also for reinforcing planking, balsa propellers, wire fittings, and any other points which need extra strength. Silk is applied like tissue; that is, to the center first, then to the tips and then to the sides. The doping will fix it to the ribs. Silk is flexible enough to cover compound curves.

36" Width---Model Silk---per yard---40¢

solid models, or where weight is not important apply as many coats as are necessary to completely hide the surface which normally shows through dope or lacquer. Rub down with 320 "Wet or Dry" paper. Add several more coats of Add several more coats of dope or lacquer. Finally rub down with 400A "Wood" paper. For the final finish, rub down with a good polishing compound such as JASCO Polishing Compound. For additional weather and moisture protection apply two coats of Simonize. Apply it with a wet cloth to prevent a burning of the finish. A high gloss may be obtained by rubbing briskly with flannel. The results will be in direct proportion to the application of "elbow grease".

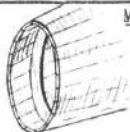
Glider: Use one or two coats of JASCO Wood Filler. Sand smooth with 6 Nought and finish with 10 Nought and wax. For weight rule gliders, add several extra coats of clear or colored dope. Finish as in the above paragraph.

Note: Be sure to let the lacquer, paint, or dope, dry thoroughly between each coat, and allow them to harden before rubbing.

CANS	12 oz.	14 oz.	18 oz.	16 oz.
Clear Dope	12¢	20¢	35¢	55¢
Colored Dope	15¢	25¢	40¢	70¢
Thinner	12¢	20¢	35¢	55¢
Banana Oil	15¢	25¢	40¢	70¢
Glider Polish	18¢	30¢	45¢	80¢

COLORS: Red, White, Blue, Yellow, Silver, Orange; Black and White

The above nitrated compounds are of high quality. Mix COLOR DOPES before using. THINNER has a slight reducing action for Anti-Blush. 4-6 coats of BANANA OIL will give celluloid surface. GLIDER POLISH has High-Gloss and non-warping properties.

**MONOCOQUE CONSTRUCTION**

Simplifies all balsa building. Just needs exact bulkheads. Can be sanded down to fit purpose. Extra light 6-7 lbs. balsa.

1/16 x 3/8 x 36----30 for 20¢
1/8 x 3/8 x 36-----20 for 25¢

A perfect **Stooge** would bite cement off your finger tips.

**JASCO Model Airplane Cement**

Model airplane cement is made by dissolving nitrated cotton with a solvent. The result is a gummy mass which, when left exposed to air, hardens into celluloid. That is the basic formula. However, in actual production the final cement resulting depends upon the quality of the various materials put into it as well as the knowledge of what constitutes a good cement for model work. Although we do not make our cement on the premises, our knowledge of nitrated cotton processes and just what is needed for model work, has enabled us to carry only the best cement. A constant check assures uniformity.

Our cement is graded into three classifications: Indoor, Outdoor and Gasoline Model. At present their main difference is in the consistency: that is, light for indoor, and extra heavy for gas models. We are also experimenting with a special indoor formula which will give a comparatively thick cement that will almost completely disappear

by the time it sets. This cement will have a deep penetration power and good butt joint qualities with a minimum of actual final weight. As soon as it is perfected for commercial use the can will be marked "Special Indoor."

To obtain the best results from cement joints, the following precautions should be noted. If possible, all work should be done in jigs which will keep the joints in an undisturbed condition long enough to allow the cement to set securely. Be sure to be generous when applying it to Outdoor and Gasoline Model work. Where a butt joint must take a load, be sure to strengthen the joint with a bamboo splinter. All the joints on a gas model should be gone over at least three times, with several hours of intermediate drying. If a joint fails, scrape off the old cement before re-cementing. In cementing balsa to hard wood, be sure to roughen the hard wood surface so that the cement can anchor. Bind all metal or wire fittings where stresses or vibrations are present. Although **JASCO Cement** will set under almost all atmospheric conditions, for the best results work in a dry and warm place. (Also remember that all nitrated cements require air to evaporate rapidly, and, therefore, do not expect a fast job where the major portion of the cementing surface is covered, such as in a lamination.) **JASCO Cement** is placed in cans for your convenience and safety.

Cement

CANS	2 oz.	4 oz.	8 oz.	16 oz.
Indoor	12¢	20¢	x	x
Outdoor	12¢	20¢	35¢	55¢
Gas	x	20¢	35¢	55¢

For applying use Wire or Bamboo

JASCO Prepared Wood Filler

JASCO Prepared Wood Filler has a nitro-cellulose base, upon which dope, lacquer, or paint can be applied without fear of the filler rising from under the finished surface. It also contains the lightest possible filler ingredients obtainable, which no standard commercial filler has. It is of a clean transparent nature, and it is plasticized to prevent the warping of thin surfaces. It can be sanded smooth with ordinary sandpaper without fear of clogging the sandpaper. (For best results use Wet-Dry sandpaper.) It should be applied evenly with a brush, first in the direction of the grain, and then against it. The surface should be sanded until the paper begins to scrape the top of the surface.

CAN	2 oz.	4 oz.	8 oz.	16 oz.
PRICE	20¢	35¢	60¢	\$1.00

BE SURE to mix well before using!

JASCO Plywood

Plywood has innumerable applications to gas models. It is especially useful in building up strong front portions which have to take severe punishment. It can be cemented into place with ordinary cement, but where the stresses are strong, it is best to screw or bolt it to hardwood bulkheads. The thicker sizes can be used for formers and bulkheads to which the landing gear and motor mount are fixed. Just remember **plywood**, whenever you need light and strong construction.

Three-Ply plywood can be had in the following thicknesses: 3/64, 1/16, 1/8 & 1/4. 3/64 & 1/16 are made of Birch; 1/8 is Poplar and 1/4 Pine. Same price for all thicknesses.

6x6	6x12	6x18	6x24	12x12	12x18	12x24
10¢	18¢	26¢	34¢	34¢	48¢	60¢

BAMBOO: Straight grained and matured. 1/16 x 1/4 x 15--1¢ each. Doz.---8¢

SANDPAPER: All final work is done with sandpaper. Begin with coarse grade and end with the very finest. Do not sand too deeply with rough grade as it destroys balsa fibers. Use WET/DRY variety for finishing painted or color doped parts since ordinary dry paper will clog up. Be sure to wet it before using. Use sanding block for smooth and even results. Only fine grades, unobtainable in your local store, are carried on stock.

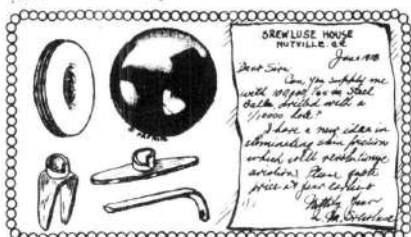
SANDPAPER	WET/DRY
6 Nought---2 for 3¢	360A----4¢
10 Nought-----2¢	400A----4¢

SHEET CELLULOID: Gas job gauge. For windows, cowlings, funnels & tanks. Celluloid 8x14--10¢ 14x16--20¢

SCOTCH MASKING TAPE: Has close adhesion but can easily be removed. Be sure paint is dry. 3 feet---5¢

SCOTCH CELLULOSE TAPE: Transparent, has strong but not permanent adhesion. Extra strong; for holding wing fairings, doors, removable wires, temporary covering repairs. Can be reused.--100" Roll 1/4" width---10¢

FIBER: Excellent substitute for plywood. Use 1/64 for curves and 1/16 for mounting electrical appliances. 1/64"size | 3x6--5¢ | 1/16" size
6x6--10¢ | 6x12--18¢ | 3x6---15¢



JASCO Ball-Bearing Washers

Our latest Ball-Bearing Washer is a marvel of precision and machine-work, far beyond the price listed. Although the outward appearance is similar to the original design, changes have made it the best washer now on the market. This is a rather bold statement, but a comparison will prove our statement. The most important change is the addition of a center retaining washer. This washer keeps three 3/32" high grade steel balls separated at all times, thereby avoiding internal friction, and also keeps them free from dust and grit. The size of the washer has been kept the same, as a smaller size necessitates finer parts which do not stand up under the ordinary abuses common to models. The larger bearing surface also keeps the propeller more readily in the correct thrust adjustment. The improved JASCO Ball-Bearing Washers can be used for as many strands as you can use on the model. During a recent test, the washer was compressed between a high speed electric drill and a wooden table, under a pressure of about 50 lbs. After being subjected to a high speed run of over 10,000 r.p.m.'s for several minutes, the washer showed no signs of wear although the table top was charred by the heat generated.

With all these improvements we have also managed to decrease the weight to .013 oz. This has been made possible by using brass races, by having a hole-lightened center Monel washer, and by using only three balls. The washer is slipped on the shaft like an ordinary flat washer. It can be used time after time as it is the only washer to have the eyelet-retaining feature. The shaft hole will take wire up to 1/16" diameter. The advantages of using Ball-Bearing Washers are self-evident. The most important ones also that there is a definite friction reduction between the propeller and the plug when the propeller is freewheeling. We might mention that the majority of the 1934 contest-winning models were equipped with Ball-Bearing Washers.

Ball-Bearing Washer ---10¢ each---3 for 25¢

Flat Washers Use two oiled flat washers for thrust. Less friction than cupped, but must be oiled. Be sure to keep grit free. Price--1/8, 3/16, 1/4,--3¢ per doz.

JASCO Special Balsa Structural Sections

Our 1936 Catalogue listed a very complete assortment of structural sections. This was for the purpose of determining just what sections and sizes were applicable to practical model work. Our present list will fill every practical need. You will note that the sections shown can be used advantageously in a great many combinations. At present the use of the sections is not comparatively widespread probably because few model builders realize the advantages of structural sections for model work. With the weight rules changing and the high power fetish slowly gathering momentum, the use of structural sections will soon be taken for granted. Why not look deeper into this phase of engineering?

The sections listed are made of stock that is straight and of even grain, and cut on the grain line which gives the

JASCO Freewheeler

The JASCO Freewheeler has withstood tests of thousands of flights. Its rugged construction easily withstands the torque of 20 strands of 1/8" rubber. The special shape provides a large cementing surface and several different means of attachment. In an emergency, it may just be bent to a "U" shape and slipped onto the propeller all ready to work. Many times have we heard the ominous whizz of a homemade freewheeler on its way to destruction, and after we handed the poor lad a JASCO Freewheeler, his grateful look had to be seen to be appreciated. The spiral cut provides automatic disengagement when the power is exhausted. The elimination of springs considerably lessens the pressure of the propeller hub against the plug during the freewheeling period, and results in a consequent decrease of drag. The only precautions to bear in mind, when using a JASCO Freewheeler, are to use a large size of wire to prevent the straightening of the bend in the shaft, and to have the shaft hole as far from the spiral cut as possible to eliminate the possibility of the bend curve chewing the engaging point. A tube bushing is furnished with each JASCO Freewheeler.

JASCO Freewheeler, -Right or Left--5¢ each

JASCO Thrust Bearing

There is nothing like a weak bearing to discourage any further contest efforts of even the most fanatical builder. A strong bearing will keep the propeller adjustment and save a great deal of time. JASCO Thrust Bearings are made of semi-round wrought iron, and are not tempered. A tempered bearing cannot be bent to any other shape except that of the original, and it is more likely to crack if it is in a collision or if it is overloaded. All thrust bearings and any other metal parts that carry a load should be roughened before being cemented and bound to the balsa. If the bearing becomes loose during a contest, when time is at a premium, bind in place very tight with rubber instead of thread.

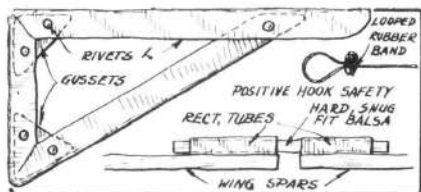
The figures of the Maximum Safe Load on the chart are a little on the safe side. A slight increase may be made, but be sure to test your own figures at home before entering a contest. Since thrust adjustments are very important in every design, a simple double bearing is given with each #2 and #3 bearing. These are bent and bound to the sticks, as shown. The bearing shaft hole is large enough to accommodate the largest diameter wire usually used for that particular number of strands.

#	Size	Shft. Hole	Safe Load	Price
1	Small	.023	4 str. 1/8	2¢
2	Medium	.046	8 str. 1/8	3¢
3	Large	.046	14 str. 1/8	4¢

most strength for the weight of about 8-10 lbs. per cu. ft. for ordinary outdoor work. Use the color-coding when ordering.

TRAILING EDGES			BALSA ANGLES		
36" Length			36" Length		
W	T	Price	W	T	Price
1/4	5/64	3¢	1/8	1/8	3¢
5/16	3/32	3¢	5/32	5/32	4¢
3/8	1/8	4¢	3/16	3/16	5¢
1/2	5/32	5¢	1/4	1/4	6¢
48" Length			3/8	3/8	12¢
5/8	3/16	8¢	"U" BEAMS		
3/4	1/4	10¢	1/2	1/4	8¢
7/8	9/32	14¢	3/4	3/8	10¢
1	5/16	18¢	1	1/2	14¢

Stock Color-Coded--from 8 to 12 lbs.





Aluminum and Duraluminum

JASCO Aluminum and Dural have almost unlimited applications in model work, as they are light and can be easily formed to whatever shape is needed. When working with metal, the importance of good workmanship cannot be overemphasized. Sloppy fittings, rough edges, and poor foundations will cause more trouble than you can imagine. A hack saw, a drill, a file, a hammer, pliers and a vise are about all the tools you will need.

The aluminum is the softer of the two, and it can be bent, shaped, and hammered very easily to sharp corners. The dural is normally brittle and it can be bent only in an arc. Rebending will very likely produce a fatigue crack. However, it can be temporarily annealed by heating it just under a blistering temperature. Let it cool and then bend it to whatever form is needed. This annealing condition will last from a few hours to a day.

SECTIONS—Angles are used mostly for motor mounts, although other sections may also be used for this purpose, but they are especially suited for joining two piece wings.

Aluminum & Dural Angles	
	$\frac{1}{2} \times \frac{1}{2}$ —15¢ $\frac{3}{4} \times \frac{3}{4}$ —20¢
	Rectangular Aluminum $\frac{1}{2} \times 1$ —25¢ $\frac{3}{4} \times 1\frac{1}{2}$ —35¢
Price per foot	

JASCO Brass

JASCO brass is used wherever soldering is needed for strength or for something that is to be airtight, such as, a gas tank. When repairing gas tanks, use a soldering iron. Never use a torch, as a torch often sets off gas fumes in the tank with a consequent explosion. Soldering is a comparatively easy task if you clean the surface to a shine. In repairing, wash off the oil with gasoline, and then scrub with a wire brush or sandpaper. Use a large soldering iron, as the heat necessary to melt the solder must be transferred to the work with it. After the object is clean, coat it with flux and apply the iron. As soon as the solder on the tinned iron begins to flow to the brass, more solder should be melted on the iron and transferred to the brass. Do not use too much solder, and be sure to have it flow upon the joints smoothly. Avoid lumpy soldering, as it usually indicates insufficient heat, and this condition has a habit of just overlapping the openings without actually sticking to the metal.

SHEETS—Used for making gas tanks and electrical connections.

Size	6x6	6x12	Size	6x6	6x12
.010	10¢	17¢	.032	14¢	24¢
.016	11¢	19¢	.050	28¢	50¢

TUBING—Used for freewheeling, gear shafts and bearings, and gas connection bushings.

Dia.	Wall	Price	Dia.	Wall	Price
1/16	.016	10¢	1/4	.035	15¢
3/32	.016	10¢	5/16	.035	20¢
1/8	.016	10¢	3/8	.035	25¢
3/16	.016	12¢	Price per Foot.		

JASCO Celluloid-Treated Cambric Tubing

Cambric tubing is superior to rubber tubing for cover-

SHEETS—The smaller gauges are ideal for covering curves, fire walls, control tabs, and other parts that have to take abuse. The large gauges of aluminum can be hammered into compound curves, and the dural can be cut and worked into motor mounts and landing gear fixtures.

Aluminum				Dural		
Size	6x6	6x12	12x12	6x6	6x12	12x12
.006	6¢	10¢	18¢	x	x	x
.010	7¢	12¢	20¢	10¢	18¢	30¢
.016	8¢	14¢	25¢	14¢	25¢	40¢
.025	x	x	x	16¢	30¢	50¢
.032	14¢	26¢	45¢	20¢	34¢	60¢
.040	x	x	x	22¢	38¢	65¢
.064	30¢	50¢	90¢	40¢	70¢	\$1.20

TUBING—Tubing is useful for freewheeling, telescoping wing connections, landing gears when flattened, axle and shaft bearings, and motor mount braces. Flatten and roughen when fixing with cement and thread to balsa and drill for bolts when fixing to hard wood.

Aluminum		Dural	
Dia.	Price	Dia.	Price
.010 Wall	1/32 Wall	.035 Wall	
1/16	9¢	3/16	10¢
3/32	9¢	1/4	10¢
1/8	9¢	5/16	12¢
5/32	10¢	3/8	14¢
		1/2	30¢

RIVETS—Rivets are best for permanent connection, especially where the vibrations are strong. Expose one diameter length for riveting and have a firm backing to prevent any enlarging of the hole.

Dia.	Length	Price per doz.	
1/16	1/8	4¢	DURAL
3/32	3/16	4¢	&
1/8	1/4	5¢	ALUM.



JASCO Wire

Wire parts should be made with smooth curves and bends. Ends should be smoothed with a file or a stone. Always use the size of wire that will provide a generous safety factor. Use safety hooks for rubber motors. Sand and oil dull or rusty wire. The larger sizes of wire can be bent in sharp curves by placing them in a vise and hitting just above the jaws. The wire cannot be threaded without annealing, which can be done by heating the wire red hot and by letting it cool very slowly. To cut heavy gauges, file a groove all around and then bend sharply. File off any protruding burrs to avoid injuries.

STRAIGHT POLISHED MUSIC WIRE

3 Foot Lengths

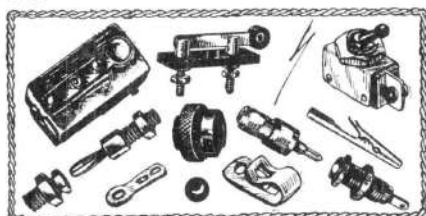
No.	Gage	Price	Max. Rubber Loads
1	.010	2¢	ROG Clips, Springs
3	.012	2¢	1/32 & 3/64 Rubb.
5	.014	2¢	1/16 & 5/64 "
6	.016	2¢	3/32, 7/64, 1/8 "
8	.020	2¢	Bearing, 1/8, 3/16 "
10	.024	3¢	4 Strands of 1/8 "
13	.030	3¢	6-8 Str. 1t. Ld. Gr.
15	.034	4¢	8-12 " 3 oz. "
16	.038	4¢	10-14 " 4 oz. "
18	.040	5¢	14-18 " 5 oz. "
1/16	.062	8¢	18-36 " 8 oz. "

5 Foot Lengths for Gas Models

3/32	.094	15¢	Ld. Gr. up to 3 lbs.
1/8	.125	25¢	Ld. Gr. up to 8 lbs.

ing wire hooks. Its tenacious interlaced threads prevent chaffing and tearing. No amount of rubber pressure will be able to cut it in two. It can be re-used, and it will save many motors. Will take 1/16 wire

CAMBRIC TUBING-----1 Foot-----15¢



JASCO Electrical Appliances

It is true that most motor troubles are caused by poor electrical wiring and connections. If you will keep in mind that every splice is just another spot where a connection may be broken completely or cause a high resistance, you will realize the importance of having the fewest possible connections. All connections should be soldered, or bolted, and taped to prevent oil, cement, or dope and other insulating materials from saturating the splice. Also, if possible, make all connections behind the fire wall to keep the wire free from oil. Take care to keep the wires away from any sharp edges which might cut through the insulation, thereby exposing the wire for possible short circuits.

SWITCHES: Mount switches away from oil sprayed area since oil is an electrical insulator. Toggle design with covered movement is best, but be sure that it has positive action or your coil might burn up if contacts are touching and switch on. JASCO Toggle Switch is the best obtainable and made by reputable manufacturer. Look for the H & H mark when buying switches.

MIDGET KNIFE SWITCH S.P.S.T.---25¢
JASCO SPECIAL TOGGLE SWITCH---35¢
With 1 foot soldered leads-----40¢

CONNECTION CLIPS: For battery box, neat connection points for removable wire points-----2 for 5¢

JACKS & PLUGS:--For Booster Battery connections. Mount on Fibre and keep away from oil. Solder connections. Midget TIP & PLUG combination is for light connection. For best and positive connection use Midget BANANA JACK & PLUG combination with their large contact surface.

MIDGET JACK--10¢ No Solder PLUG--10¢
BANANA JACK--10¢ No Solder PLUG--10¢

HOOK-UP & HIGH TENSION WIRE: Multi-strand tinned wires. Hook-up wire is rubber covered and can be easily peeled and soldered for connections. High Tension is Cambric covered celluloid treated wire for maximum insulation of the coil and plug connection. Best by actual use.

HOOK-UP wire-----6 feet for 10¢
HIGH TENSION Ignition Wire--1 ft.--5¢

CONNECTION LUGS--No Solder--6 for 5¢

INSULATION CROWMENTS:--For passing wires through metal or wood bulkheads. Has a nut for fixing. 1/8" Dia. hole, needs 3/8" mounting hole. INSULATION CROWMENTS-----10¢ each

ACCURATE CUT-OFF TIMER:--Precision device for timed flights. Can be mounted with small metal bands. With ON & OFF lever. Needs external switch. Most reliable and lightest timer yet found. 1 to 50 seconds range. CUT-OFF TIMER-----\$1.50 Postpaid

MIDGET ALLIGATOR CLIPS:--Should only be used for temporary and testing connections-----10¢ each

Brass Screws and Nuts

The bolt and nut method of fastening is the most practical method for holding hard wood or metal parts together. On gas model work where vibration often loosens the nut, it is advisable to use lock washers for all metal fixtures and a flat washer for wooden type. Also use a double nut lock for extra precaution. The Fillister type of head is furnished in as many sizes as obtainable. Wood screws should be used on fairly hard wood, for best results.

Size	Mach.	Wood	Spec.
1/4"	8¢	6¢	10¢
3/8"	12¢	8¢	15¢
1"	18¢	10¢	20¢

All fit 3/32 dia. hole. Price per dozen complete with nuts. Note self-locking feature on the special split-screws.

FLAT & LOCK WASHERS to fit above screws-----per dozen-----4¢

Block Plane

Inexpensive but serviceable planes. Screw operated cap clamps. Bottoms polished.

Cutter
1 inch
Length
3 1/2 inches

60¢



NOSE PLUG ACCESSORIES

HARD WOOD PLUGS: Small size for low power and axle bush. Large will take 24 str. 1/8. Drill off center for adjustable thrust. Have one on every shaft for easy prop removal. Both for 1/16 wire. Small 1/2" Face 1/2" Hub-----1¢
Large 1" Face 1/2" Hub-----3¢

BRASS BUSHING: 1/2" Lt. for 1/16. Force fit into above 1/2 Doz.--5¢

EXTRA LARGE FACE BRASS BUSHING: 1/2" protrusion, 7/8" face. Crimp edges for cementing---3 for 5¢

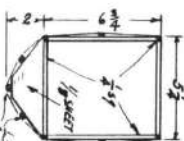
SPECIAL THREADED BRASS BUSHING: Just what we have been looking for! 1" Lt., 1/8 dia. 1/16 accurately drilled center hole. For shaft bearings on plugs, gears, wheels, adjust, thrust, tension spring holder & prop removal. Will take any power.--5¢ each.



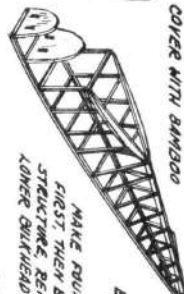
KIT FOR THIS DESIGN
READY SOON - MATCH
FOR ANNOUNCEMENT

AIRFOIL GÖTT 497- $\frac{1}{2}$ " C-STICK RIBS

TOTAL WT
 $3\frac{3}{4}$ LBS.



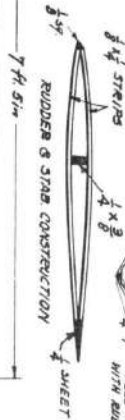
ORIGINAL OUT OF SIGHT
BEFORE 1934 ON 4-1/2" MOTOR
R/W. AT 8" W. OUT 1/2" 1/2"



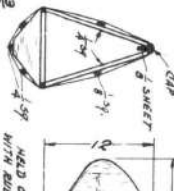
COVER WITH BAMBOO

MAKE FOUNDATION
FIRST THEN BUILD UPPER
STRUCTURE. REMOVE & CEMENT
LOWER ORKAMENDS & SYNCHERS

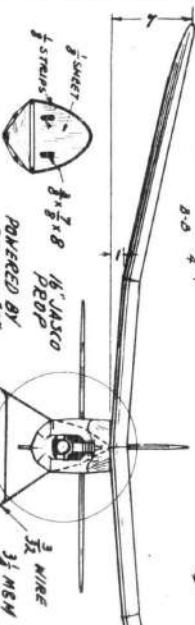
BALSA BLOCKS
1 1/2" x 1/2" x 1/2"



RUDDER & STAB. CONSTRUCTION
7 1/2" x 1/2"



FORKS FOR STABILIZER
1/2" SHEET BALSA FIXED TO THE FUSELAGE



POWERED BY
BROWN-3"
1/2" JASCO
1/2" WIRE
3 1/2" WHEELS

HISTORY

FIRST DESIGN BUILT SEP 1937-ABOUT
TO FLIGHTS TO DATE WITHOUT CRACK UP
HAS EXCEPTIONAL SPIRAL STABILITY
FLIGHT CHARACTERISTICS-TIGHT CIRCLE
VERY SILENT CLIMB-TIGHT CIRCLING
GLIDE & BALANCING TENDENCIES

JASCO FLAMINGO

Designed by ROGER HAMNER - NEW YORK AIRWAYS

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JASCO

"Pioneers in Model Aeronautical Developments"



CATALOGUE & HANDBOOK #7

Junior Aeronautical Supply Co.

100 East 10th Street — New York, N. Y.

THIS catalogue is expressly intended for those of you who have been building models long enough to know that quality supplies are essential for continued success.

THE character of any business can be best judged by the character of its customers. Our roster of customers is small, but it consists of those who are the life-blood of the hobby. You will find them as contributors to your favorite magazine, winners of contests, record holders and serious experimenters. A great number of our earlier friends are now active in the aeronautical industry.

OUR aim is modest. It is not to be the richest, nor the largest, but to be the world's finest supply company.

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Junior Aeronautical Supply Co., New York, N. Y.

"C" (Quarter Grained) Balsa Background.

CHARACTERISTICS OF BALSA WOOD

Balsa is particularly adaptable for model airplane use because of its lightness and growth structures. It is made up of countless number of air cells or pockets into which fast drying cement can flow and hold pieces together. Light Balsa has large sized cells, while heavier grade has smaller.

The sketch shows three possible cuts. You will recognize "A" by its velvety feel and by the ease with which it can be bent into tubes. "B" has tiny speckles and feels stiffer when bending. While "C" has large speckles and glazed surface, and it is especially stiff when trying to bend it. These special characteristics can be used as follows:

"C" cut is perfect for compression members such as ribs and bulkheads. It can be loaded three times as much as "A" of similar size before it will bend or buckle. "C" ribs will keep shape under covering pressure which would normally double up an "A" cut rib. Bulkheads need not be double-plied when cut from "C" cut stock. Use "C" whenever possible to obtain maximum strength with minimum weight. Chart below gives the maximum radius to which "C" can be bent without cracking.

"A" cut is a natural bender and it can be bent considerably without moistening. When wet, it can be bent into surprisingly small diameters. "B" cut has in-between characteristics of "A" and "C". It should be used when bending requirements exceed "C" safety, but are not so severe as those covered by "A". The above information is especially applicable for sheet stock.

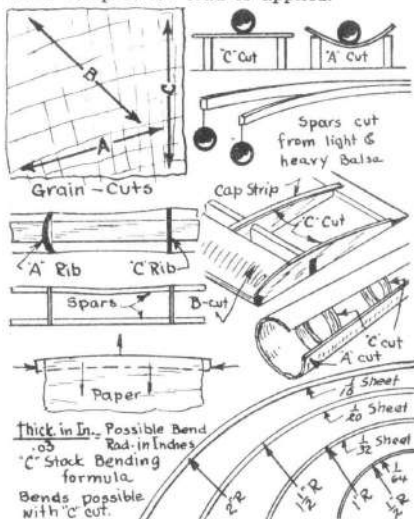
Strength of balsa depends on its density or weight per cubic foot. Two spars cut to identical size but of different weight will vary in strength according to the difference in weight. That is, a spar cut from 12 lb. stock will have twice the strength of a same size cut from 6 lb. balsa. Or we can look at it from another angle. If weight of two spars is same regardless of their dimensions (except that their cross sections are of similar shape) their strength will be same. Ex. A $\frac{1}{2} \times \frac{1}{2}$ spar cut from 12 lb. balsa will have same strength as a $11/64 \times 11/16$ spar cut from 6 lb. stock.

The above paragraph shows that the strength of balsa depends on the weight of the stock from which it is cut. However, there is a distinction between hard and soft stock spars which we must consider. A smaller cross sectioned spar (cut from heavier balsa) will bend almost twice as much as a larger cross section spar (cut from light stock) when under same load. So if we were to multiply the load by the bending distance we will find that the harder stock spar will consume greater amount of energy (Load x Distance). In practice: When a wing tip hits the ground a light balsa spar might snap at comparatively small bending moment. While the hard but smaller balsa spar will absorb the shock by its ability to bend or flex a longer distance.

Balsa is strongest when under direct compression. Small size spars or strips will

take enormous loads under such conditions. But once they are bent out of direct line, their strength drops very rapidly. Balsa will crush, instead of bending, if the distance between the supports is not greater than eight times its smallest dimension. Ex: $\frac{1}{8}$ sq. should be fixed at 1" intervals to obtain maximum compression load advantage.

In practice: A strip or spar having long distances between supports should be made of large cross section and light stock if weight is important. In multi-spar wing construction, the spars are under tension or compression. Those under compression will bend or crack very easily if ribs are spaced too far apart. In fuselage construction we get around the spacing rule by pre-bending the longerons and using the covering to prevent them from buckling outward when compression load is applied.



One secret of fine workmanship is to use light, generously sized balsa. It can be easily shaped with razor or sandpaper. This is especially true for ribs, bulkheads and tip outlines which are cut by template-guided razor. On light stock, the blade follows the template edge without trouble. While on hard balsa it tries to follow the grain instead of the template with consequent ragged and uneven outline. - - - Also use light and thick sheets for covering curves. You will be able to use sandpaper without fear of breaking through the sheet when removing rough and high spots, and smoothing butt joint. By being generous with sandpaper, the entire job will look as though it was carved from one piece. - - - As you probably know, thin sheets allow very little sanding and the job must be left in natural state. Thin sheets also tend to sag between supports. For average rubber powered model work use $1/20$ " or thicker sheets. Let the size of the model dictate the choice of sheet when in doubt.

"Be happy. Use good supplies, and avoid exasperations."

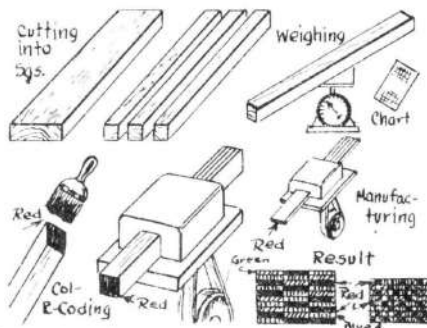
BALSA is the backbone of the model airplane building. About 4,000,000 bd. ft. of it are used annually by the industry. It is imported from Ecuador in rough planks, kilndried and surfaced here. Known as the lightest wood, it varies in weight from 3.5 to 20 lbs. per cubic foot.

To take care of the 600% weight variation of BALSA, JASCO invented the COL-R-CODE system. This idea eliminates the guessing game between the model builder and the shipping department. It consists of reducing a balsa shipment into small 2" square units which are individually weighted and end-colored according to the JASCO COL-R-CODE. The completely colored ends assure continuous check on the weight (or strength) of BALSA during production, distribution and final use.

JASCO GRAIN-GRADING into "A", "B" and "C" cuts is easily accomplished because of small units needed for COL-R-CODE. The square unit can be cut on any of the two sides according to the GRAIN-CUT request.

Another feature which you will like on JASCO BALSA STOCK is its SMOOTH-SAW-CUT surface. This is quite a pro-

duction accomplishment when you consider the structure of balsa. When cut with standard saw blades, its soft texture and stringy fibers produce chunky saw dust which is caught and jammed between saw teeth. It is this jammed and chunky dust which produces deep scratches and grooves on ordinary BALSA stock, and not the dullness of the blade as you would suspect. Saw blades used by JASCO are designed for BALSA cutting only, and they produce very



fine, powder like, saw dust which does not scratch nor groove the stock as it is being cut.

Why do we stress "SAW-CUT-SMOOTH" surface? You will note on photos that JASCO saw cut produces clean lines. While scratched or production sanded balsa has grooves which can only be removed with fine sanding. When a scratched or grooved piece is under stress, the entire load becomes concentrated on the weakest spot. On smooth stock the load is distributed all over. You can try this yourself by running a small scratch along or against the grain. The stock will always break along the scratch. BALSA spar or strip is as strong as its deepest scratch. Use SMOOTH SURFACED BALSA and avoid carrying dead weight.

JASCO BALSA COL-R-CODE

The following COLOR CODE was established by JASCO to enable you to order what you need with assurance that you will get it. JASCO Code is based on the poundage per cubic foot. JASCO BALSA STOCK is trimmed to smallest practical size and its poundage identified by exact scale and charts, and not by how it looks to the eye and feels to the hand while in plank width. This means scientific control of strength in full sense of the word.

Wt. per cu. ft.	COL-R-CODE
6 lbs.	Yellow
7-8	Orange
9-10	Red
11-12	Green

Wt. per cu. ft.	COL-R-CODE
13-14	Blue
15-16	Black
Over	Natural

JASCO Outdoor 36" Balsa Strips are stocked according to the expected demand and use. Small sizes ($\frac{1}{8}$ to $\frac{1}{4}$) are cut from hard balsa, Green and Blue, so that they will have sufficient strength to withstand rough handling and sudden loads despite their small cross sections. Larger

sizes ($\frac{1}{2}$ and up) are cut from Red and Green because they are normally used for lower stress work which is usually shaped. We do stock most of the sizes, but in limited quantity, in all weights between Yellow and Blue. However, it is advisable to order strips in grades recommended so that you may not be disappointed. Strips are cut smooth, straight and to the exact dimensions listed.

COL-R-CODE RECOMMENDATIONS

YELLOW: Planking, filleting and where little strength is required.

ORANGE: Stringers, bent ribs, indoor flying scale longerons and spars, large sized shaping ribs.

RED: Large sized spars, longerons, motor sticks diagonal braces and stringers.

GREEN: Longerons, spars and strong stringers. A good all around grade for average work.

BLUE: For small spars, longerons and stringers which are highly loaded or roughly handled.

JASCO 36" BALSA STRIPS

1/16 sq. 2 for 1c	5/32 sq. 1c
1/16 x $\frac{1}{8}$ 3 for 2c	3/16 sq. 2 for 3c
1/16 x $\frac{3}{16}$ 4 for 3c	3/16 x $\frac{1}{4}$ 2c
1/16 x $\frac{1}{4}$ 1c	3/16 x $\frac{3}{8}$ 2 for 5c
1/16 x $\frac{5}{8}$ 2 for 3c	3/16 x $\frac{1}{2}$ 3c
1/16 x $\frac{1}{2}$ 2c	1/4 sq. 2c
3/32 sq. 3 for 2c	1/4 x $\frac{1}{8}$ 2 for 5c
3/32 x $\frac{3}{16}$ 1c	1/4 x $\frac{1}{2}$ 3c
3/32 x $\frac{1}{4}$ 2 for 3c	1/4 x $\frac{3}{8}$ 2 for 7c
3/32 x $\frac{5}{8}$ 2c	1/4 x $\frac{1}{4}$ 4c
3/32 x $\frac{1}{2}$ 2 for 5c	5/16 sq. 3c
1/8 sq. 7 for 5c	3/8 sq. 2 for 7c
1/8 x $\frac{1}{4}$ 2 for 3c	3/8 x $\frac{1}{2}$ 4c
1/8 x $\frac{3}{8}$ 2c	3/8 x $\frac{3}{8}$ 5c
1/8 x $\frac{1}{2}$ 2 for 5c	1/2 sq. 5c

"JASCO introduced COL-R-CODE and GRAIN CUTS in 1936.

JASCO 36" Balsa Sheets

JASCO Balsa Sheets are cut from 6 to 12 lb. stock. (Yellow to Green). Any desired Grain-Cut may be had in sizes from 1/64 to 3/32 on 2" wide sheets. And 1/32 to 1/16 on 3" sheets. Thicker sheets are cut to favor "C".

It is our policy to favor thin sheets as much as possible, both in quality and Grain-Grading. Although we are able to supply thicker sheets in any desired Grain-Cut if stock on hand permits, we reserve the right to ship them in whatever Grain-Cut we may have. If you must have a specific Grain-Cut, please advise so that your order may be filled when a new shipment is received.

GRAIN-CUT and COL-R-CODE

RECOMMENDATIONS

Order "C" cut for ribs, bulkheads and wherever the stock does not have to be bent beyond the limits listed. Use "B" for leading edges and whenever slightly curved portions have to be covered. "A" is for sharp bends and tubular work. Both "A" and "B" can be used for sheet type of fuselage construction if light stock is used. **YELLOW:** Sheet balsa fuselages, cowlings, monocoque strips, fillets, fill-ins, glider wings, tail stock. On light rubber designs: Outline formers, leading edges, bulkheads,

superstructure and tubular work.

ORANGE: Rubber motor tubes, flat sided fuselages, light ribs, wing tip and tail outlines which use much balsa, bulkheads for rubber models and low stressed gas jobs, leading edge covering. Good grade for all around work where shaping with normal strength is required.

RED: Used mostly for gas model ribs, bulkheads, strong tips, large tubes, and wherever fair strength is needed. Can be used for practically everything because of its in-between hard and soft characteristics.

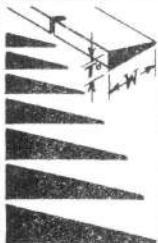
GREEN: Extra strong bulkheads, nose plugs, anchor fill-ins, tapered spars and parts that have to take wear and tear.

36" Balsa Sheets

		3" WIDTH
1/64 x 2	6¢	
1/32 x 2	5¢	1/32 x 3 9¢
1/20 x 2	5¢	1/20 x 3 9¢
1/16 x 2	5¢	1/16 x 3 9¢
3/32 x 2	6¢	3/32 x 3 10¢
1/8 x 2	7¢	1/8 x 3 12¢
5/32 x 2	8¢	5/32 x 3 12¢
3/16 x 2	9¢	3/16 x 3 13¢
1/4 x 2	10¢	1/4 x 3 15¢
5/16 x 2	12¢	5/16 x 3 18¢
3/8 x 2	13¢	3/8 x 3 20¢
1/2 x 2	15¢	

TAPERED TRAILING EDGES

PRE-CUT TRAILING EDGES. For real time saving and precision construction. Cut true and straight from RED, GREEN and BLUE stock. Obtainable in two tapers, 16° and 12°. 16° taper will accommodate all airfoils whose thickness at the 90% Chord station is between .28 and .30 of chord: (Clark Y, R.A.F. 32 and NACA 6412.) 12° is for airfoils having .20 of chord at the 90% Chord station: (NACA 6409, Eiffel 400 and Göt. 497.) The thickness dimensions given are closest to 1/64th reading.



36" TRAILING EDGES

W	T 16°	T-12°	Price
5/16	5/64	X	3¢
3/8	7/64	5/64	3¢
1/2	9/64	7/64	4¢
5/8	11/64	9/64	5¢

46" TRAILING EDGES

W	T 16°	T-12°	Price
3/4	7/32	5/32	7¢
7/8	1/4	3/16	9¢
1"	9/32	7/32	12¢

JASCO GAS MODEL Balsa

JASCO Gas Model 48" Balsa strips are cut from 13 to 17 lb. balsa; BLUE to NATURAL. BLUE stock is recommended for stringers, large size spars, leading and trailing edges, and longerons which have rounded corners. Use BLACK for standard longeron and spar needs. It is a good all around grade which will fill almost every need in gas job construction. For extra strong longerons or spars, order NATURAL grade. The 48" length will meet all standard needs at lower cost than longer lengths.

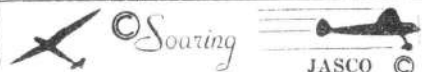
48" GAS MODEL Balsa STRIPS

1/8 sq.	3 for 4¢	3/16 x 3/4	6¢
1/8 x 1/4	2¢	3/16 x 1	2 for 15¢
1/8 x 3/8	3¢	1/4 sq.	3¢
1/8 x 1/2	2 for 7¢	1/4 x 1/2	5¢
1/8 x 5/8	4¢	1/4 x 3/4	7¢
1/8 x 3/4	5¢	1/4 x 1	9¢
1/8 x 1	6¢	5/16 sq.	4¢
5/32 sq.	2 for 3¢	3/8 sq.	2 for 15¢
3/16 sq.	2 for 5¢	3/8 x 3/4	9¢
3/16 x 3/8	2 for 7¢	1/2 sq.	8¢
3/16 x 1/2	4¢	1/2 x 3/4	10¢
3/16 x 5/8	5¢		

JASCO MONOCOQUE STRIPS

No model building career is completed without making one or more monocoque models. It is an experience in fine workmanship you will not want to miss. Surprisingly easy if you have the patience. To simplify construction and encourage monocoque construction, JASCO stocks specially light balsa at extra low prices. Sold only in full or half bundles.

1/16 x 3/8	30 for 25¢ (Rubber & CL "A")
3/32 x 3/8	25 for 25¢ (CL "B" Gas Model)
1/8 x 3/8	20 for 25¢ (CL "C" Gas Model)



CARVING Balsa BLOCKS

Soft balsa stock set aside especially for light carvings. For harder grade specify need or poundage. For longer sizes than listed add cost per inch set in (—), to the basic size price. Please add 10¢ for packing and postage because blocks are shipped separately.

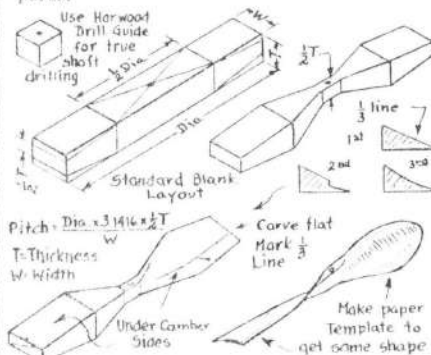
1 x 2 x 4—3¢ (3/4¢)	2 x 3 x 4—8¢ (2¢)
1 x 3 x 4—5¢ (1¢)	2 x 4 x 4—10¢ (2 1/2¢)
2 x 2 x 4—5¢ (1 1/4¢)	2 x 6 x 4—15¢ (3 1/4¢)

Now flattered by imitations.—For true CODE use JASCO Balsa."

JASCO OUTDOOR PROPELLERS AND SUPPLIES

The importance of props on performance of the model ranks next to stability. Do not expect poorly made props to pull your model high enough for good thermal hunting. To date we have found no ready made substitute which could take place of hand carved balsa prop. We wonder why some of you hesitate to carve props. The job is comparatively easy if you follow a definite system.

Steps in prop carving: Draw on the block the blank outline. Drill shaft hole. Cut block to exact blank outline. Cut away the bottom camber to a flat surface. Draw a line $\frac{1}{2}$ of blade width back of the leading edge. Cut front portion of the undercamber to this $\frac{1}{2}$ line. Then cut away the rear part. (All this while you should be checking both blades to make sure that they are similar.) Sandpaper with rough and smooth grades until the undercamber is completely finished. The upper camber is carved away with care as the thickness becomes critical. The exact airfoil shape can be had by continuous check with fingers for differences in thickness. Cut tips to elliptical outline. Sand smooth and check for balance. Cement bushing in shaft hole. Coat blades with clear dope, sandpaper, and then apply about four coats of cement thinned with dope until you obtain a celluloid skin which protects and strengthens the blades. You can use silk or paper for covering, but you will have to add several coats of cement or woodfiller to fill the pores.



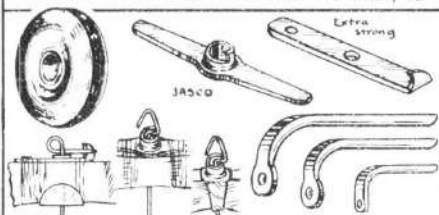
JASCO PROPELLER BLOCKS are cut from 9-12 lb. Balsa. (Small diameters are mostly light.) Note the generous block dimensions to enable you to carve large area blades which are needed to efficiently absorb high power. Also included are several blocks suitable for single blade folders.

6 x $\frac{5}{8}$ x 1	3c	11 x $1 \frac{1}{4}$ x $1 \frac{1}{4}$	14c
7 x $\frac{3}{4}$ x $1 \frac{1}{4}$	4c	15 x $1 \frac{1}{8}$ x $1 \frac{1}{8}$	15c
8 x $\frac{7}{8}$ x $1 \frac{1}{2}$	5c	16 x $1 \frac{1}{2}$ x 2	16c
9 x 1 x $1 \frac{1}{2}$	6c	17 x $1 \frac{1}{2}$ x 2	20c
10 x 1 x $1 \frac{1}{2}$	8c	18 x $1 \frac{1}{4}$ x 2	22c
11 x 1 x $1 \frac{1}{2}$	9c	SINGLE BLADES	
12 x $1 \frac{1}{8}$ x $1 \frac{1}{4}$	10c	9 x $1 \frac{1}{2}$ x 2	10c
12 x 1 x $1 \frac{1}{2}$	8c	10 x $1 \frac{1}{4}$ x 2	13c
13 x $1 \frac{1}{8}$ x $1 \frac{1}{8}$	12c	10 x $1 \frac{1}{4}$ x $2 \frac{1}{4}$	15c

JASCO BALL BEARING WASHER Another JASCO development now in universal use. Simple but effective design. Just slips on shaft like an ordinary washer with none of its faults. A center washer keeps balls separated and free from dust and grit. Besides minimizing thrust friction to a very small degree and letting full power of the rubber react on the propeller, it also provides a large steadying surface for the prop hub. With price reduced so low on the popular size you will find it to your advantage to use JASCO BALL BEARING WASHER on all your ships. Use it wherever you need a dependable thrust bearing. It is used on the escapements of many radio control models.—The large 7/16 diameter size can handle all the rubber you can wind. Slips easily on 1/16 shaft. The smaller 5/16 size will take .040 and can handle 24 strands

JASCO BALL BEARING WASHERS

SMALL 5/16 Dia.—Fits .040 Wire 10c ea.
LARGE 7/16 Dia.—Fits .062 Wire 5c ea.



JASCO FREE WHEELERS

JASCO FREE WHEELER: It is still the simplest method to achieve efficient, trouble free and guaranteed freewheeling. Special shape provides large cementing surfaces and several ways of attaching to the hub. It can be shaped into "U" and used in emergency without cementing. Although the spiral hub is large, have the shaft hole as far as possible from the engagement point. Will safely handle 20 strands of $\frac{1}{8}$ th, and .019 wire shaft. Complete with $\frac{1}{2}$ brass bushing for shaft bearing.

JASCO FREE WHEELER 5c

EXTRA STRONG FREEWHEELING:

Proven design for high power of 36 strands of $\frac{1}{8}$ and 1/16 shaft. Made of 1/32 thick brass. The shaft automatically disengages without use of springs when power is exhausted. Drilled for anchor and shaft bearing holes. Complete with large face bushing for hub bearing.

STRONG FREE WHEELER 2 for 15c

THRUST BEARINGS: Made from malleable Steel. Will take shocks without breaking. Have good washer or bearing surface. Roughen and bind with thread and cement. If a bearing breaks off the mounting, bind it in place with tightly wound rubber for temporary need. See chart for shaft hole size and maximum safe load of $\frac{1}{8}$ th.

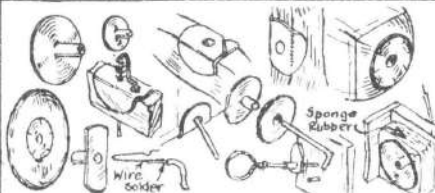
No.	Size	Shaft Fit	Safe Load	Price
No. 1	SMALL	.024	4 strands	2c
No. 2	MEDIUM	.031	8 strands	2-5c
No. 3	LARGE	.040	11 strands	3-1/2c

JASCO pioneered in the development of devices and methods for

JASCO LARGE FACE BUSHINGS

JASCO LARGE FACE BUSHINGS: No end of usefulness on rubber and gas models. Large face can be cut, crimped and notched for special needs and extra strong cement anchorage. Now used for prop hubs, nose plug bearings, light freewheeler, balsa wheel bushing, landing gear anchors, rubber anchorage, booster jacks, rubber tension hook, spring type of freewheeler, contacts for battery boxes and many other devices we cannot remember at the moment. If you ever had trouble with tubes loosening in soft balsa and upsetting your line-up, you will appreciate the design of the **LARGE FACE BUSHINGS**.

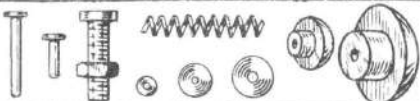
SMALL: $\frac{3}{8}$ " Face $\frac{1}{8}$ " Hub-.075 I.D.—5 for 5¢
LARGE: $\frac{7}{8}$ " Face $\frac{1}{4}$ " Hub-.080 I.D.—3 for 5¢



STANDARD BRASS BUSHINGS

Used for prop shaft and axle bushings. May be forced fit into $\frac{1}{8}$ " Face Bushings for snug 1/16 wire fit.

SMALL: $\frac{1}{4}$ " Length.....064 I.D.—10 for 5¢
LARGE: $\frac{1}{2}$ " Length.....064 I.D.—8 for 5¢



JASCO THREADED BUSHING: Made especially for prop shaft bearings on the nose plugs. It sandwiches the nose plug accessories in a tight grip and provides a true bearing for the shaft and surface for the Ball Bearing Washer. Does not depend on cement to hold it in place. Strengthens nose plug laminations, and speeds up work. Also good for gear shaft bearings, wheel bushing and wherever true and long bearing is needed. $\frac{1}{2}$ " long, will take 1/16 shaft and needs $\frac{1}{8}$ " dia. mounting hole.

JASCO THREADED BUSHING 10¢

HARDWOOD NOSE PLUGS Also good for axle bushings. All drilled for 1/16 wire. Best when used with $\frac{1}{2}$ " brass bushing.

SMALL: $\frac{1}{2}$ " Face— $\frac{1}{4}$ " Hub.....1¢
LARGE: 1" Face— $\frac{1}{2}$ " Hub.....3¢

RUBBER TENSIONER SPRING

COIL SPRING: Made from .020 (No. 8) wire. Strong enough to tension 36 strands of $\frac{1}{16}$ th, or spring out shaft for free-wheeling. Pull out for greater power.

COIL SPRING 2 inches for 5¢

FLAT WASHERS: Well made. Oiled flat washers are better than cupped ones. Keep free from grit when using as thrust bearing. 1/8" (.030 I.D.) & 3/16" (.034 I.D.)—2¢ doz.
 1/4" Dia. (.064 I.D.) 3¢ per dozen

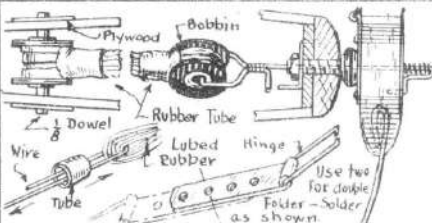
JASCO BOBBINS

BOBBINS just about complete the list of English inventions which brought the wild rubber motor under control. BOB confines rubber strands between two sides and prevents climbing up and out of safety hook. Also keeps motor lined up with shaft and eliminate that awful shaking and swinging when tightly wound rubber insists on creeping up one side. Large diameter shank provides generous area for rubber anchorage and keeps it from cutting through. — The original English plastic BOB is made in one piece. To duplicate it here would be too expensive. JASCO modified it as shown so that it could be sold for 5¢. New construction allows easier shaft bending. Rubber pressure keeps the two hard fiber washers lined-up. Should be used in combination with **RUBBER TUBING** as shown. (Another English idea; like the rubber tensioner.) BOBS are made in two sizes. Large $\frac{1}{4}$ " dia. will take up to 36 strands of $\frac{1}{16}$ th or equivalent. Smaller $\frac{3}{8}$ " dia. will handle 20 strands. Both will take 1/16 wire. **JASCO BOBBINS**—Large or Small 5¢ each

(Bobbin was invented by Mr. Rippon of London. JASCO has the sole manufacturing license for U.S.)

RUBBER TUBING: Keeps strands under control behind the shaft and rear hooks. Red, handmade from pure gum. Used in laboratories. Lively and very "stretchy." Not to be confused with ordinary rubber hosing. Use about $\frac{1}{2}$ " per motor. Motor must be equal-lengthened and lubed before the tube is slipped on. Use "S" hook as shown and stretch rubber as you push the tube on the rubber. Then replace "S" hook with shaft or rear hook. 1/16 walls. Relaxed sizes given. Two sizes: $\frac{1}{4}$ " Inside Dia. for up to 20 strands of $\frac{1}{16}$ th. And 5/16" I.D. which will take 36 strands.

$\frac{1}{4}$ " & 5/16" RUBBER TUBING 3 in. for 5¢



PROPELLER FOLDERS

Contest proven design. Well made from hard brass strips. Angular (12°) hinged to fold blade snugly against the fuselage side. Extra shaft holes to accommodate all possible conditions. Push wire pins through unused holes to prevent shifting. Fix folder to hub and blade with cement and thread binding. Use two for double-folder. Stocked in two sizes. Both will fit 1/16 wire shaft. Small size good for about 20 strands. Larger will easily handle 36 of $\frac{1}{16}$ th.

	Width	Length	Gauge	Hinge
SMALL:	$\frac{1}{4}$ "	1 $\frac{1}{8}$ "	.020	.010
LARGE:	$\frac{3}{8}$ "	1 $\frac{1}{2}$ "	.032	.019

JASCO FOLDERS 15¢ each

controlling the surging power of tightly wound rubber motors."

JASCO INDOOR SUPPLIES

JASCO INDOOR Balsa

Indoor Balsa is graded according to the Grain-Cut and expected use. The lightest balsa (3.8 to 4.5 lbs.) is cut into tubular stock (1/64 A&C and 1/32 A) where bulk is needed for compression and torsion forces. 1/32 B and larger sizes are cut from slightly heavier stock (4.5 to 6 lbs.) and are especially suited for spar, rib and outline work. This grading is now an accepted standard with model builders. Although it seems that the weight difference between light and slightly heavier balsa is small, the difference in the strength will surprise you. This can be best demonstrated by testing each grade. The light stock will crack with a snap and leave a clean-cut edge without strings. While the heavier grade will bend considerably before breaking and when it does break, the ends will still be held together by the stringy fiber structure.

New comers are strongly advised to build sturdy ships to assure a happy and successful career. Learn how to fly and adjust indoor models before attempting "C" cut motor sticks, & tubes, invisible spars and tungsten bracing. Light models will do wonders in hands of experts, but we have often seen the medium weight and dependable job carry away the first prize. Sizes shown on most of the indoor plans are on border line between safety and

trouble. Beginners should be on the plus side of the sizes given.

Indoor construction is simple if care is taken. "A" cut sheets are easily bent into motor sticks and tubes around a form. Sketch shows the process. Extra light tubular work can be made by using 1/64 "C" stock. The method is similar except that it requires extra care and experience. Prebend with fingers before wrapping with tissue. And expect to break a few sheets when learning. Leave tube on form overnight, or bake in a low temperature oven. —Make all spars evenly matched by cutting them from same pre-tapered sheet. Test by fixing large ends on table and suspending equal weights on tips. Outlines are made by bending wet strip around form and letting it dry before removing. The secret of bending balsa strips without breaking is to keep them taut while bending. A slight let up in the process will develop kinks. A small size funnel with portion cut away to accommodate clamps will be found very useful. Ribs must be cut from "C" stock with sharp, templated guided razor. Use only the very finest sandpaper (10-0) on indoor work. You have learned to your sorrows that thin work must always be sanded in one direction away from your body.

JASCO SPECIAL INDOOR Balsa is an accepted necessity for serious indoor work. It enables experts to keep establishing new records, and helps beginners to achieve long flights with little experience. (Reports on re-orders indicate almost doubling of time when changing over to JASCO INDOOR Balsa.) It has been used on practically every record and contest winning model since 1932. JASCO is justly proud in maintaining such a reliable source of high quality INDOOR Balsa.

The sizes listed will fill all indoor requirements. Strips are cut from heavier grade since they are intended for spar and outline use. Follow the suggested "use" chart. (1 1/4" width is the largest size needed for motor stick, which requires the finest grade. Therefore all indoor stock is cut to this size to allow choice selection.)

JASCO INDOOR Balsa SHEETS

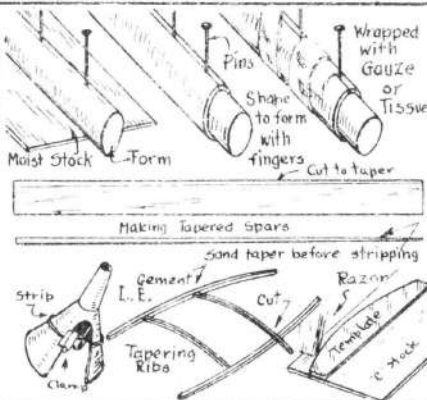
(All sizes 18" Long.)

CUT	SIZE	PRICE	USE
"A"	1/64 x 1 1/8	4c	Easily bent tubular stock. Small tubes. A & B motor sticks.
"C"	1/64 x 1 1/8	4c	Extra stiff tubes & motor sticks. Use Tungsten bracing.
"A"	1/32 x 1 1/8	3 1/2c	Easily bent tubular stock. Standard "C" Tractor motor stick.
"B"	1/32 x 1 1/8	3 1/2c	Stringy texture. For spars & outlines.
"C"	1/32 x 2 x 12	4c	Stiff. Special cut for sliced ribs.
"B"	1/20 x 1 1/8	3 1/2c	Longerons & Spars
"B"	1/16 x 1 1/8	4c	Spars & Tailbooms
"B"	3/32 x 1 1/8	5c	Light spar stock. Spars & Ld. Gear.

JASCO INDOOR Balsa STRIPS

(Sold only in 5c sprays.)

SIZE	PRICE	USE
1/32x1/32x18	for 8c	Tip outlines, ROG spars.
1/32x1/16x13	for 8c	Tail spars, Outlines.
1/20x1/20x15	for 8c	Spars, Longerons. (Specify.)
1/20x3/32x9	for 8c	Spars, landing gear.
1/16x1/16x13	for 8c	Spars and longerons.



"Since 1932 JASCO has supplied the world with Indoor Supplies."



JASCO MICROFILM

Flexibility is an essential feature in microfilm. Without it the film is not practical for use. It tends to burst when touched or shocked. Flexibility is obtained by mixing in correct proportion Trycresyl Phosphate or Castor Oil in the basic solution. Of the two plasticizers, the Trycresyl Phosphate is by far the best, and it also is about three times as expensive. (JASCO uses it.) The trick in obtaining flexibility without tackiness is to use just the right amount of the plasticizer. Too little means brittleness, and too much produces tacky surface. JASCO has this phase of formulating well under control because of its pioneering and experience in the indoor field.

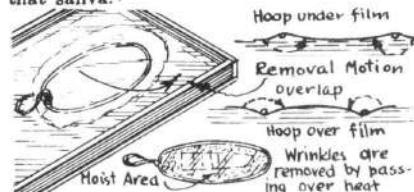
For best results make film in soap-free water whose temperature is between 70-80 degrees. (Colder water retards drying.) Keep away from drafts. The amount of solution and space used determine the thickness. For small sheet pour on one spot, and for large and long sheets pour in an elongated stream. Colors indicate thickness. Blue-violet is about the thinnest that can be used on Baby ROG. Apple-green and Green are the thickest sheets used. A more detailed color chart will be found on the can label.

Microfilm is removed from the water's surface, after it has been allowed to set for five or ten minutes or when it is no longer tacky to touch, with a wire hoop which has been submerged before the Microfilm Solution was poured on water. Bring the hoop up about $\frac{1}{4}$ " above the surface under the best portion of the film. Make certain that the film touches wire all around before you sweep the film covered hoop out of the water. Any let-down under the water will make the film slide off the wire and fold or crease.

You can also remove the film by placing hoop over it. Press the hoop below water surface and fold film fringes over it all around, then sweep the hoop off. Be careful not to let the water run on the top of the film which will unfold the fringe and let it sag away from the hoop.

Applying film to the framework: Place wing frame on smooth surface such as enameled table top. Run a wet cloth around it, coat the frame outline with

saliva and replace it in the moist circle. Center film hoop over it and bring it down, blow the film against the moist table surface which will tend to pull the film snug against the wing's frame. Pat the film against the spar and tip outline. Wait about half hour before trimming with hot wire or thinner. Hot wire is best as it forms a bead. Thinner dissolves considerable amount of film and you should take care not to let it come too close to the spars. - - - Small surfaces such as rudders, stabilizers, ROG wings and fuselages can be pressed against the film while it is hanging after coating the outlines with saliva. (Benzine thinned rubber cement is also a good adhesive but it is much heavier than saliva.)



JASCO MICROFILM SOLUTION is based on an established and user-approved formula. It is surprisingly easy to make film with JASCO SOLUTION. Beginners have no trouble in making satisfactory sheets from it. It is flexible without tackiness thus assuring long and dust-free life.

Can Size	2 1/2 oz.	4 oz.	8 oz.	16 oz.
Price	20¢	35¢	60¢	\$1.00

SPECIAL 1 oz. Bottle10¢

ALUMINUM HOOP WIRE

JASCO $\frac{1}{8}$ " DIA. ALUMINUM WIRE is the ideal hoop material. It is stiff enough to handle the largest size sheet yet it can be neatly shaped so that the film will touch the wire all around without raising or pressing the film very much away from the surface. You will appreciate this feature if you ever had to work with stiff and contrary iron wire or weak wire clothes hangers. USE JASCO $\frac{1}{8}$ " ALUMINUM WIRE for hoops and eliminate the most critical operation of MICROFILM MAKING.

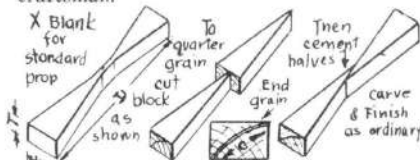
$\frac{1}{8}$ Dia. ALUMINUM WIRE3¢ per foot.

INDOOR PROPELLERS

For some unknown reason the microfilm and two piece INDOOR machine cut PROPELLERS found a very cool reception. We are therefore again listing the needed large diameter blocks. Since perfect and super-light balsa is at a premium for sheet stock use, we reserve the right to supply the large diameter blocks in best possible grade under circumstances.

A perfect indoor propeller can be successfully used for years. It should be in balance by weight, blade area, shape and flexing. Carving should never be rushed. Four to six hours is not too long. Cut block to "X" blank and follow the carving system as shown for outdoor props. Use a very sharp knife and carve in long thin slices. Constantly inspect for thinness and

avoid "windows". Use every bit of will power to sand away. Your workmanship on the propeller mirrors your ability as a craftsman.



INDOOR PROPELLER BLOCKS

D	T	W	Price	D	T	W	Price
7	x 1/2	x 3/8	3¢	12	x 3/8	x 1 1/8	10¢
8	x 3/4	x 3/8	4¢	13	x 3/8	x 1 1/8	12¢
9	x 3/4	x 1	5¢	14	x 1	x 1 1/2	14¢
10	x 3/4	x 1 1/8	7¢	15	x 1	x 1 1/2	15¢
11	x 7/8	x 1 1/4	9¢	16	x 1	x 1 3/8	18¢

"JASCO Microfilm clothes the little man who wasn't there."

INDOOR BEARINGS & WASHERS

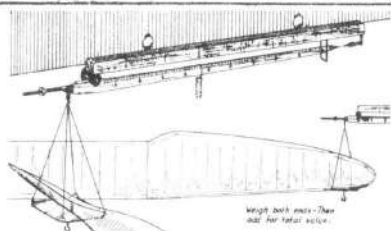
JASCO INDOOR BEARINGS and WASHERS seem insignificant and some of you wonder why we devote more than two lines to them. If you had to make every one of them by hand as we do (they are too small for production) you would also like to talk about them.



WASHERS are made from thinnest practical brass sheet by drilling countless number of holes in it with #74 drill. After burnishing and polishing both sides to remove drill burrs, the washers are individually punched with a $\frac{1}{8}$ " diameter die. ($\frac{3}{32}$ " dia. proved to be too small.) Now you know why every WASHER is so individual when it comes to centering of the hole. Use two at a time. Be sure to keep them well oiled and grit free at all times.

BEARINGS are made from dural which can just handle fully wound load of $\frac{1}{8}$. The shaft hole is drilled with #74 drill and can accommodate .020 (#8) wire. The contact area is burnished and polished. BEARING is bent to standard shape as shown. Use large radius bends when changing to your needs.

INDOOR DURAL BEARING..... 5¢
INDOOR WASHERS Dozen... 5¢



JASCO BEAM SCALE KIT is a clever piece of designing. Made from standard stamped metal parts (to keep cost down) it is easily assembled in less than two hours. It is accurate to 1/1,000 oz., and sensitive to 1/5,000 oz. Rugged enough to handle 10 oz. without trouble. Priced low so that it is within reach of every model builder.

BEAM SCALE can be used for gas model work by using 1 oz. weight. This will increase the scale to 10 oz. If a part is heavier than that, you can weigh each end at a time and then add both for total. Thus making it applicable for parts weighing almost 20 oz.

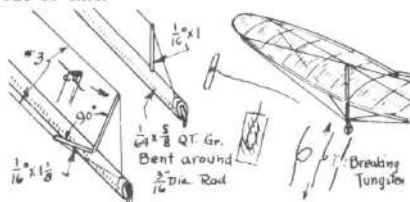
Kit is complete with all the supplies you need. Including 1/100 and 1/10 oz. weights, printed scale, ready formed knife-edge and other metal parts, balsa, cement, threaded counter-balance, conversion tables, plans and instructions. Order yours at the very first opportunity and find out why it is used in responsible places.

JASCO BEAM SCALE KIT. 50¢ Postpaid
1/100 and 1/10 oz. weight can be had for
10¢ each.—Special 1 oz weight 20¢ P.P.

JASCO TUNGSTEN WIRE

Tungsten Wire has almost twice the strength of ordinary steel wire. It is rust-proof; will not stretch under strain and can be obtained in sizes small enough for indoor work. It only has about 1/10th the drag of finest thread.

Successful application requires experience. Use the following suggestions: Work on white paper so you can see the wire. Cement ends to balsa strips for ease in handling. A kink will break wire when pulled. Double end for larger cementing surface. When applying diagonals on mike fuselage do not pull tight or you will get it out of line.

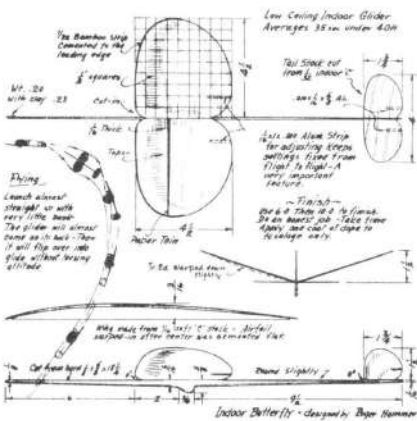


JASCO Tungsten Wire is stocked for those indoor builders who believe in fine and light construction. It is used for bracing motor sticks, wings and diagonals on microfilm covered fuselages. (Also for flying or exhibition scale models, and for invisible magical, display or electrical surprises.)

Use #3 for Cass "B", and #4 for Class "C" motor sticks single wire brace. #2 on "B" and #3 on "C" when using twin braces. #2 or #3 for wing rigging. #5 and #6 for scale models or where invisible strength is required. - - - Wire is wound on machined fiber spools. Be sure to replace loose ends in the notch when you are finished.

— TUNGSTEN WIRE

No.	Wt. per In.	Stress	10 ft.	25 ft.
2	.0000054 oz.	3 oz.	20¢	40¢
3	.0000097 oz.	6 oz.	20¢	40¢
4	.000022 oz.	13 oz.	20¢	40¢
5	.000061 oz.	37 oz.	25¢	50¢
6	.000155 oz.	96 oz.	30¢	60¢



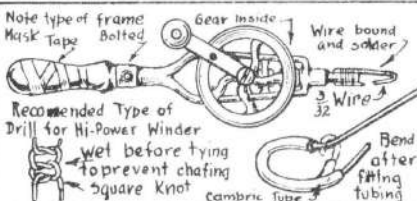
Rubber is reliable except under extreme cold or high temperature and humidity conditions. 80° in shade and 35% moisture content constitute a crisp summer day with rubber holding up well. But 90° and 60% just about cooks everything in sight. (Winter-white skin will blister in about half hour.) A theory suggests that the sun turns the sulphur in the rubber into a sulphur dioxide which in turn becomes sulphurous acid when it contact the high water content in the air. Direct sun rays are exceptionally active, causing even wing-hold- ing rubber to snap.

Precautions during the high T&H days: Design light models so you can carry long and small cross sectioned motors which will make many turns safer. Keep fuselage covered with wet towel while waiting for your turn. Incorporate a removable motor stick which can be kept in cool and dark box, also to prevent rubber from breaking up the fuselage when it breaks, and make replacing simpler.

These points were evident at the 1939 Nationals. Indoor boys flew under Turkish bath conditions but had normal rubber breakage. Those using year old rubber reported few failures. (Under present distribution system you are sure of getting almost factory fresh rubber which might still need aging before it can deliver its full possibilities.)

Rubber is at its best when aged about 2 months. JASCO SPECIAL BROWN RUBBER varies in age from one week to one month. It is kept in a well ventilated wooden closet with dull black interior. Ultra-violet rays (sun) are most injurious to it.

Preparing a motor: Determine the motor length. Measure out the required full length. Moisten ends and tie with tightly pulled square knot and two extra knots. This will result in lube-proof knot because moisture allows exceptionally tight knotting. Drape required number of loops over hand. Even them up with help of an assistant as shown. Keep up the rotary motion until all loops are of equal length. Tie with rubber bands before lubing.



JASCO CAMBRIC TUBING

CAMBRIC TUBING is another JASCO find with no equals. It will handle any amount of rubber without tearing. By far superior to weak rubber sold for similar purpose. Cambric tubing is made like fire water hose covered with a thick layer of flexible celluloid. Will save motors and keep you from worrying. Slit in half for cockpit edges. Will fit 1/16 wire.

CAMBRIC TUBING- 6" for 8¢ - 15¢ per ft.

JASCO SPECIAL BROWN CONTEST RUBBER

The original SPECIAL BROWN RUBBER was introduced in 1932. It proved to be the best through years of abusive contest use. It is now credited with practically all records and major contests since it was placed on market. For years its BROWN color identified it as the only rubber which was especially prepared for contest work. Lately almost all rubber on the market has a brownish shade. Yet the original SPECIAL BROWN still proves to be the best by any test.

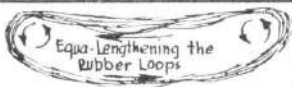
All this "brown" business is confusing to the buyer who is anxious to buy the original SPECIAL BROWN RUBBER. Therefore, he assured that JASCO stocks only the SPECIAL BROWN made from the original formula. In fact, JASCO has the distinction of "chipping-in" to help finance the original experimental batch of SPECIAL BROWN.

SPECIAL BROWN CONTEST RUBBER

1/30" Thick. Skein = 225 feet.
1/32".....25 ft. for 5¢.....25¢ per skein
3/64".....20 ft. for 5¢.....30¢ per skein
1/16".....15 ft. for 5¢.....35¢ per skein
5/64".....15 ft. for 5¢.....40¢ per skein
3/32".....12 ft. for 5¢.....50¢ per skein
7/64".....12 ft. for 5¢.....60¢ per skein
(The above sizes are for indoor use. Packed in footage indicated for 5¢. Special note: Manufacturer intends to discontinue 3/64, 5/64 and 7/64. Please give substitute.)

1/8".....10 ft. for 5¢.....65¢ per skein
3/16".....15 ft. for 10¢.....95¢ per skein
1/4".....10 ft. for 10¢.....\$1.20 per skein

(Used for outdoor models. May be ordered in any length. Use size so that total number of strands will not exceed 20.)



JASCO RUBBER LUBRICANT

JASCO LUBRICANT is a concentrated solution of chemically pure and non-injurious ingredients so well blended and preserved that it does not separate or become rancid with age. It is a full-bodied liquid which will keep tightly wound rubber strands separated with its tenacious lubricating film. It will not cake or evaporate on hottest day. It has two Wakefields to its credit, and trust of those who can tell the difference.

Lubricating rubber: Bunch in palm, apply lube, sandwich between right and left palms and spread lube all over with circular motion. Re-rub or re-lube after several tightly wound flights. Sand and grit are deadly to rubber's life. Wash them off with water and re-lube.

JASCO RUBBER LUBRICANT

Medium Bottle 10¢ 2½ oz. Can25¢
1 oz. Bottle.....15¢ 4 oz. Can40¢
Cans have spout-top cover for easy application.

A miracle: "To obtain maximum turns on a sultry hot day."

COVERING SUPPLIES

AMERICAN "SILKSPAN" PAPER

SILKSPAN: An All-American product which is by far superior to any model paper you or we have used to date. (Our experience dates back to 1926. Yours—?) **SILKSPAN** has smooth surface which remains so after doping: No need of sanding. Texture: Unusually strong because it is manufactured from long, fine and strong pulp fibres which are laid out in a criss-cross manner. This feature gives **SILKSPAN** strong resistance against tearing with or against the grain.

Outstanding Feature: Can be used wet like silk without fear of it falling apart in handling while covering or forming compound curves.

Shrinkage: Just right. Almost even in all direction, with emphasis along the grain line. Use standard method of application and finishing. Two to three coats of dope will make it air tight.—Priced exceptionally low for such a fine and dependable product.

AMERICAN "SILKSPAN" PAPER

For rubber and small gas models. 20 x 24 Sheets. — "OD" **SILKSPAN**..... 3¢ each.

For regular gas model work. 24 x 36 Sheets. — "GM" **SILKSPAN** — 10¢ each.
Special Price 3 for 25¢

COLORS: Brilliant, rich and will not fade. — Stocked in RED, WHITE, BLUE, ORANGE and YELLOW colors

JAPANESE TISSUE PAPER

Best obtainable. Has definite grain which runs along the easy tear. Good for double surface covering. **COLORS:** Red, White, Blue, Yellow, Orange, Green and Black. 20 x 24 sheets.

OUTDOOR TISSUE 2 for 5¢

JAPANESE BAMBOO PAPER

For gas model work. Stocked in two grades, Lightweight and Heavyweight. (LTW for "B" and HW for "C" class.) Obtainable only in white color. 24 x 36 Sheets.

BAMBOO PAPER 7¢ per Sheet

JASCO SILK: Fine weave. (About 135 thin threads per inch.) Natural condition. Obtained direct from importers to assure continuous supply in standard quality and grade. Excellent for silk reinforcement. Will behave like mentioned in text. Needs 3 to 4 coats of clear dope for transparent and drum-like covering.—Natural silk sheen color. (No color) 36" wide. Can be ordered in any desired length.

JASCO SILK 55¢ per Yard.
Special Size — 18" x 18" 15¢

WHITFIELD BAMBOO PAPER

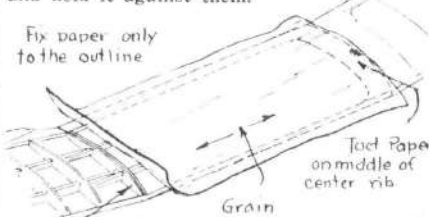
Regular Japanese bamboo paper is prepared only in "white". No other. The paper advertised as "Colored Bamboo Paper" is made in the U.S.A. Stocked in LTW and HW. Lightweight can be used wet like silk without fear of it falling apart in handling while covering compound curves.

COLORS: Red, White, Blue and Yellow.
24 x 36 Sheet 10¢ each 3 for 25¢

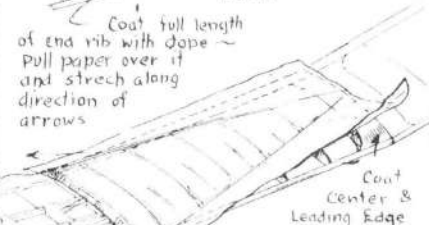
HOW TO COVER: Neat covering can be easily accomplished by using the following system: Cut paper to size so that the grain will run span-wise. (Grain runs along the longest sheet dimension or parallel with a tear. Paper shrinks most with the grain. Spanwise grain will produce minimum of sagging between ribs.) Use dope for adhesive on thin paper, and half & half dope and cement for bamboo or **SILKSPAN GM** paper, and silk.

Covering flat surfaces: Cement paper to one side, let it dry before coating the remainder of the outline. Pull paper smooth as you pat it in contact with the cement. There is no need of coating individual bracings as dope will penetrate through paper and hold it against them.

Fix paper only to the outline



Coat full length of end rib with dope — Pull paper over it and stretch along direction of arrows



Covering curves: (Round fuselages, cambered and tapered wings.) Tack paper at one point. Then coat the end rib or bulkhead full width and pull paper over it. As the cement is setting, pull paper taut to form a smooth triangle between tack spot and end. Lift up the free triangular flaps and coat the outline. Pull paper taut while cement is setting. You can use similar method for undercamber if the paper is porous which enables you to apply dope through it with a brush while you blow the paper against the rib. When using bamboo, "**SILKSPAN GM**" or silk, run a cement line on center of the ribs and fix covering to it. Then cement each half separately by coating ribs and the outline.

"Covering is important, but it is the framework that counts."

Silk covering: It is very difficult to cover with dry silk without having permanent wrinkles. This happens because dry silk threads have too much friction among themselves, and a pull to remove a wrinkle influences threads far removed from the spot. By wetting, the threads slide easily over each other and allow stretching in direct line without affecting adjacent areas. You can cover most severe compound curves and round fuselages in one piece of silk when using it wet.—Use same covering procedure as described above after you have soaked the silk and wrung off the excessive water. Cement will blush when it contacts wet silk, but blush can be removed with thinner after silk and cement are dry. You might have to re-wet the silk as you work if the curve is sharp or covering slow.—By using silk wet, you can easily accomplish the most desirable and heretofore the hardest type of covering.

Covering with Wet Paper: Wet "SILK-SPAN" can be worked in same manner as wet silk to cover compound curves without fear of tearing. Bamboo paper can be used wet to a small degree, and then only on small areas such as wing tips and fillets, but never on such large areas which are possible with Silk or "SILKSPAN". Ordinary tissue when wet will fall to pieces when attempting to use it.

Double Tissue Covering: Cover with first layer as described except that grain should be chordwise. Finish with water spraying and nitrate doping just as though the job was completed. Now lay the second layer as you would in normal covering with grain spanwise or opposite to the first layer. Spray with water and do not worry about wrinkles. As soon as water has evaporated, apply dope all over. Double Tissue Covering compares in strength to bamboo papering with but a fraction of its weight.



To understand why paper tightens when it is water doped, we must know how it is made: Paper is made from wood or rags which are ground very fine and mixed with water. The result is a pasty liquid known as pulp. This paste is then processed with rollers and dried into uniform sheets.—The paper tightens after it is sprayed with water because the moisture frees the pulp fibers from straight position into which they are forced by heat and rollers. As the moisture evaporates these fibres tend to assume their original haphazard shapes caused by the grinders. With most of the fibers tending to curl and being intermixed with each other, the paper will try to shrink in accommodating the curling action of the fibers. To preserve this tautness against future moistening, the paper is doped with dissolved nitrated cotton which penetrates it and keeps the fibers in their shrinking position. (Dope also tightens the paper by its own shrinking process.)

NITRATED COTTON CEMENT

Nitrated cotton cement used for model work has several poor characteristics. Although it dries unusually fast, it needs plenty of air making it poor for laminar. It tends to peel off from hard or polished surfaces. Its salvation lies in the large cellular structure of balsa. The cement flows into the air cells or pockets and secures an anchorage. Therefore, prepare the work so that the cement will work under good conditions.—Roughen hard or smooth surfaces. Pre-coat strong joints and let cement sink in before applying another coat and joining the pieces. Be generous with several coats on all joints and especially on "butt," and let it form 'socket' type of application. "Blushed" cement has practically no strength. Bind metal parts to balsa. Give the cement a break by not being too curious whether the work is dried or not, and do not take too much for granted.

JASCO CEMENT: Just about the best that can be made for model work. Has very good penetrating properties. Will dry strong and clear under most severe humidity conditions. (Note: It might tend to blush under extremely high humidity conditions but it clears in short time.) Dries quickly and keeps up with your construction speed. Dependable for fast and secure emergency repairs. Prepared in three grades of viscosity for specified purposes. Apply with wire or bamboo strip. Packed in cans for your safety and convenience.

JASCO MODEL CEMENT

	1 oz.	2 1/2 oz.	4 oz.	8 oz.	16 oz.
INDOOR	7c	12c	20c	X	X
OUTDOOR	7c	12c	20c	35c	55c
GAS	X	X	20c	35c	55c

TESTORS MODEL CEMENT IN TUBES



Reliable quality.
Very handy for emergency repairs and when making monocoque construction
LARGE 5" Tube—5c 2 oz. SIZE—10c

LIGHT & DEPENDABLE PROP FOLDER



Extra light (.05 oz.) but strong prop folder. Developed by the Chicago boys. Will fit 3/8" or smaller hubs. Capable of handling 24 strands of 1/8th. Bend lugs to correct angle, to obtain snug blade-fuselage fit, before binding and cementing to hub and blade. Use two for a double folder.

CHICAGO TYPE FOLDER 2 for 15c

CAPPING STRIPS Cut from 8 lb. "C" grain stock
1/32 x 3/32 or 1/8 7 for 4c
1/20 x 3/32 or 1/8 7 for 4c
1/16 x 1/8 or 3/16 6 for 4c

JASCO SUPERFINE TISSUE: The finest and the lightest paper on the market. Air tight. Surprisingly strong. Used mostly for indoor models, and especially for fuselage covering and diagonal bracing.

SUPERFINE PAPER 20 x 24 — 7c each.

FINISHING SUPPLIES

The basic ingredients of model airplane liquids are nitrated cotton and solvents. (Cotton is made of cellulose which is insoluble in ordinary solvents until it is treated with nitric acid.) When this solution is applied to a surface, the solvents evaporate and leave a clear and hard skin of celluloid-like substance which is dissolved nitrated cotton.

The difference between the various liquids used by the model builders depend on the amount of nitrated cotton used in relation to the solvents, and also on the addition of other ingredients for special requirements. Dope is a simple solution of nitrated cotton and solvents. Cement is identical to dope except that more cotton is used. Banana Oil is also same but thinner and contains small amount of gums. Colored Dopes are

a mixture of clear dope and colored pigments. Gloss Solutions or clear lacquers use the basic solution and gums which provide body, hardness and shine.

The dope tightens the covering by loosening the fibers, as noted under 'Water Doping', and by its own contracting action.—As the solvent evaporates, the dope replaces it, and because its molecules want to stick to each other it will form a straight line between points of attachment. Since the covering is microscopically coarse and 'wet' it will naturally follow the motion of the contracting dope. (Perhaps the action can be better visualized by assuming that there is no covering intermixed with the dope.) Gums, Pigments, Plasticizers, etc., retard the shrinking by providing bulk which replaces solvent.

CLEAR DOPE: Basic solution of nitrated cotton and solvents. Just right for model work. Will not blush on humid days. Use two coats on outdoor models which are covered with regular or SILKSPAN paper. Three coats on Bamboo and SILKSPAN GM paper and Silk. More coats might weaken the covering by changing its strong fiber characteristics into celluloid-like strength; once a tear is started it spreads very easily. Far too many coats of clear dope are required to obtain a gloss finish. Use one or two coats of Banana Oil, Glider Polish or Gloss Solution. Never use clear dope on thin balsa as it will warp it.

JASCO FINISHING LIQUIDS

	1 oz.	2 1/2 oz.	4 oz.	8 oz.	16 oz.
Clear Dope	7¢	12¢	20¢	35¢	55¢
Banana Oil	7¢	12¢	20¢	35¢	55¢
Thinner	7¢	12¢	20¢	35¢	55¢
Colored Dope	8¢	15¢	25¢	40¢	70¢
Glider Polish	8¢	15¢	25¢	40¢	70¢
Gloss Solution	8¢	15¢	25¢	40¢	70¢
Wood Filler	12¢	20¢	35¢	60¢	xx

COLOR DOPE SHADES: Red, White, Blue, Yellow, Orange, Green, Black.

NOTE: Blue & Red = Purple. Black & Red = Brown. Blue, Red & Yellow = Olive Drab. ALL JASCO LIQUIDS, except 1 oz. sizes, packed in cans to free both of us from worrying about broken bottles. More economical for you because of smaller wall area on which liquid can stick.

BANANA OIL: Thinner than dope. Contains gums. Shrinks very little. Used for doping covering on light framework. One or two coats will give good gloss with hard surface. Apply several coats for extra hard but thin and light celluloid-like skin. Finish with W/D and polishing compound.

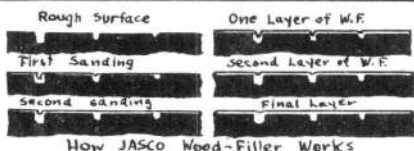
GLIDER POLISH: Similar to Gloss Solution but leaves thinner and more flexible skin, and has "flashier" look which should be toned down with regular finish technique. Especially recommended for thin sheet work. Apply with brush or pour in a stream and spread evenly with fingers. May be thinned if found too thick for the particular need.

COLOR DOPES: Rich and brilliant colors. For best results thin about 50% and apply with soft sable brush (at least 50¢). Thinned COLORED DOPE will not slacken covering like thick coats usually do. Apply two coats on flying models. More on solid scale or balsa surface. When using two or more coats be sure to finish in-between with W/D. A coat of Banana Oil, thinned Glider Polish or Gloss Solution is needed for high gloss.—Thinning does not change the shade of the color. Addition of white will produce lighter shades.

JASCO WOOD FILLER: Developed and prepared by JASCO especially for balsa. Made of plasticized nitrated cotton solution and very light pore filler. Can be sanded with ordinary sandpaper. Transparently clear. Will not warp thinnest sheets. Perfect base for Colored Dopes. — **BALSA WOOD FILLER** forms a sandable skin on the balsa contour. Sanding removes filler from high spots and leaves it in the valleys. Additional layers with in-between sandings even up the porous balsa surface.—Recommendations: Stir well before use. (Shaking is not enough.) For gliders and thin sheets brush one or two coats, sand with 6-0 and finally with 10-0. Extra light sheets are finished with the back of the sandpaper while heavier stock is finished with one or two coats of Glider Polish and rubbed down with polishing compound and waxed. For props, monocones, and solid models or balsa block apply one or two coats of clear dope which closes (but does not fill) the pores, and then as many coats of FILLER as necessary (2 to 5). Sand first two layers with 6-0, or until balsa is sufficiently covered to be waterproofed, then use wet W/D. Finish with Colored Dope, Gloss and rub down. Note: Do not expect miracles without an honest effort.

GLOSS SOLUTION: Contains gums which produce high polish and thick skin (but is not as strong as dope or cement skin) with few applications. Plasticized; Natural finish too "flashy" which should be toned down with wet W/D 400A and rubbed down with Polishing Compound and waxed for "rich" and "aged" appearance. May be thinned.

THINNER: Same base as solvents used in the JASCO LIQUIDS. It will thin them well without trouble. It will remove "blushes" by dissolving the nitrated cotton and letting it dry under normal humidity conditions.—Blushing occurs on humid days because the evaporating solvents cool the dope or cement below the temperature of the surrounding air. On humid days we have an excessive amount of water vapor in the air which easily condenses into water when it contacts the cooler dope or cement surface. Water seems to flow into the dissolved nitrate cotton and honey-comb it with pockets, which you can easily detect when cutting up "blushed" or white film. White film is much weaker than normal transparently clear type.—Clean your dope brushes with thinner after use for a happier life.



HANDY CARVING & CUTTING KNIFE

Especially adaptable for cutting out ribs, bulkheads, carvings and other light or thin balsa parts. Pointed, razor-like blade can be replaced at will.

KNIFE...10¢ EXTRA BLADES...3 for 10¢

CHROME PLATED METAL PROPELLERS

No finishing required

TWO-BLADE Steel Type

2"	10c
2½"	12c
3"	15c
4"	20c

THREE-BLADE Steel Type

2"	15c
2½"	20c
3"	25c
4"	30c



BIRCH DOWELS

1/16, 3/32, 1/8 & 3/16 Dia.—12" Length 1c

SHEET CELLULOID: Will fill all gas or rubber model transparency needs. Make paper pattern of window or windshield before cutting celluloid. Allow about an hour for cement to set, and hold celluloid in place with pins. Also for trailing edge reinforcement where rubber holds wing in place.

4 x 6	3¢	6 x 16	12¢
6 x 8	6¢	12 x 16	22¢

BLOCK PLANE: Just about the most useful tool for model work; balsa or hardwood. Especially handy for gliders, solid models, wing tips, tapered spars and strips, cowlings, bulkheads, and many other uses which will become apparent during work. Cuts working time in half. Just fits the palm. Adjustable 1" wide steel cutter. 3½" long face. Substantial cast iron frame. Factory edge. Should be sharpened before use on balsa. If you wish us to sharpen it for you to razor edge, add 25¢.

1" CUTTER BLOCK PLANE65¢

JASCO SANDPAPERS

Shape with regular rough sandpaper obtainable in hardware stores. Use 6-0 when work is almost finished. 10-0 is the last word for "slick" surface. W/Ds can be used Wet or Dry, but 6-0 and 10-0 are more economical for dry work. The advantage of W/Ds is that they can be used wet so that dope or pigment particles will not stick to surface and clog the abrasive particles. Be sure that balsa is sufficiently waterproofed or water will seep through and raise blisters. Also, wet W/D will keep work cool; colored Dopes are very susceptible to friction heat and might peel off if care is not taken. All papers made from carborundum dust. 360A is similar to 6-0, and 400A to 10-0.

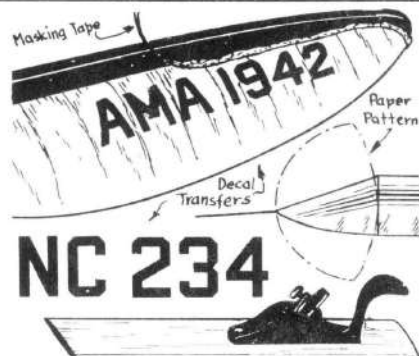
JASCO SANDPAPERS

6-0	2 for 3¢	W/D 360A	4¢
10-0	2¢ each	W/D 400A	4¢

MASKING TAPE

Simplifies stripping. Apply firmly to surface to prevent under-creeping. Remove when color is almost dry to prevent hard and sharp dope edges. Cut in half for economy.

MASKING TAPE — 3 feet.....5¢



DECAL TRANSFERS

Use DECAL Transfers for neat and clean-cut license numbering. Directions printed on back of each Decal. For secure job, carefully brush Banana Oil over Decals. "A", "C", "M" and "N" letters, and "0" to "9" numerals stocked in all six sizes.

Size	Price	Size	Price
1" (Tails)	3¢	4" (CL."B" G.M.)	5¢
2" (Rubber)	4¢	5" (CL."C" G.M.)	8¢
3" (CL."A" G.M.)	5¢	6" (Large G.M.s)	9¢

SCOTCH CELLULOSE TAPE: Transparent. Strong but not permanent adhesive. Used on leading edges of gliders; to hold hatches closed; binding long splices. Cement dissolves it slightly. Also for temporary covering repairs. You should always have a roll in your repair kit.

¾" CELLULOSE TAPE...100" Roll for 10¢

BAMBOO: Straight grained and matured. Strongest next to the polished side. Bend over electric bulb. Sand exposed bamboo strips with 10-0.

1/16 x ¼ x 15.....1¢ 6 for 5¢

JASCO stocks "RITZ" and Modelcraft "D-G" machine carved gas model props. This assortment provides a complete variety of outline, pitch and weight characteristics from which to choose the ideal prop. "RITZ" design can be had in three grades of quality and finish.

"RITZ" PROPS



FOR GAS MODELS

SUPER-RITZ—The original "Ritz" which was introduced several years ago at 50c. It is a quality job throughout. Well laid out from the aerodynamical viewpoint. Excellent workmanship. Completely finished with high gloss lacquer surface. P/D about .55

S-R Stocked from 8" to 16" Dia.....35c each.

AIRFLOW-RITZ Design similar to "Super". Carved from Gumwood. Slightly heavier. Smooth high polished surface, but not lacquered. P/D about .55.

A-R Stocked from 8" to 16" Dia.....25c each

STANDARD-RITZ Has the familiar "Ritz" outline. Lighter in weight. Smooth sandpaper finish. Should be lacquered and rubbed down before using to prevent oil soaking condition. P/D about .45.

S-R Stocked from 8" to 14" Dia.....15c each

MODEL-CRAFT "D-G"



GAS PROPS

Machine carved from straight grained hardwood. Owners of high compression engines will find them just right in weight to obtain maximum r.p.m. Smooth sandpaper surface. P/D about .5

D-G Stocked from 9" to 14" Dia.....15c each

Note: Mention make of engine or shaft diameter when ordering small size props.

P/D	Pitch Diameter	Ex: .55	P. of 7.7" Dia. of 14"
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SPINNERS: Not a luxury but a necessity. Prevent knuckle bruising on exposed crankshafts. Solid Dural Spinner is threaded on shaft and tightened with nail end through small holes provided on sides. Spun types are mounted by cutting, bending and fixing with wood screws to the prop hub. Spun type light enough for rubber models. Both types are highly polished. Diameter and length are same.



SOLID DURAL SPINNERS

3/4" Dia.....	CL. "A" & "B".....	25c
1" Dia.....	CL. "C" Engines.....	30c

SPUNNED ALUMINUM SPINNERS

3/4" Dia.....	20c	1 1/2" Dia.....	30c
1" Dia.....	25c	1 3/4" Dia.....	35c

GAS MODEL PROPS

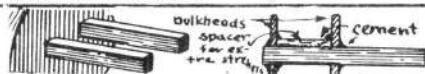
A model having 20 sec. motor run must have rocket like climb to have a winning chance. With models being built to the minimum weight required by the engine displacement, the factors which will effect the climb are the power, propeller used, and the aerodynamical efficiency of the model.

Engine power is theoretically based on its cubic displacement, but we know that it really depends on the make of the engine and how well it is treated. What counts in the end is how big a prop it can swing at its highest r.p.m.

Propeller converts the rotary motion of the crankshaft into forward motion by biting the air at an angle as it rotates. The trick in converting the full power of the engine into maximum possible forward speed is to select a prop which will fully absorb the power with least waste. If you use too small a prop, the motor will race at its maximum r.p.m. without being fully loaded by the small prop. Power is being wasted. And if the prop is too big, the motor slows down and it is kept too far from its maximum speed. The ideal prop will absorb the power just at about the highest r.p.m. the motor is capable.

Assuming that we use the same motor and prop, the aerodynamical efficiency of the model will determine the angle of attack of the prop blades. On a streamliner, the angle of attack will evidently be lower than on a blunt design, which means that more power is required to overcome the drag of higher angle if the same r.p.m.s. are desired. (Actually, the r.p.m.s. on the blunt design will have to be increased to obtain similar air speed or climb.) If the motor is not able to take care of the higher drag, it will slow down and with it the rate of climb. There is very little that can be done to equal the climb of the streamliner under such circumstances. If the model is large and heavy, and power low, a change to larger diameter and lower pitch will be definitely beneficial.

The best recommendation that we can give in how to choose the correct prop for a particular design and engine is to stick to one brand, and try out different diameters until you have found what you think is the ideal size. It is then a simple matter to reorder it as you can be sure that it will have similar characteristics. A good start with which to begin your selection is to use the diameter recommended by the motor manufacturer.



BASSWOOD: For motor and wing mounts. Cut smooth from straight grained wood. Roughen for cementing surface and oil-proof with several coats of dope. When wood screw rips off, drill out the chewed up portions and plug up the hole with moistened peg. Stocked in 1 ft. lengths only.

1/8 sq.....	1c	1/4 x 1/2.....	2c
1/8 x 1/4.....	2c	3/8 x 3/8.....	4c
3/16x1/4.....	2c	1/2 x 3/4.....	5c

OHLSSON "STREAMLINE" WHEELS

Made of fairly thick and tough rubber. Slightly heavier, size for size, than M&Ms. Inflated and deflated. An exceptional value at such low prices.

2½" Dia. \$1.25 per Pair P.P.
3½" Dia. \$1.25 per Pair P.P.
4½" Dia. \$1.75 per Pair P.P.

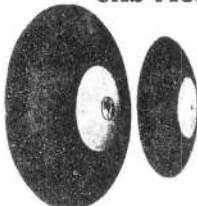
"STREAMLINE" BALSA WHEELS have fineness ratio of about 3. Sanded smooth, but should be finished as prescribed for balsa. Rotate on shaft while pin striping with brush. (..... sq. in.) indicate maximum wing area allowed for that diameter for contest work. Priced per pair. Singles at half price. All sizes have .040 axle hole.



¾"4¢ (99 sq. in.)
1"5¢ (149 sq. in.)
1½"6¢ (299 sq. in.)
2"10¢ (No limit)
2½"15¢ 3"20¢

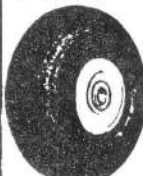
Grommet & Bushing for 3/32 & 1/8 axles. (Give size of axle.)

Fitted at 10¢ per pair.

MEGOW'S NEW STREAMLINED GAS MODEL WHEELS

Developed specifically for gas model use, these wheels have important advantages not found in pneumatic air wheels. Made of special sponge rubber, both some punctures and deflation troubles are avoided and great resiliency secured. Lightest weight wheels obtainable.

2½" per pair, 60¢
 (½ oz. each)
3½" per pair, 75¢
 (1¾ oz. each)

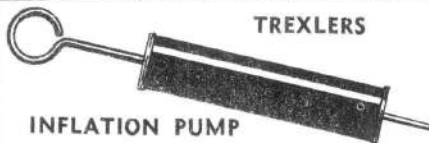
SPONGE RUBBER DO-NUT WHEELS

Made from Red sponge rubber. Good eyelet-grommet axle housing. Will fit 1/16 wire. May be ordered singly for tail wheels.

1" dia. 10¢
1¼" dia. 15¢
1½" dia. 20¢

Price per Pair

SINGLE WHEELS: Gas Model Wheels sets broken for single wheel landing gears. Price: Half of List plus 10¢. No Inflating tube furnished.

TREXLER'S**INFLATION PUMP**

Made especially for TREXLER BALLOON WHEELS. Press rubber tube valve between fingers while pulling the plunger out for another stroke. Like a bicycle pump, it needs a drop of oil once in a while to maintain compression.

TREXLER INFLATION PUMP.....20¢ P.P.

M. & M. MODEL WHEELS

M & M WHEELS were first introduced to the model builders in 1934. Since that time they have been constantly improved. We believe that the M & M WHEELS of today are the last word in miniature wheel construction. Built for service, durability and pleasing appearance. You need but look at clever construction features to realize why M & M WHEELS have proven to be the best. Made from best rubber obtainable which will not stretch out of shape.

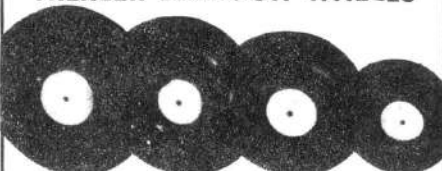
M. & M.s FOR RUBBER MODELS

Sizes: 1¼", 1½" and 1¾" Dia.50¢
Special 1¼" Do-Nut Wheel60¢
Sizes: 2", 2¼", and 2½" Dia.60¢

Price per Pair, Postpaid. The above wheels have .040 axle hole which can be easily enlarged with any pointed instrument.

M. & M.s FOR GAS MODELS

2½ x 1—Wt. 1 oz.—9/64 Axle90¢
3¼ x 1½—Wt. 1½ oz.—9/64 Axle\$1.50
3½ x 1¾—Wt. 2¼ oz.—3/16 Axle\$2.75
4½ x 1¾—Wt. 5 oz.—3/16 Axle\$2.75
Price per Pair, Postpaid. Weight per pair.

TREXLER BALLOON WHEELS

TREXLER BALLOON WHEELS: Made in one piece from finest rubber. Mounted on wooden spool-like hub. Leak proof valve—long rubber tube sealed by tire pressure against hub. Light and strong.

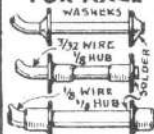
TREXLER'S FOR RUBBER MODELS

1½" & 1¾" Diam.15 oz.40¢
1¾" & 2¼" Diam.30 oz.50¢
2½" & 2¾" Diam.35 oz.60¢

TREXLER'S FOR GAS MODELS

2¾" Diam.1 oz.\$1.00
3" Diam.1½ oz.1.25
3½" Diam.2 oz.1.50
4" Diam.3 oz.1.75

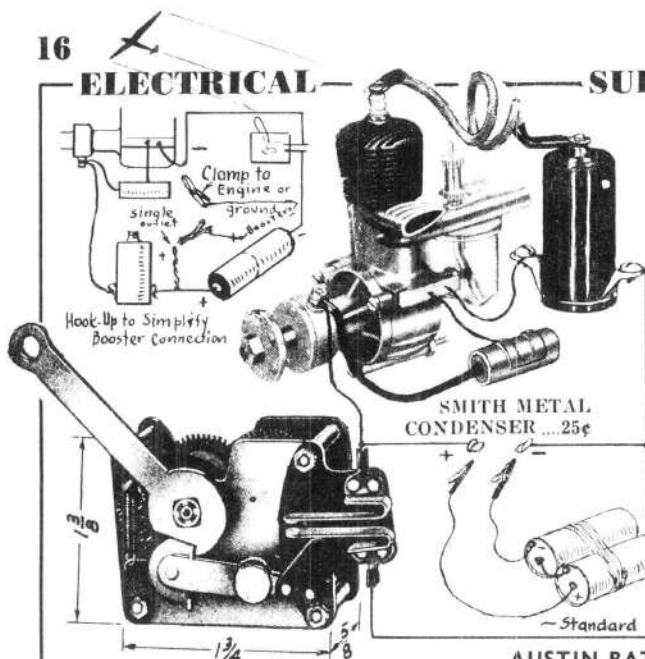
Prices per pair, Postpaid. Weight per pair
Gas Model sizes drilled for 1/8 wire.

SPECIAL EYELETS & WASHERS FOR AXLE

To hold wheels on Axles. Also to make up the difference between axle and hub. See sketches. Be sure to solder-tin axle and bushing before soldering. Mention size of wire when ordering.

BUSHINGS 1 for 5¢ WASHERS Dozen 5¢

"To single wheel or not to single wheel, that is the question."

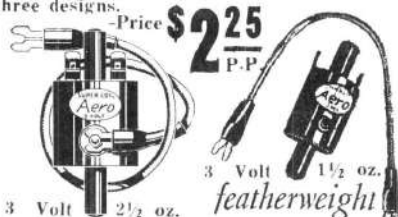


SMITH COIL: Most widely used. Standard on almost all high quality motors. Latest design evolved from years of experience. New improved screw type terminals and bracket mounting. Moulded in neat bakelite case. Complete with high tension lead. 3 V. 2 1/4 oz.
SMITH COIL \$2.50

MECHANICAL TIMER: Found very dependable and positive in action. Can be mounted inside with lever protruding out. Use wire hook to hold lever "ON" while cranking. Made in two grades. Identical mechanism except that \$1.95 one is made of dural to reduce weight.

MECHANICAL TIMER 2 oz. \$1.50 P.P.
DURAL MECH. TIMER 1.2 oz. \$1.95 P.P.

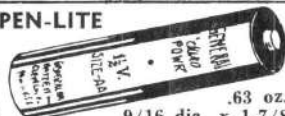
AERO SUPER COILS Designed with definite ideas about small engine ignition needs. Primary winding draws a minimum of current needed to energize Secondary with enough power to produce a hot and healthy spark, powerful enough to fire through carbonized points. The extended silicon steel core provides added over all efficiency between Primary and Secondary for reason you will understand when you get your Electrical Degree.—Windings and core hermetically (air and oil tight) sealed in flexible bakelite. Spring clip connections and Snap-on High Tension Lead. Made in three designs.



AERO CONDENSERS 3 Volt 20¢

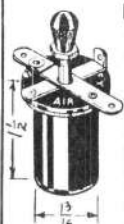
GENERAL PEN-LITE BATTERY

Recommended.
 Packed with
 amperage. 5¢



AUSTIN BATTERY CASES: Just about the neatest and lightest on the market. Threaded for bolting to model. Can be readily adjusted by providing a slot on the mounting board. Tin eyelets with solder, insert tinned wire ends and flow solder for good connections. Three sizes.

#1 Two Penlites 25 oz. 35¢
 #2 Two Mediums 35 oz. 35¢
 #3 Two Large 5 oz. 35¢



BERKELEY'S TIME-AIR \$1.00 P.P.

AUSTIN

AIR-DRAULIC TIMER is the first of its type made especially for model work. Can be adjusted accurately from 1 second to 5 minutes. Dimensioned as shown. Wt. 5/8 oz.



AUSTIN TIMER \$1.00 P.P.

SMITH COIL
 Specially designed for vest pocket models.
COMPETITOR

3V. \$1.75 P.P. 1 1/2 oz.



"He sleeps in haunted houses. Hunts big game with empty hands."

JASCO HOOK-UP WIRE

The ideal wire for model use. Light and of small diameter, but its 7 strands of tinned copper wire are more than enough for primary current. Uses small but tough flexible plastic insulation. Remove insulation with razor to expose ready to solder wire.

JASCO HOOK-UP WIRE 2 Ft. for 5¢

HIGH TENSION WIRE Same as used on most quality coils. 16 strands of copper wire covered with rubber, interlaced threads and coated with celluloid. Guaranteed to confine that hot spark.

HIGH TENSION WIRE 5¢ per Ft.

H.T. WIRE with CLIPS 15¢

SWITCHES & CONNECTIONS

JACKS & PLUGS are used for booster, solderless type. Makes positive connections.

JACKS & PLUGS 2 for 15¢

SWITCHES: Light enough for plane use. Toggle switch of good and dependable make.

MIDGET KNIFE SWITCH 20¢

TOGGLE SWITCH 30¢

ALLIGATOR CLIPS: Just about the most useful item for testing and booster connections. Just expose two bolts or brass strips. Solderless type, but better use solder.

ALLIGATOR CLIPS 2 for 15¢

TERMINAL CLIPS: For battery boxes, and when using removable motor with fixed ignition. Do not use on oil splashed area.

TERMINAL CLIPS 2 for 5¢

CONNECTION LUGS: ...6 for 5¢ For connecting wire to bolts or ground on engine.

HANDY FUEL CAN & FUNNEL



Simplify refueling. Keep dirt out of fuel. 8 oz. Handy-Can holds enough gas for a day's flying. Just press plunger to pump fuel into tank.

PUMP FUEL CAN 60¢ P.P.

LONG FUNNEL ...35¢ P.P.



BRIGHT STAR BATTERIES

Discovered by model builders to be the best. For some reason they seem to have constant and dependable supply of packaged electricity, just what is needed for model engines. Cap. 1½ volts.

Type Wt. Dia. Length Price

Penlite .55 .9/16 1 7/8 .. 5¢

Medium 1.5 1 1/8 .. 10¢

Large 3.4 1 3/8 2 3/8 .. 10¢



ELECTRICAL ACCESSORIES shown here were selected as best from a large assortment of radio supplies. Memorize the wiring diagram so that you will know at a glance if the electrical system is at fault. Make all connections clean and secure with solder so that you will not waste time in wondering. A twisted wire connection might work when dry, but once it is oil soaked you might as well do the job over again, and good this time.

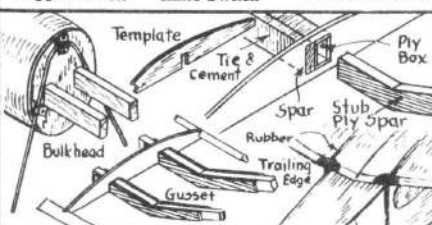
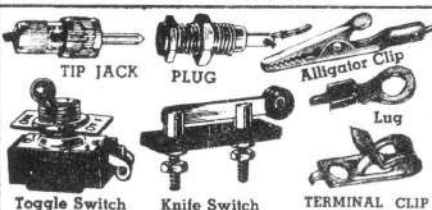
CHAMPION SPARK PLUGS



Standard equipment on most engines, and are most widely used replacements. Well made by manufacturers with years of ignition experience. Three sizes, **CHAMPION V-1** 3/8"x24...65¢ Fits Brown Jr., Dennyrite, O.K. Forsters, Cyclones, Bunch Series and others.

CHAMPION V2 1/4" 65¢ For Ohlsson "60" and "23", Torpedo, Phantom, Hi-Speed, Brownie and other "B"s.

CHAMPION V-3 1/4" 65¢ Fits same engines as V-2. Smallest Champion plug. Used on Atom, Bantom, Ohlsson "19" and other "A"s.



JASCO PLYWOOD: Used for firewalls, airfoil templates, landing gear bulkheads, spar gussets, box spar and false spar on two piece wing, and wherever strength, durability with lightness is needed. It is a vital item on gas model construction. You should use the best.

JASCO stocks **BIRCH WELDWOOD** in 1/16 and 1/8 sizes. As the name implies, three birch veneers are welded together under pressure and heat with a plastic binder (Bakelite type) instead of glue as in standard plywood. This makes **WELDWOOD** oil and waterproofed. Heat resistant up to the charring point of the wood. It does not open on the exposed seams. It is an ideal plywood for gas model work.

JASCO PLYWOOD

3 x 6 6 x 6 6 x 12

1/32 5¢ 10¢ 20¢

1/20 5¢ 10¢ 20¢

3/32 5¢ 10¢ 20¢

BIRCH WELDWOOD

3 x 6 6 x 6 6 x 12

1/16 7¢ 13¢ 25¢

1/8 7¢ 13¢ 25¢

SHEET FIBER Excellent for cowlings. Cement on balsa for firewalls. Trailing edge reinforcements. Small spar gussets, and airfoil templates. Good insulation for electrical appliances. Rough sand for good cementing surfaces.

FIBER: 1/64" Wall.

3 x 6 5¢ 6 x 6 9¢ 6 x 12 16¢

But he runs away when you ask him to touch a high tension lead!"

JASCO MUSIC WIRE

MUSIC WIRE: Invest in a good round nose pliers (\$1.00 to \$1.50) to end your wire bending troubles. Ends should be filed or ground smooth because "bend-break" produces very sharp burrs. Always use safety hooks on rubber models, and double bend mounting hooks to avoid nasty injuries, especially at the free-wheeling bend. Large sizes are bent by clamping in vise and hitting just above the jaws. To cut heavy gauges file groove all around and bend sharp. —JASCO stocks only the best imported grade. Lively. No weakening spiral knurls. Polished. Stocked in straight and true lengths. (Except No. 1, No. 3 and No. 6 which are cut from coils.) No. 8 and No. 10 in 2 ft. lengths, others as noted.

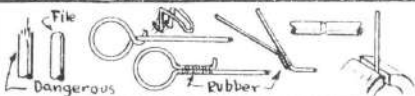
JASCO MUSIC WIRE

No.	Gauge	Price	Rubber Load & Uses
1	.010	2¢	ROG Clips, Springs
3	.012	2¢	1/32 & 3/64 Rubber
5	.014	2¢	1/16 & 5/64 "
6	.016	2¢	3/32, 7/64 & 1/8 "
8	.020	1¢	Fold. Prop. Springs
10	.024	1¢	4 Str. of 1/8th
12	.028	2¢	6-8 Str. Hooks
15	.034	3¢	8-12 " 2 oz. Ld. Gr.
18	.040	4¢	14-18 " 3 oz. " "
22	.049	5¢	18-24 " 4 oz. " "
1/16	.062	6¢	24-36 " 6 oz. " "

5 FT. G.M. MUSIC WIRE

3/32	.094	15¢	Ld. Gr. up to 2 lbs.
1/8	.125	25¢	Ld. Gr. up to 4 lbs.

NOTE: If your package is shorter than wire length specify how we should cut or bend to fit. **SPECIAL** — .073 x 3 ft. — 8¢



TUBING for axle and shaft bearing, braces, telescoping connections. Roughen for cement and bind with thread. Force balsa into tube before bending or flattening to prevent kinking. To strengthen flattened tubing insert wire before shaping. Use bamboo filler on extra sharp bends to keep strength.

SPECIAL .010 WALL TUBING

Stocked only in 6" & 12" Lengths

	Outside Diam.	Alum. per 12"	Brass per 12"	Wire Fit
1/20		9¢	10¢	.020
1/16		9¢	10¢	.016
3/32		9¢	10¢	.062
1/8		9¢	12¢	.094
5/32		10¢	14¢	.125
3/16		12¢	16¢	
1/4		14¢	20¢	

SPECIAL ALUM. BENDING TUBING

For wing and tail outlines. Will bend without kinking. Shape to fit and flatten if you wish. Can be ordered in any length, but specify lengths to fit your package. 1/32 wall. Stocked in 3/16 & 1/4 outside diameters. Aluminum wire also good for outlines, and can be flattened.

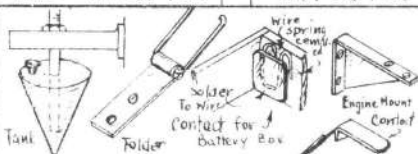
SOFT ALUMINUM TUBING 1¢ per inch.
1/8" ALUMINUM WIRE 3¢ per foot.

DURAL and ALUMINUM: Dural is the "Spring or Stainless Steel" in the aluminum family. (17 S-T Dural = 95% Al, 4% Copper, 0.5% Mn. and 0.5% Mg. And it is about 2% heavier than aluminum.) Use dural for almost all work except on bending parts, like flaps. Dural is stiff and brittle and can be bent only once. However, it is much harder to work with dural than with softer aluminum. If you had no previous experience, it is advisable to begin with aluminum which is much easier to fabricate. Dural and Aluminum conduct electricity, but because of high resistance surface skin, it is not recommended to use them as part of the wiring system.

ALUMINUM

DURAL

	3x6	3x2	6x6		3x6	3x12	6x6
.006	3¢	6¢	6¢		5¢	10¢	10¢
.010	4¢	7¢	7¢		8¢	16¢	16¢
.016	6¢	12¢	12¢		10¢	20¢	20¢
.025	8¢	15¢	15¢		13¢	25¢	25¢
.032	9¢	17¢	17¢		16¢	32¢	32¢
.062	5¢	10¢	10¢		20¢	40¢	40¢



BRASS is used where strength and workability is needed. And also for electrical contacts. Easy soldered when cleaned and well heated. Sheet stock for tanks, contacts and hinges. Strips are stocked especially for folder hinge.

BRASS

SHEETS

STRIPS

	3 x 6	6 x 6		6" x 12"
.010	7¢	17¢	1/4 x .032	3¢ 5¢
.016	10¢	20¢	1/8 x .015	3¢ 5¢
.025	18¢	35¢	3/8 x .025	3¢ 5¢
.032	22¢	40¢	1/2 x .032	4¢ 7¢

ALUMINUM RIVETS: Best for permanent connections especially where vibrations are strong. Drill hole for snug fit. Expose one diameter length for riveting.

Dia.	Length	per Doz.
1/16	1/8	3¢
3/32	3/16	1¢
1/8	1/4	5¢



METALS have many applications in model work. About all the tools you need are a hacksaw, drill, shears, fine file, hammer, pliers, soldering iron and a vise. Always make a paper pattern of your work before shaping from metal. Center punch holes before drilling. File rough edges and round corners. Clamp work in vise with bend line just above the jaws. Use hardwood block between work and hammer. Use large soldering iron so that work will have enough heat to let solder flow. Hot iron and soldering paste will do wonders, but work must be polished clean for secure soldering. Try digging solder off with knife. If it flakes, re-clean and re-solder. Do not depend on solder joint to carry loads, especially when it is on steel wire.

"Metal and wire parts have no feeling, but your skin has!"

GASOLINE MOTORS

The engine manufacturers endeavor to give you a fool-proof motor. All you have to do is to feed it properly and provide a hot spark. Do not expect a choked or leaned motor to start off with a bang. Nor expect the spark plug to do the impossible when your wiring is poor or battery drained by

constant "sparking". (Use boosters every time you start no matter how good a coil or batteries you may have.) You will find instructions provided with the motor pretty sensible. Also, realize that you must understand your particular motor in all its whims to really get its utmost power.

The OHLSSON MOTORS are designed and engineered from the latest two-cycle combustion engine technical data. Manufactured from modern alloys by most advanced methods. Careful attention to individual parts and precision workmanship assure complete satisfaction in dependability and performance.

OHLSSON FEATURES: Cylinder machined from solid steel alloy. Well finned for cool operation. Piston ground to 1/10,000 in. tolerance and individually lapped into cylinder to maintain high compression. Crankshaft is also machined from solid alloy steel. Counterbalanced. Ball Bearings for thrust loads. ("60" also has Roller Bearings for radial loads.) Dust proof timer assembly. Tungsten breaker points tensioned by steel spring for positive contact. Incorporated ignition cut-off switch; just retard the arm to its fullest. Transparent tank with self sealing cap. Just press the fuel can nozzle against it and squirt fuel inside. Complete with Smith Coil & Condenser.

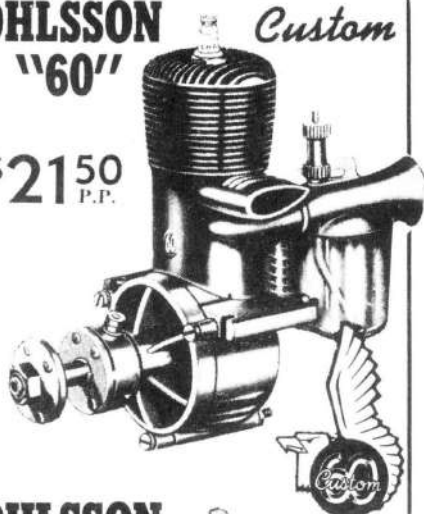
OHLSSON "19"

\$14.50
P.P.



OHLSSON Custom "60"

\$21.50
P.P.

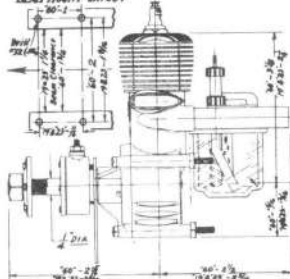


OHLSSON "23"

\$16.50
P.P.



REAR MOUNT LAYOUT



Specifications

	"60"	"23"	"19"
Bore & Stroke	15/16" x 7/8"	11/16" x 5/8"	11/16" x 17/32"
Displacement	.60 Cu. In.	.23 Cu. In.	.199 Cu. In.
Static Thrust			
Rating	4 1/2 Lbs.	30 Ounces	24 Ounces
Complete Motor Weight	10 Oz.	4 Ounces	3 3/4 Ounces
Recommended Propeller	14" to 16" D 10" Pitch	10" Dia. 6" Pitch	9" Dia. 5" Pitch
Inversion	Operates equally well upright or inverted		

"They capture the power of fire for you."

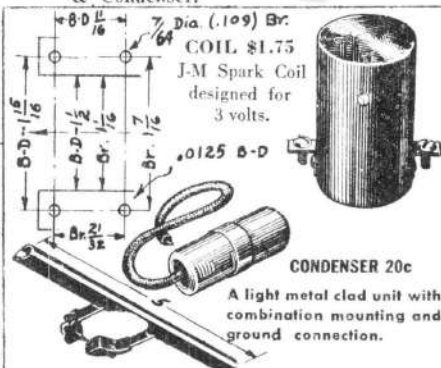
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BROWN JR. MOTORS

BROWN JR. MODEL "D": The most popular design of the family. It is the production version of the famous "B". Everyone can now enjoy the "B's" performance at almost half of the cost. "D" includes all of the latest sound engineering principles and advances used on the "B". Improved timer, chrome molybdenum crankshaft, needle valve fuel adjustment and transparent tank. Motor shipped ready to run, complete with coil and condenser.



"BROWNIE": Junior's lively little brother. Latest product of the Junior Motors Corp. Groomed to carry on its winning tradition into the "B" class. Complete with Coil & Condenser.

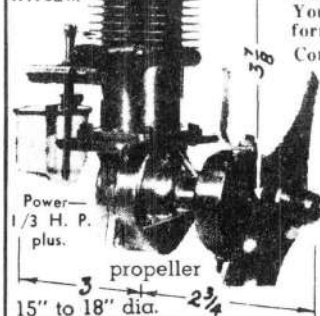


EXHAUST MANIFOLD: A luxury you can now afford. Made from steel tubing with welded mounting lugs. Bright nickel finish. Dimensioned as shown. May be cut to fit your needs. Weight: .15 oz.

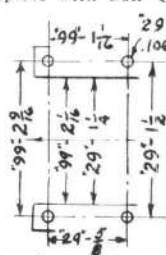
BROWN Jr. MANIFOLD 50¢ P.P.

\$17.75 "99" FORSTER "29" \$15.50 P.P.

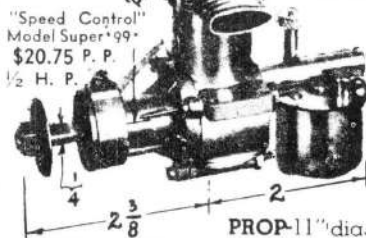
Bore—1 $\frac{1}{16}$ " Stroke—1 $\frac{1}{8}$ "
Displace .997 cu. in.



Quality motors Approved by model builders. Fine and intelligent workmanship guarantees your complete satisfaction. You will be pleased with the performance of the modern "FORSTERS". Complete with Coil & Condenser.



"Speed Control"
Model Super "99"
\$20.75 P. P.
 $\frac{1}{2}$ H. P.



A sure cure for whatever ails you: "A dependable motor."

JASCO CONSTRUCTION KITS

Soaring in a glider is the purest form of flying yet achieved by man. It is possibly the closest approach we will ever reach in experiencing the feeling which is the birth-right of the birds.—It is an experience which cannot be equaled or duplicated behind a noisy and blustering engine. You must be in a slick and sensitive sailplane to find and utilize the invisible might and strength of the skies.

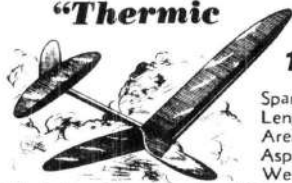
Model builders experience a faint imitation of the soaring excitement when one of their power models catches a riser. But such moments are too few and far apart. The mechanical power is basically wild and we have to compromise with efficiency to bring it under control. Then, also, the power has a habit of becoming temperamental and so keeping the model earthbound when it should be up in the skies hunting for thermals. Only a model specifically designed

for soaring alone can give you the fullest possible measure of flying satisfaction. The "Thermic" series fulfill this requirement without reservation.

The basic "Thermic" designed is the result of many years of close association with the activities of gliding clubs, and an intimate knowledge of model aerodynamics. It is a design so far advanced in the aerodynamical layout and constructional features that it will be in service for many years to come.

The success of an individual "Thermic" of the series is in large measure due to the persistent program of experimentation and testing by the staff until the model acquires an uncanny sense of automatic stability. The strength of the models will also surprise you. A conscientious selection of balsa for a particular need is responsible for that.

"Thermic 18"



15¢ By mail add 5¢

Span 18 in.
Length 11 in.
Area 29 sq. in.
Aspect Ratio 11
Weight ½ oz.

The baby of the family. Will perform well in hands of most inexperienced because no matter how it is launched it will roll into

the correct gliding position. Its feather-weight and stable tight circles produce long and satisfying flights. Selected balsa and detailed instructions will make building very easy. It is an ideal project for beginners' group. Camps found it just the thing for their handicraft groups.

"THERMIC 18" KIT: JASCO quality light-tapered wing section, smooth tail surfaces, hard balsa boom, easily carved pod, wire, tube of cement, balancing clay, 10-0 sandpaper, and complete set of plans, full size patterns, construction and flying instructions.

"Thermic 20"

25¢ By mail add 10¢



Span 20 in.
Length 16 in.
Area 50 sq. in.
Aspect Ratio 8
Weight 1 oz.

The most popular design with the contest boys. Its compact design and handy fuselage grip take full advantage of your arm power. The aerodynamical layout of 0° setting of wing and slightly lifting stabilizer

will produce the greatest possible height under capable and understanding hands. However, 0° setting requires very fine longitudinal adjustments and the model needs long distance in which to recover. You will have no trouble in obtaining record flights if you can time the pull-out turn just right so that the model will not stall and then dive. But if you are not familiar with the expert hand launch glider technique, it is suggested that you set the stabilizer at 1/16° negative according to the instructions on the plans.

"THERMIC 20" KIT: Tapered wing and tail stock, hard boom, firm pod, tube of cement, wire for hooks, balancing clay, 10-0 sandpaper, complete plans, flying and construction details, and full size patterns.

"Thermic 36"

50¢ By mail add 10¢



Span 36 in.
Length 17½ in.
Area 96 sq. in.
Aspect Ratio 14
Weight 2 oz.

Designed specifically for Hi-Start. It is too large for hand launch, too stable for

catapult, and too fast for tow line. But just watch it get up on the Hi-Start! "36" will give you all the thrills of hand launching plus the looks and performance of a sailplane. It is just the thing to take along on your flying trips to cheer you up when the motor gets temperamental or the model makes an unhappy landing. You just cannot help but get excited as you watch it wheel around and around over your head.

"36" is spirally and longitudinally stable, and it quickly recovers from upsets. Wing slips off on hard landings and dissipates the inertia force so that nothing breaks.

"THERMIC 36" KIT: Completely tapered wing and tail stock, hard boom, easily carved pod and fairing blocks, wire, cement, Glider Polish, 10-0 sandpaper, balancing clay, complete plans, construction and flying instructions, and full size outline patterns.

"Thermal hunting seems such a useless pastime.

"Thermic 50"

\$1.00 by mail
add 15c

Have you ever seen anything like it? And it glides just as beautifully and gracefully. Glider pilots wish they had something like it in fifty or sixty foot span. "50" is an ideal combination of the best features found on the world's finest soarers; arranged to provide an overabundance of stability which is so essential for successful model flying.

"50" is a masterpiece combining beauty with simplicity. Note the easily carved streamlined pod and slim boom, and how they provide the necessary cross section with minimum of parasite and skin friction. You have to look twice to realize that the graceful wing and tail are made up of straight lines with rounded corners. Internal construction is sturdy; with two spars in the wing and wide, pre-tapered trailing edges to assure smooth airflow contours. The wing is fixed to the fuselage with rubber bands so that it may fly off during an unhappy landing, and so prevent the boom from shattering. It is next to impossible to crack-up "50" because of its strength and unusual buoyancy.

You must see "50" in action to appreciate its aerodynamical superiority. It is a sight to watch it climb on a tow, and how it swings back into the tow direction when upset by a gust. And mind you, it is adjusted for a fairly tight turn. If your tow hook should happen to slip off while the model is climbing at 45°, it will execute a snappy wing-over and a roll, and start gliding without losing an inch. This remarkable

Span 50 in. Weight 4½ oz. Speed 10 m.p.h.
Length 24¾ in. Glide Ratio 9:1 Sink Sp. 1¼ ft/s
Area 108 sq. in. Aspect Ratio 12.5 Mod. NACA 6409

stability is due to correct combination of dihedral, rudder area and tow hook position. And knowing just how much of each to use, and what to change during the development period.

"50" can be towed up by standard 100 ft. kite string during sanctioned contests. But for real enjoyment, try Hi-Start.—"50" has been tested with standard rudder and stabilizer combination, and the "V" style. It does not seem to make any difference which one is used. (Except that beginners have trouble in adjusting the "V" type.) Plans show the correct size of each, and enough material is included to make the one you want.

"THERMIC 50" KIT: Light printed "C" stock ribs, pre-tapered trailing edges, hard spars and boom, medium pod and soft shaping blocks, best grade of yellow tissue, generous supply of clear dope and cement, red color and masking tape for trimming, 10-0 and 6-0 sandpaper, wire for hooks, extra balsa sheets for outlines, plywood for gussets, full size plans with at least 40 step-by-step sketches to simplify construction and flying for beginners.

"Thermic 72"

\$2.50 by mail
add 25c

Span 72 in.
Length 35½ in.
Area 410 sq. in.
Weight 12 oz.
Aspect Ratio 12.6

Glide Ratio 14:1
Sink Sp. 1¼ ft/s
Speed 12 m.p.h.
Airfoil NACA 6409

If you ever had an urge to build a large size glider, or would like to see some real flat gliding, then, "72" is the job for you. It will not let you down. But be prepared for heartbreaks because the job has a habit of getting out of sight on the slightest thermal activity.

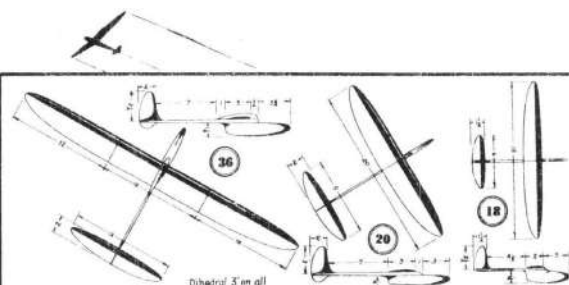
Whatever we said about "50" goes double for "72". Identical outline, proportioned to 6 foot span. It has "50's" remarkable towing and flying stability. But because of its wider and undercambered airfoil it has almost twice the duration of "50" from the same altitude.

"72" follows the construction layout of "50" with proportionally large members. Wing slides off on hard landing which insures extra long life.

—Also, the model was tried with a standard rudder and stabilizer combination, and "V" design. We found no difference in performance or stability after corrections were made. Enough material is included to make whichever you want.

"THERMIC 72" KIT: Medium, printed "C" stock for ribs, pre-tapered trailing edges for wing and tail, hard spars and boom, medium strips for tail ribs, easily carved pod and shaping blocks, extra balsa sheets for odds and ends, 4 oz. cans of clear dope and cement, yellow SILK-SPAN covering, red dope and masking tape for trimming, 10-0 and 6-0 sandpaper, plywood for gussets, full size plans with at least 40 step-by-step sketches to simplify construction and flying for beginners.

But the whole world hears about it when you catch one!"



PLANS FOR THERMICS

Full size. Same as those included in the kits. P.P.

"18", "20" or "36".....5¢
"50".....15¢ "72".....25¢

PRINTED RIBS

Printed on 1/20th 8 lb.

"C" grain balsa sheets.

Price per complete set.

"50".....10¢ "72".....30¢

GENERAL NOTES ON GLIDERS

While designing, building and testing the "Thermics" we discovered several facts which might be of help to you.—A glider needs just as much dihedral as power plane. Rudder area must be just right for safe towing and tight turning. Tow hook should be close to C.G. to obtain maximum height with limited towline. Gull shaped dihedral is not recommended.

1/3 Rubber

HI-START is a combination of Catapult and Towline launching. Start with low power. A single strand of 1/8th will be enough for "50" and "72". 1/16 will do for "18", "20" and "36". This power will tow the glider slightly higher than the length of the string. More power, and a well adjusted model, will naturally result in more height.

2/3 Kite String



"Thermic 100" PLANS-50¢ Post Paid

Span 100 in.
Length 50 in.
Area ... 800 sq. in.
Weight 28 oz.
Aspect Ratio 12.5

"100" is an ideal job for radio control. Inexpensive to build. No motor or torque trouble. Can easily carry a small set. Very stable and maneuverable for fast response.



Glide Ratio 19:1
Sink. Sp. 1 ft/s
Speed 14 m.p.h.
Airfoil NACA 6409

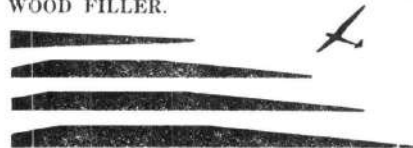
Can be towed as high as you like. Outline similar to "50". Also excellent for record or sport flying. Full size plans include airfoils and modifications for radio control.

GLIDER SUPPLIES

Just when you are about to feel downright foolish working so hard under blistering sun tossing the glider, an invisible force catches it up and carries it higher and higher as it circles the field. You pause a while and let a peculiar sort of happiness soak into your bones. Then the chase is on! You really don't care about getting it back as long as the flight is good, because it is an achievement to have an out-of-sight glider flight to your credit. You feel no regrets losing it. After all, isn't this what you have been working for so hard all day long; trying to capture an invisible thermal for a brief defiance of gravity.

J A S C O pioneered the HAND LAUNCHED GLIDER through printing of successful plans, explaining correct launch, disclosing experts' secrets and developing special supplies. The GLIDER SECTION shown needs only sanding or planing to make it an accurate and efficient airfoil wing. TAIL STOCK is cut just right for glider work. FUSELAGES are hard to stand severe shocks. GLIDER POLISH and WOOD FILLER defy air molecules to catch a free ride. It remains up to you to provide the elbow grease and intelligent co-operation.

WING SECTIONS are cut from 6-8 lb. stock. Light balsa is used for indoor gliders and heavier for outdoor work. Specify when ordering.—The secret of making graceful and smooth flying gliders is unrestricted use of sandpaper.—Strength of joints depends on your patience while cement is drying. Use at least three coats on each joint with an hour of drying in-between.—Filllets are made by mixing balsa dust with thinned cement.—Glass smooth finish is a necessity, and it is fully described under "GLIDER POLISH" and "WOOD FILLER".



WING SECTIONS

3/32 x 2 x 18.....5¢
5/32 x 3 x 24.....10¢
3/16 x 3 1/2 x 24.....15¢
1/4 x 4 x 24.....18¢

FUSELAGES

3/16 x 3/4 x 18.....2¢
3/16 x 1 x 18.....3¢
1/4 x 3/4 x 18.....3¢
1/4 x 1 x 18.....3¢
5/16 x 1 x 18.....4¢
1/4 x 1 x 24.....4¢
1/4 x 1 1/2 x 24.....5¢

TAIL STOCK

1/20 x 3 x 18.....5¢

"May the thermals be at your beck and call!"

—: INDEX:—

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On orders up to \$1.50 add 15c for postage and packing. On orders over \$1.50 add 10%. **POSTPAID & FREE PACKING SCHEDULE**—No charges on items marked "P.P."

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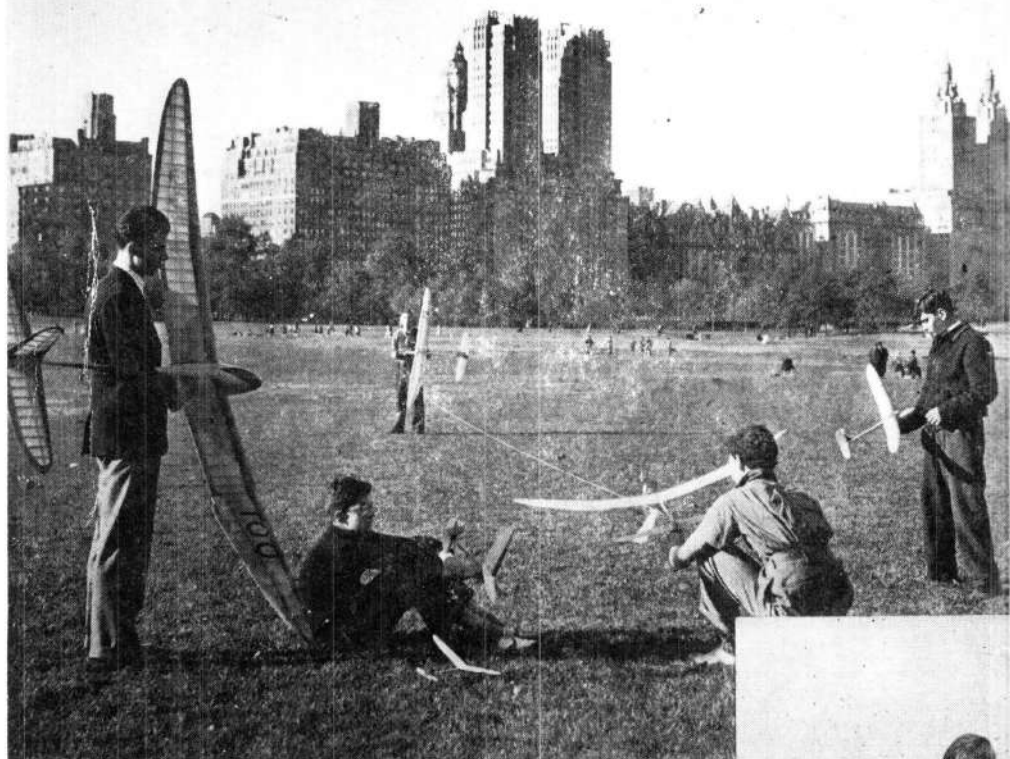
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others, size for size, or price
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"The Academy of Model Aeronautics, governing body for model aviation in America helps model builders establish clubs, set records, and sanction meets. For details write A.M.A. Headquarters, at the Willard Hotel, Washington, D.C."


In November, 1933, John left to join the family in Europe. I had no choice but to continue with JASCO; work at the office was slowing down. --I started to keep record of income and expenses. Still have the Cash Books up to and including 1936. Income for Nov. and Dec. of 1933 was \$58.30. And expenses: \$47.60. Net: \$10.70, rent not included. For the entire 1934: Sales were \$949.00. Expenses: \$732.00. Net: \$217.00. For most of 1934, Year Book and Jasco were now my full time work. -- From the beginning, in 1933, until end of 1934, JASCO operation was from my two rooms. At times, it was a bit awkward to have the boys come for the supplies, but there were times when I was glad to see them as they made it possible for me to have supper that day. (The early, 7:30 A.M. mail also helped with breakfast at times.) It was also getting a bit crowded in the storage room as I had not as yet found a way to get rid of the saw dust. --I felt that it was time to "expand." I found a set of basement rooms, which were no longer legal for habitation, on 7th street. Rent: \$8.00 per month. --Sales for 1935: \$1,612.00. Expenses: \$1349.00. (\$96.00 for rent. \$204.00 Salary for my first after school help. Net: 263.00)

1936 was quite a year. --When Lee Lawrence (His father photographed San Francisco after the earthquake from a balloon.) was on a selling trip to introduce his machine cut props, he stopped with me. --I told him that I was considering giving up the indoor supply business and spend my time on the yearbooks. Then he made me a proposition: He offered to supply all of the balsa stock, indoor and outdoor, on consignment; paying for it after it is sold. I accepted the proposition. Later on I visited his place in Wabash, Ind., to work out the details, including the color code scheme. Obviously, I needed larger quarters. I found a loft on 10th Street for \$25.00 per month. I had a stock value of indoor supplies of about \$100.00 at the end of 1935.

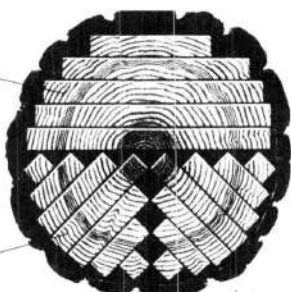
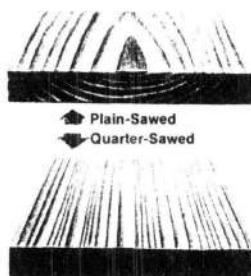
I spend most of the 1936 Spring preparing the 1936-37 Catalogue. It is not reprinted here. It was a 32 pager with over 340 balsa items supplied by Lee. It was printed in May. I mailed out as many as available cash allowed; 1 1/2 ¢ each. The loft was empty except for the indoor stock. Had to wait for orders to come to provide more money for more stamps, etc. and buy stock of items not listed before. Finally, balsa stock arrived and the mail orders were shipped within reasonable time. I thought I had it made now with balsa problem out of my hands. But few months after starting the service, I received a letter from Lee that he would no longer be able to supply the balsa stock, and that he would be willing to reduce my bill by 50% if I could pay him cash. --He had developed a method for making small slide, rulers which could be retailed at 25¢ each. He received so many orders for them that he could no longer be bothered with balsa cutting. I do not know how I managed it, but I did send him about \$500.00. So, 1936 was a financial disaster for JASCO. Sales: \$1,562.00. Expense: \$1,971.00 plus \$500. Loss: \$909.00. (Salaries were \$450.00.) --Besides this financial loss, I was now faced with cutting balsa in quantity I had tried to avoid from the start. --I made it a policy not to let anyone else cut balsa while working for me. You never know what could happen in the saw room.

control

By end of 1936 the production problems were under control. I no longer had to boil and "beat" the lubricant on my stove. I found that Eimer Chemicals was happy to do it for me. (Lube formula that John found in an English model book: 1 part glycerine, 1 part green soap (paste), 1 tablespoon salicylic acid (why-?) and 1 glass of water. Have no idea what I used for "part" measure. At first I mixed my own microfilm solution, and warmed it up under hot water to assure thorough mix. Tried all sorts of combinations. Eventually settled on 1 qt. of model dope, 1 qt. Hat B Sizing (Used for varnishing straw hats) and 3 oz. Tricresyl Phosphate. This was also now mixed in ten gallon lots by the supplier of the B Sizing. ---

By now I had also solved the indoor balsa cutting, and thus almost eliminate the rejects. There were times when I would stare at the saw blade by the hour, wondering, why it misbehaved. Eventually, I realized that I needed a blade which would produce powder-like dust. By chance I found a 7" diameter, 1/16 thick, blade with 3/8" pitch teeth shaped . I used it until 1942.

"C" GRAIN: In 1933, the most critical need was for $1/32 \times 1 \times 18$ balsa sheets which could be formed into tubular motor sticks. -To accomodate this need, the 2" boards were cut into $1 \times 2 \times 18$ blocks (later on, $1 1/8 \times 2 \times 18$ became standard), which, in turn, were cut into $1/32 \times 1 \times 18$ sheets. At very beginning, we found some of the sheets could not be formed into tubes while folding them over the form; prolonged soaking did not help. They would crack. Examining the grain of the "cracker"; we found it to be at 90° variance with the easy-to-roll stock. Knowing this fact, we were able to prepare the blocks to favor the tubular sheets. --Until 1933, indoor ribs were bent over steam or cut from curved sheets. Cutting ribs to outline was useless as they would just lean over when covered. That is, until John realized that the characteristics of the "cracker" grain could be used for "outline-cutting" ribs. And he started to use them on his models. We naturally exploited the "breakthrough" by deliberately cutting and featuring the "cracker" grain. --Since we now had a variety of graincuts, it was only natural to differentiate them by using a code: "A" for tubular stock. "B" for general use. And "C" for "outline-cutting" ribs. It was only later on that we found that the "C" cut was identical to what is known as "quater-grain" in the lumber industry. See reprint from a BELSAW BULLETIN which explains the two cuts. ("A" & "C").



The accompanying illustrations show the two typical ways most sawyers cut boards from a log. As shown, the lumber will be either quarter-sawed or plain-sawed.

One principal reason plain-sawed lumber costs less is because there is less waste and the log will produce more board-feet of usable lumber. It also requires less time to plain-saw.

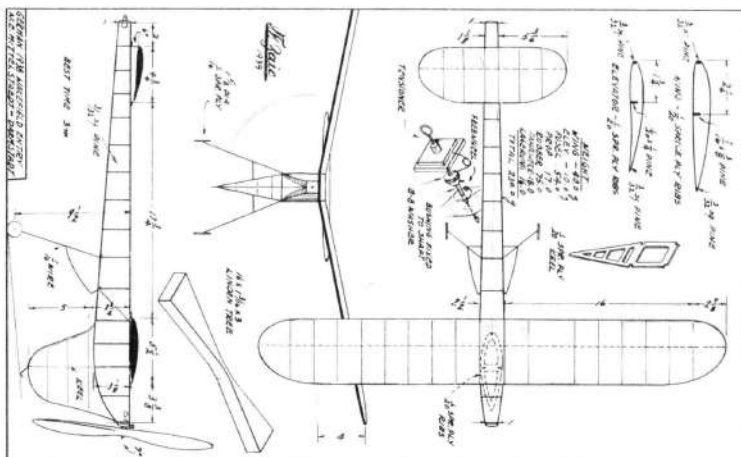
Lumber derived by the quarter-saw method not only produces beautiful grain patterns, but there is less chance of the lumber twisting and cupping and it also wears more evenly. Some of the most beautiful and durable hardwood flooring is quarter-sawed oak.

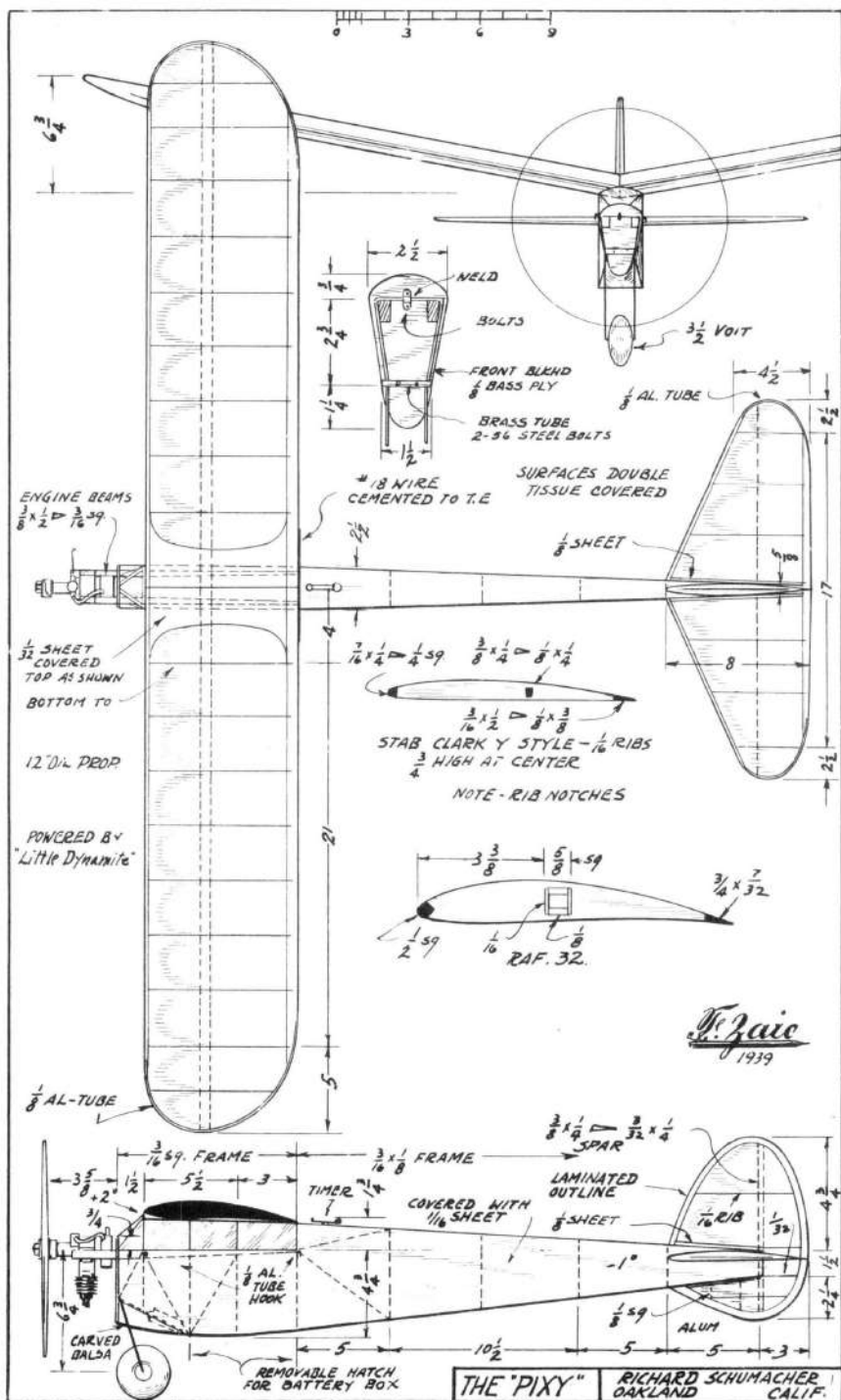
Quarter-sawed lumber is produced by first sawing the log into quarters. Each quarter is then sawed into boards at right angles to the annual rings and parallel to the medullary rays. For readers who may be stimulated into attempting to quarter-saw their own lumber, we should point out this is feasible only on automated mills equipped with special headblocks and log-turners.

QUESTION — An ad in the paper prompted me to call about some lumber for my woodworking projects, but the price quoted seemed too high. We started to dicker and he came back with the fact that this was "quarter-sawed" and "kiln-dried." I declined his price, but would like to know what is so special about this "quarter-sawed, kiln-dried" stock that makes it worth more than I'm used to paying?

ANSWER — Speculating on lumber prices over the phone (or in this column) is a risky business. There are so many factors to consider that will affect the price that I suggest that a novice contact a knowledgeable friend for assistance.

But as for your specific question, perhaps this fellow's price was out of reason but you can normally expect to pay a premium for quarter-sawed and/or kiln-dried lumber.





BEST OFFICIAL TIME
30.5 M.E.
AUG. 38 - 19m 40s
SEPT. 38 5m 10s
AND 7m 34s

MODEL FLIES
TO RIGHT
GLIDES LEFT
RIGHT THRUST
LEFT WASHOUT
SLIGHT LEFT
RUDDER

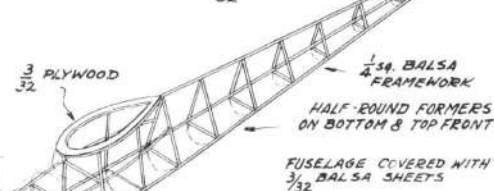
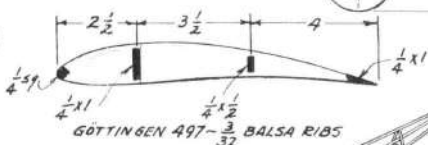
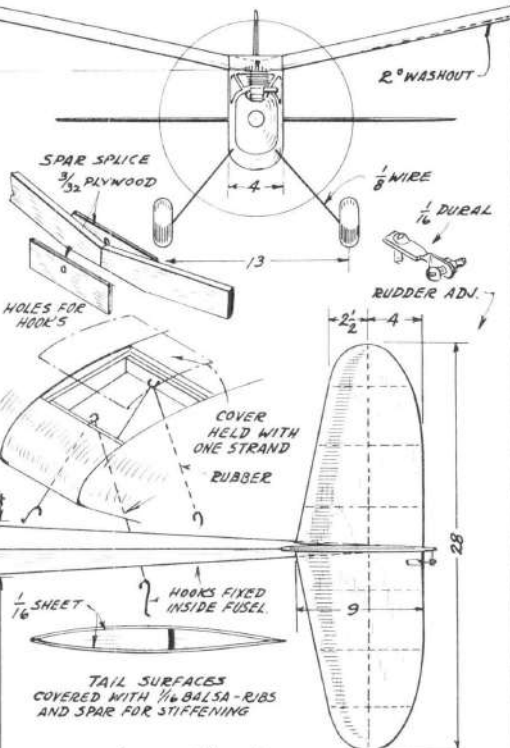
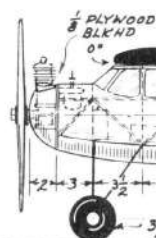
3° RIGHT
THRUST



FRONT BLKHD
1/8 PLYWOOD

OHLSSON POWERED
14" DIA. PROP.

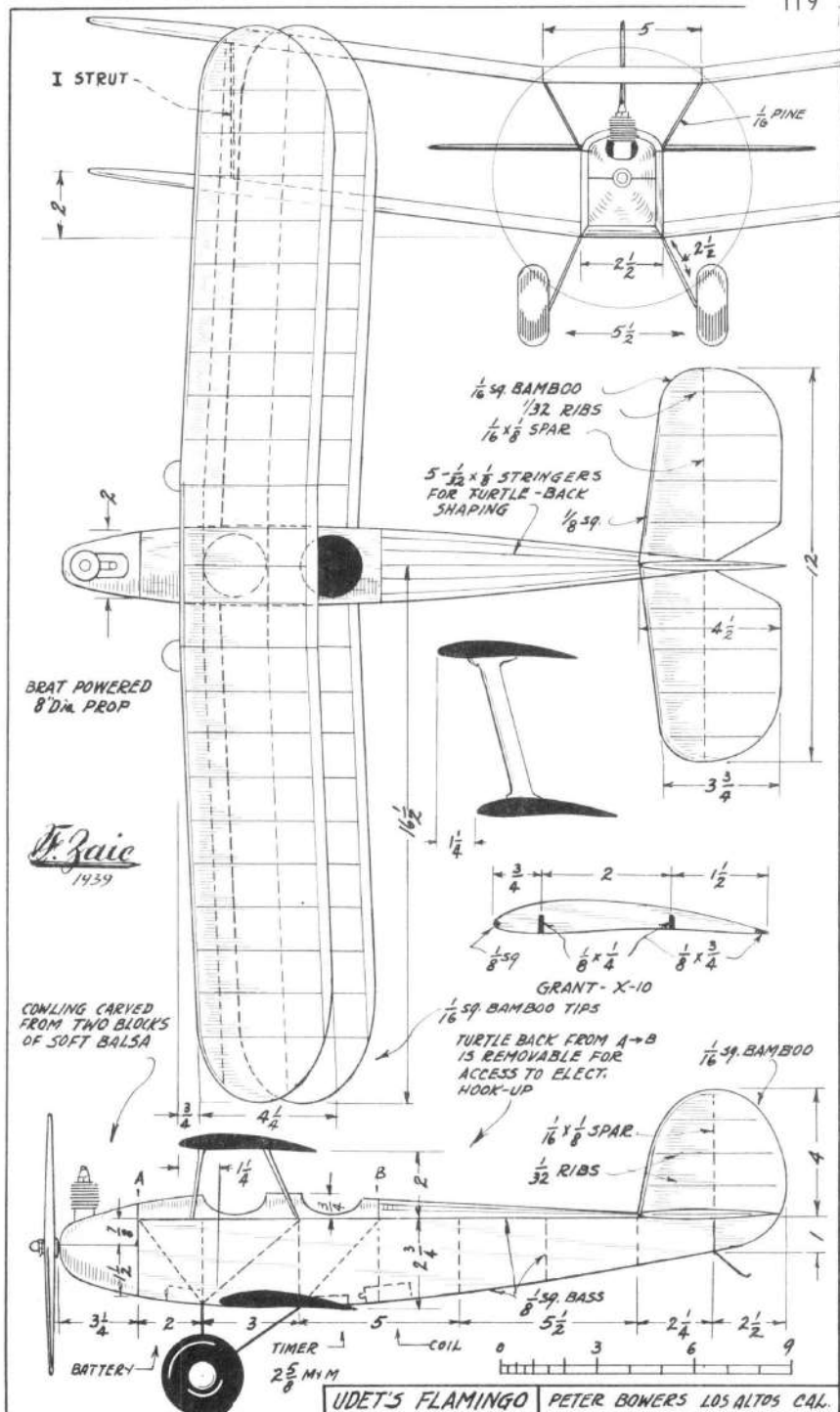
4 - 1/16" STRIPS
STEAMED TO SHAPE

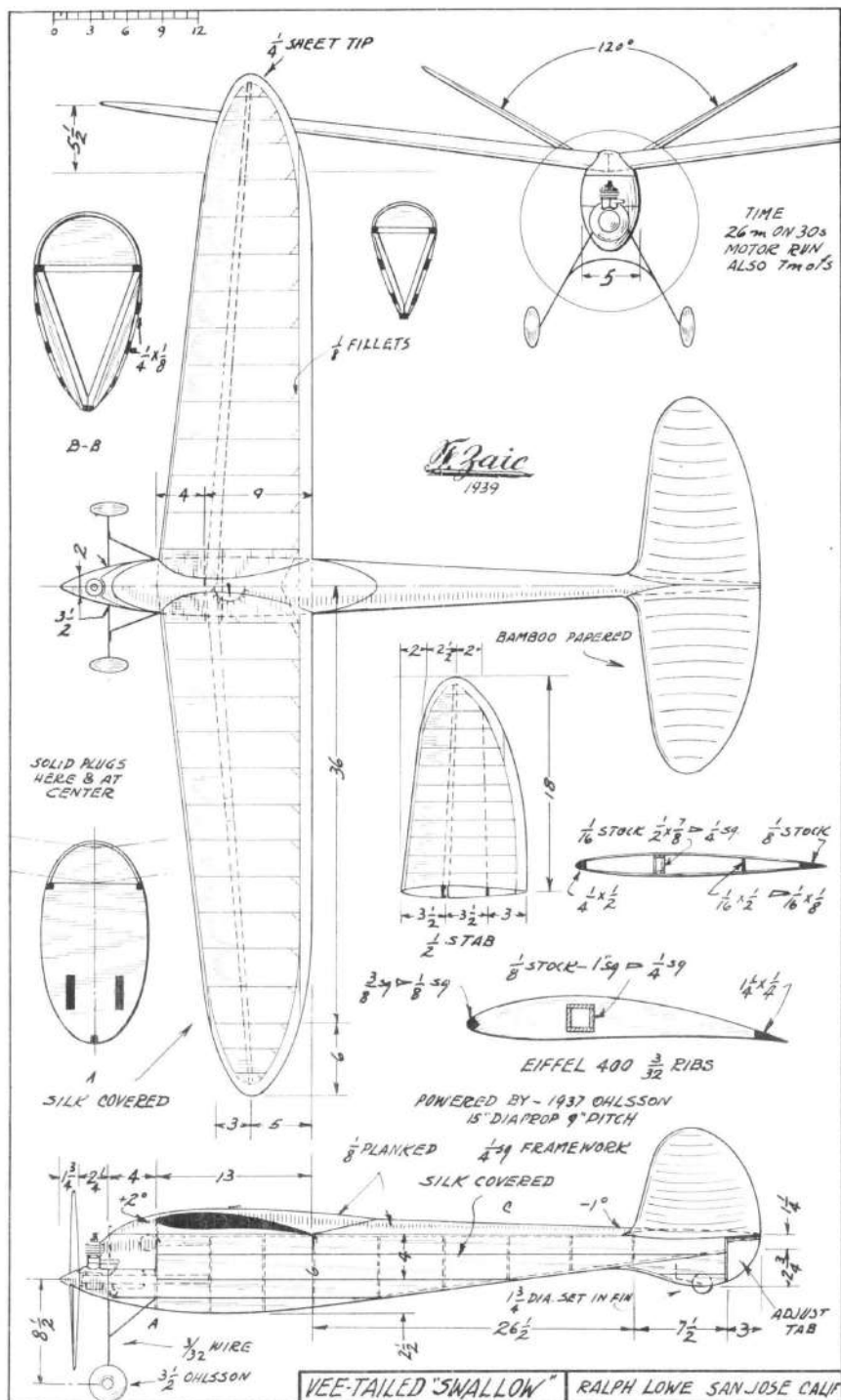


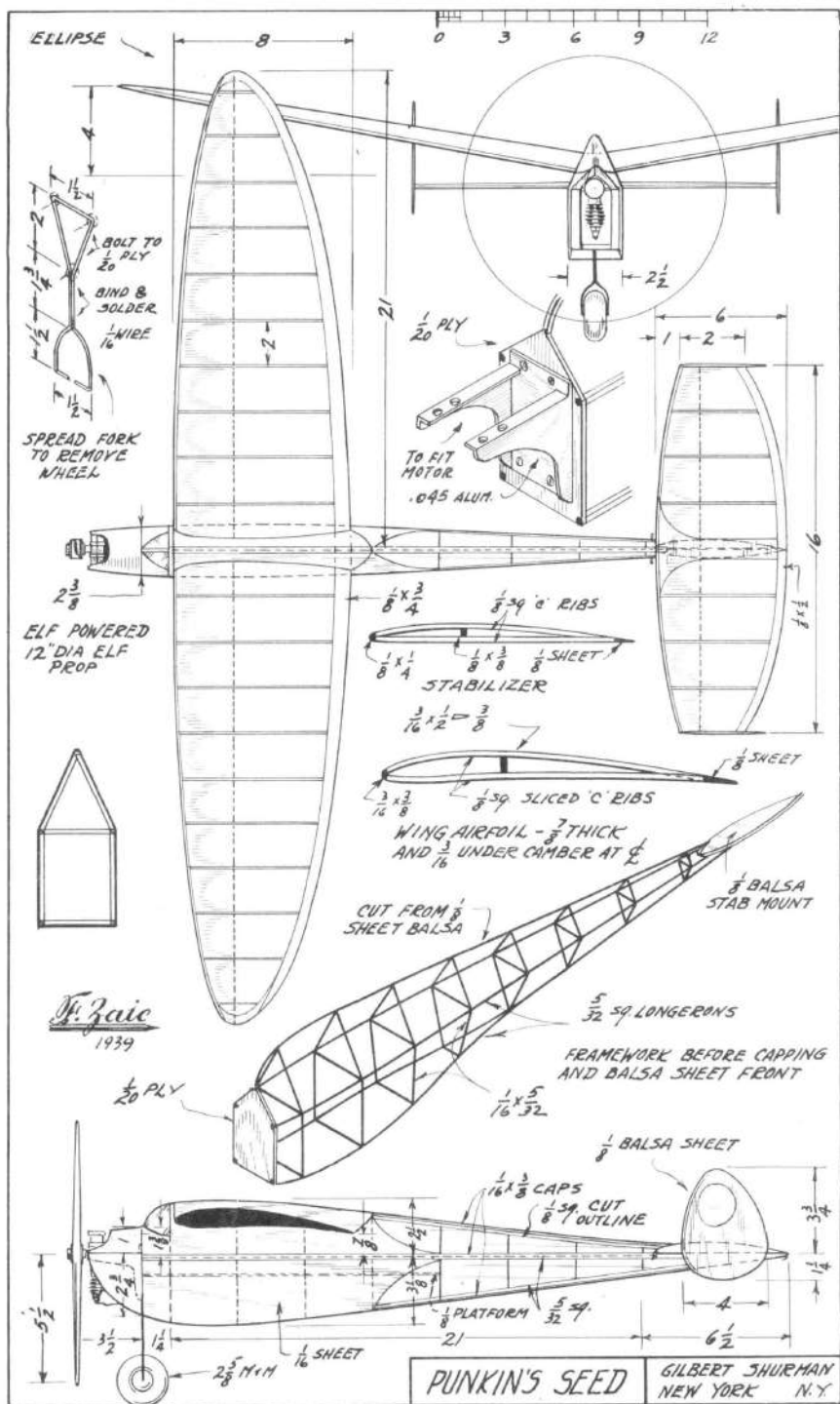
K. Zaic
1939

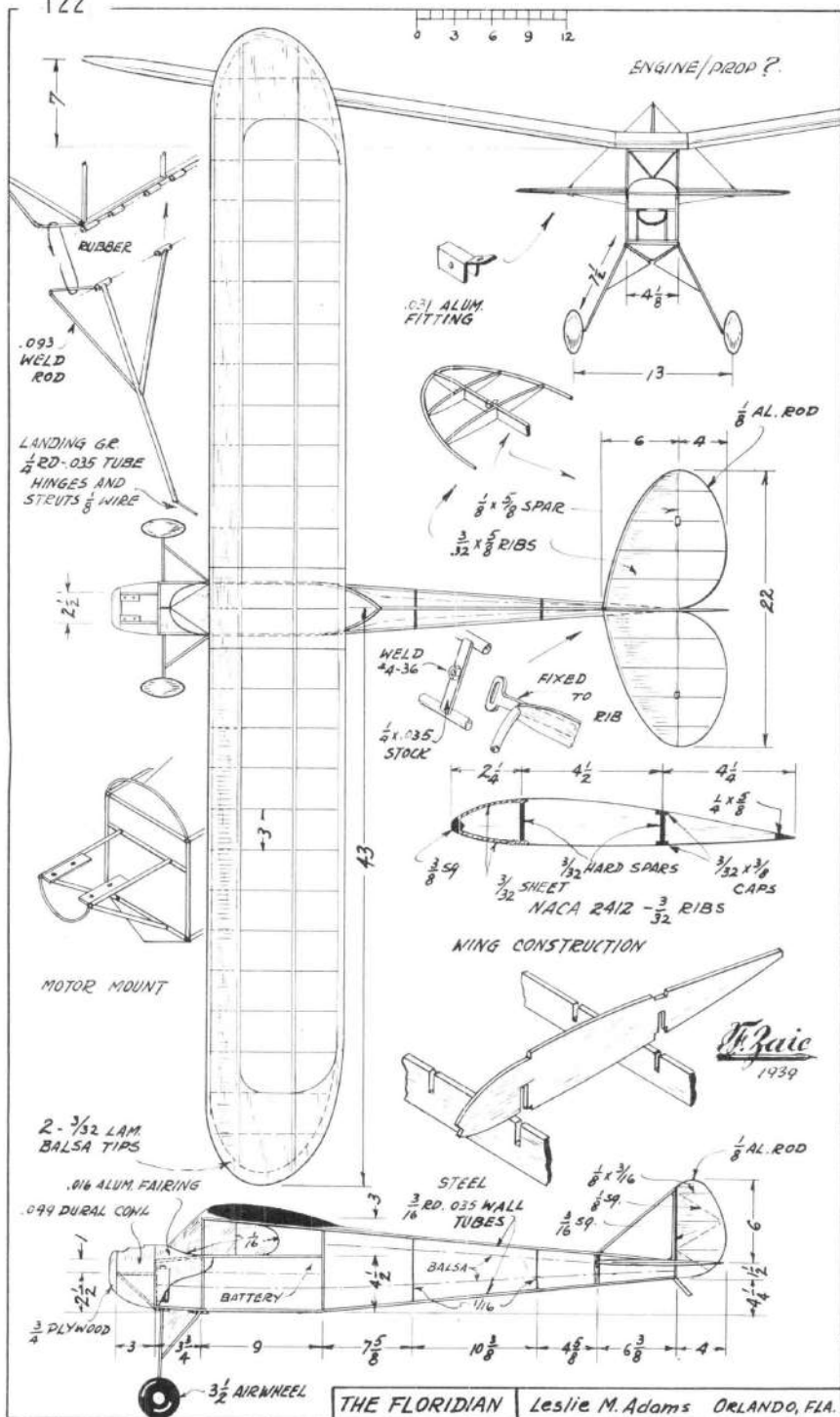
THE REBEL

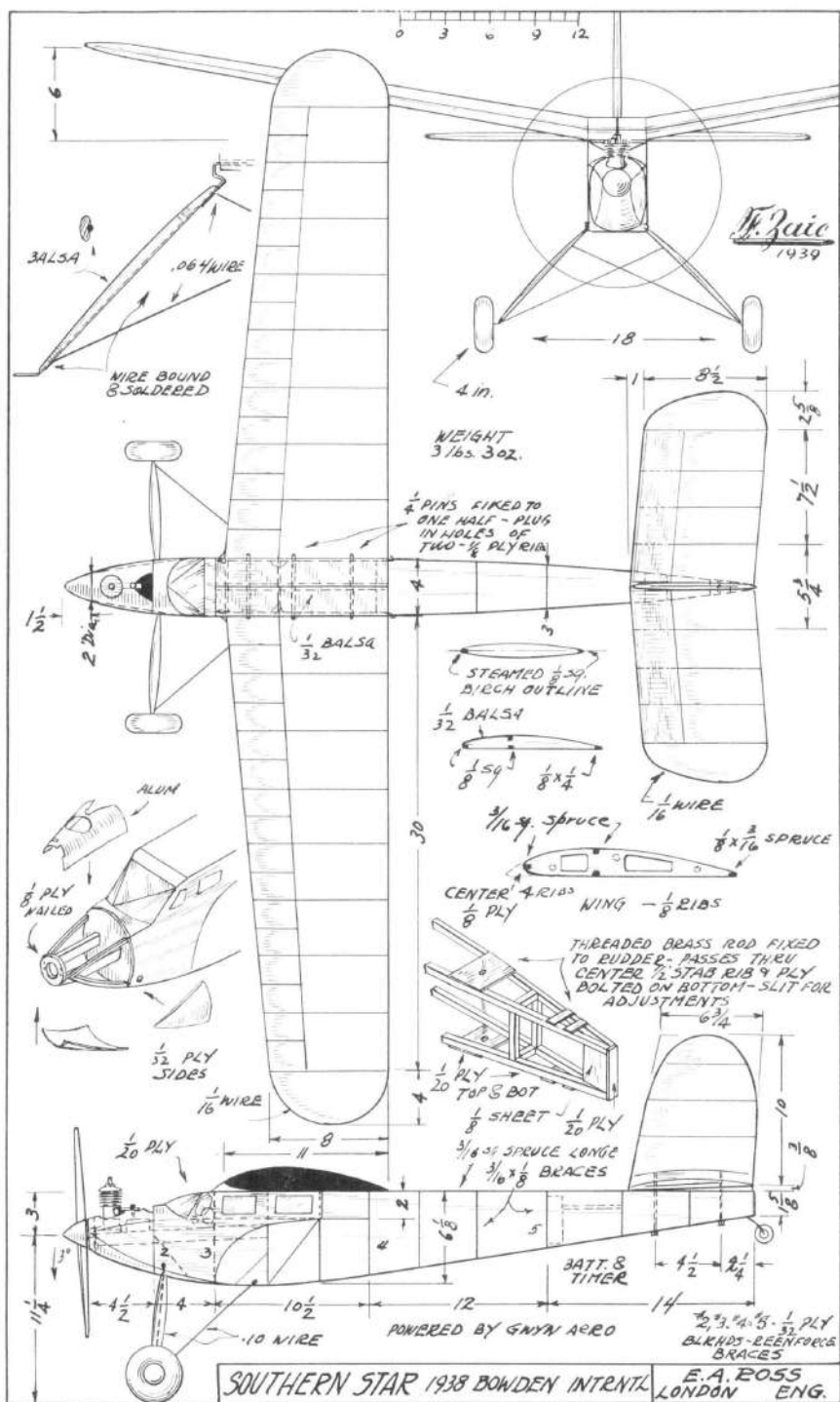
PETER BOWERS
LOS ALTOS CALIF.

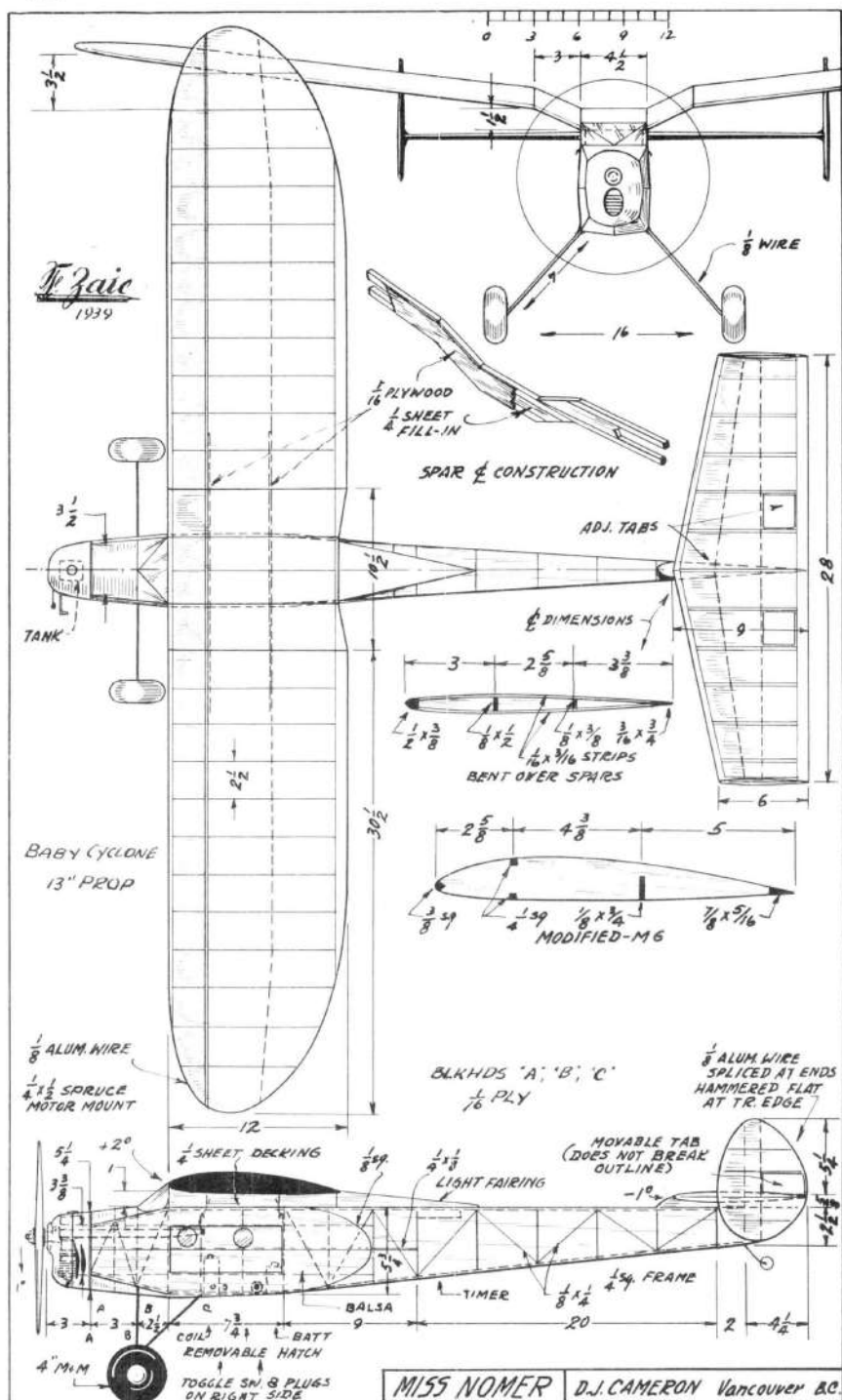


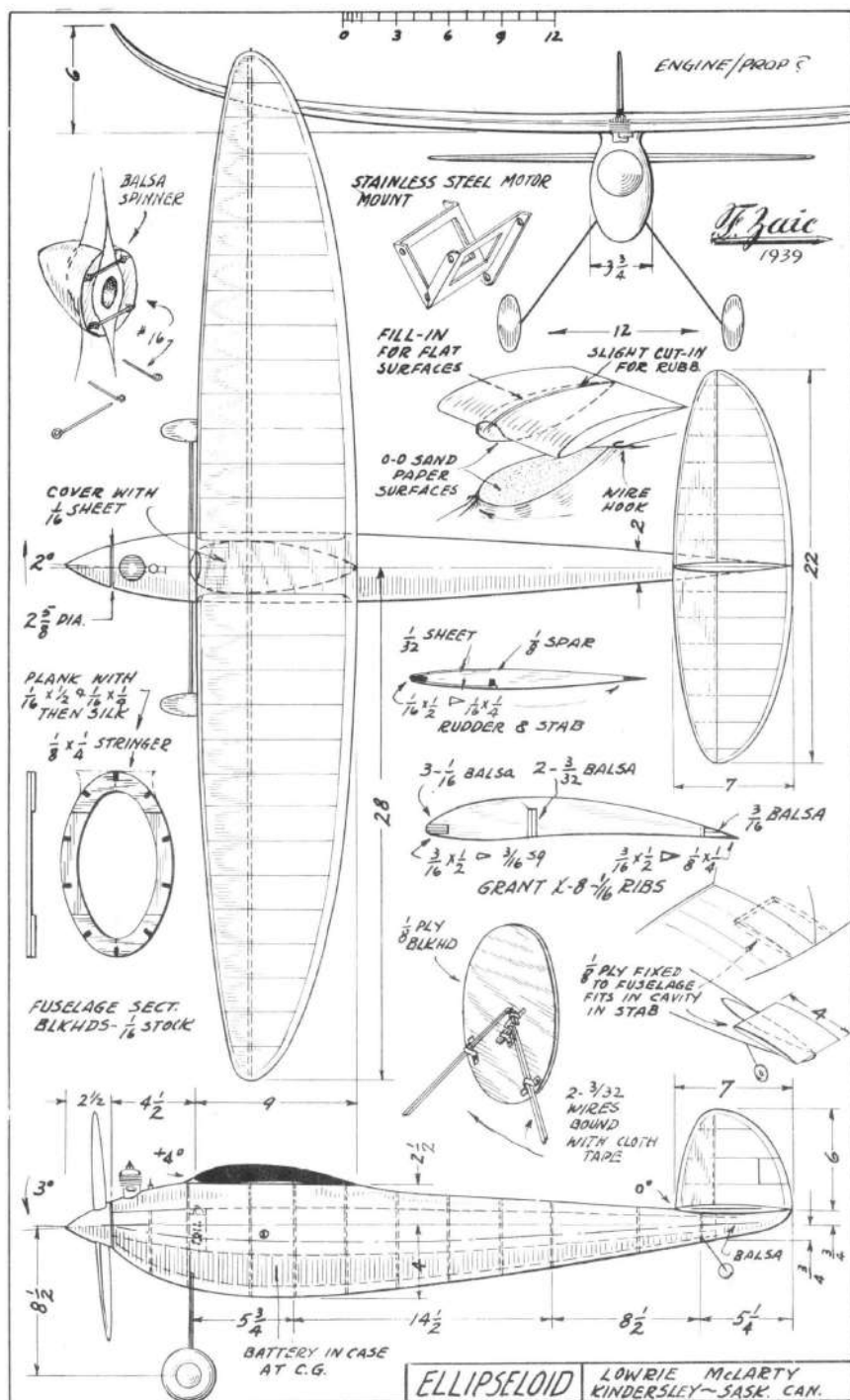


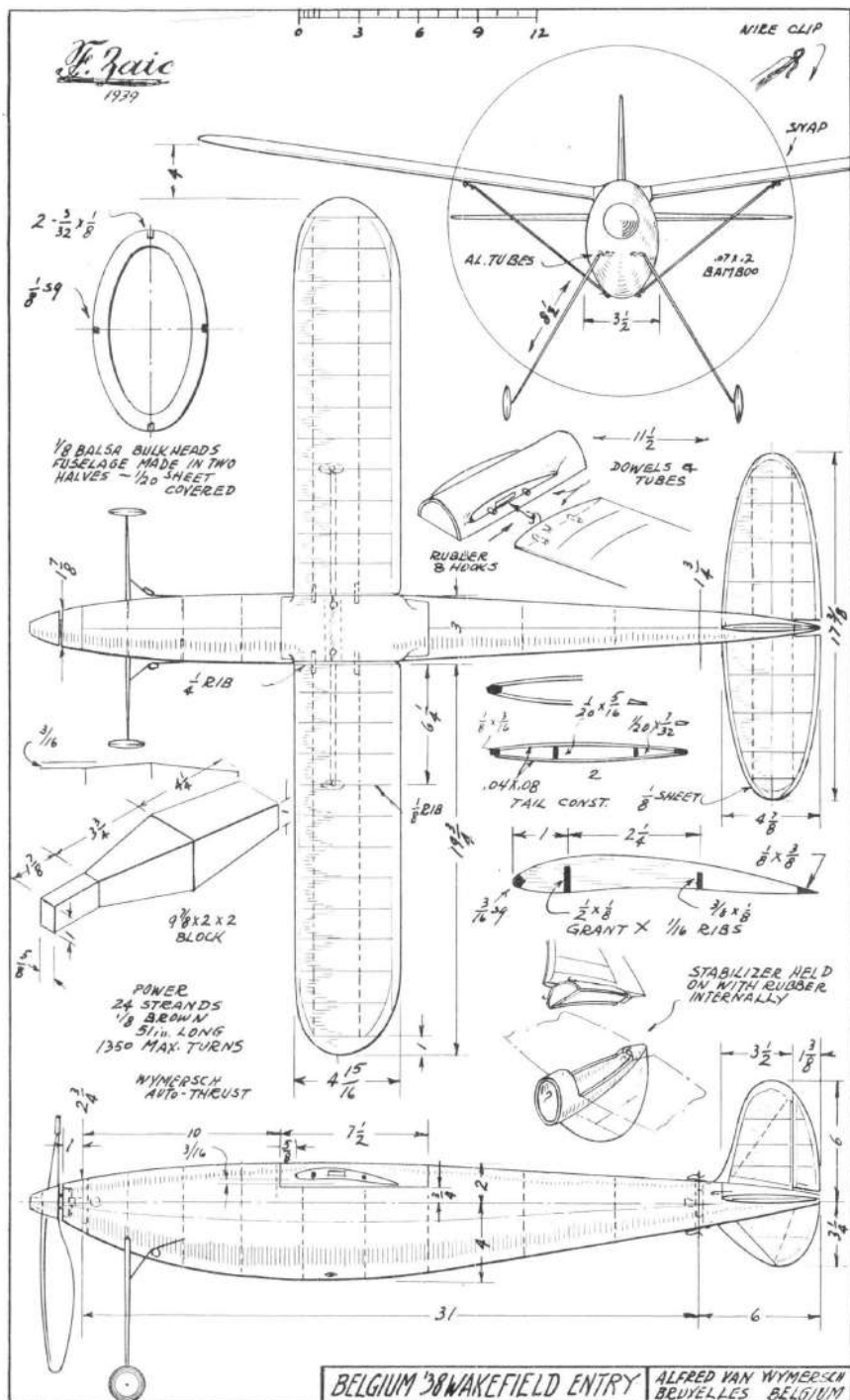


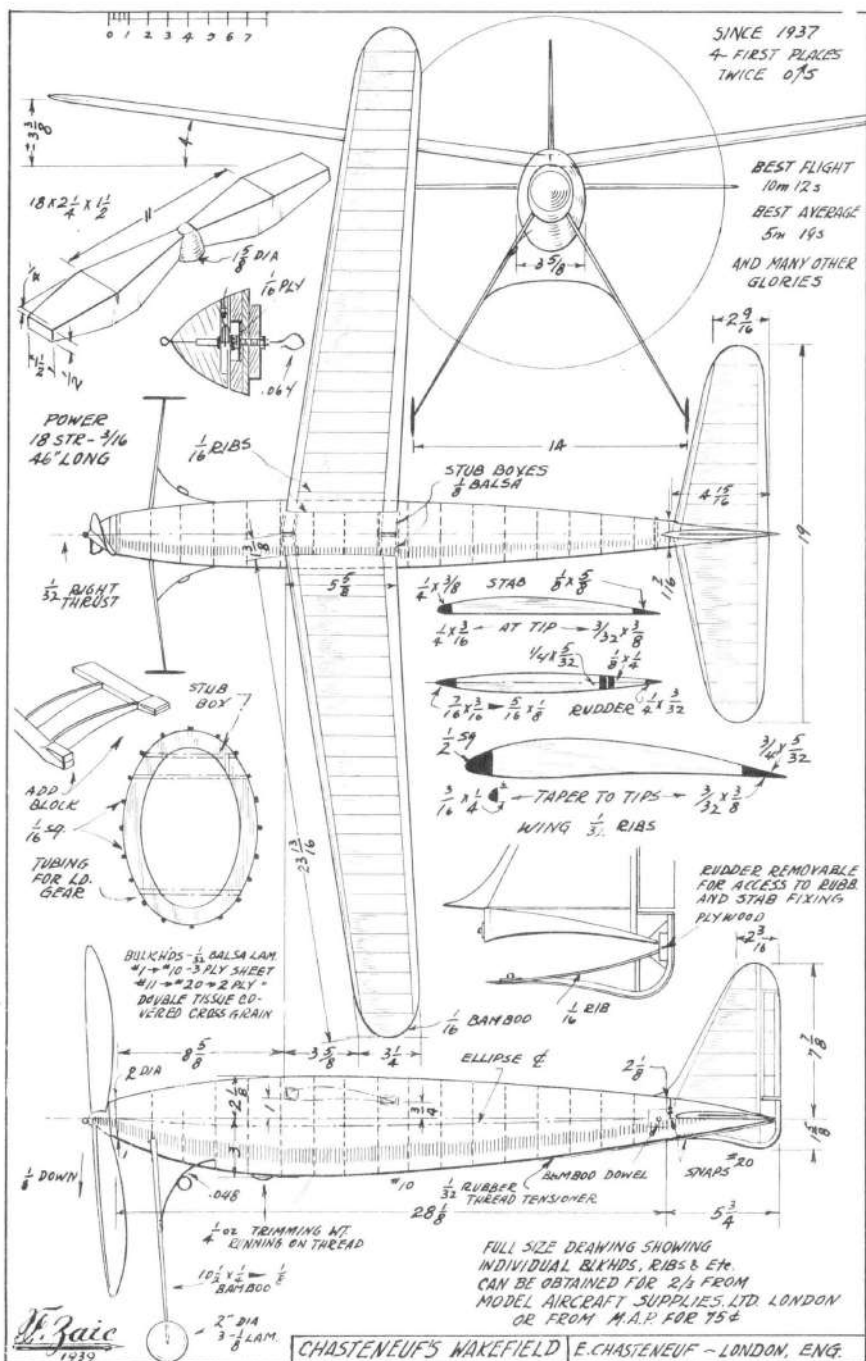












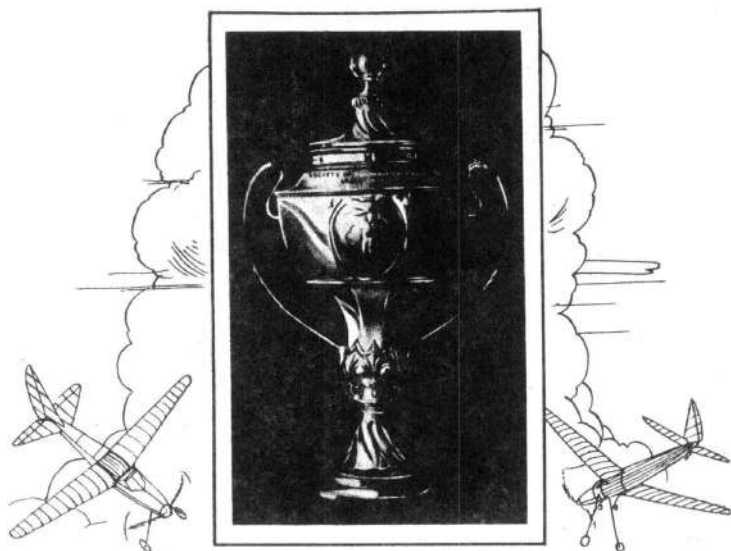
MODEL AVIATION

Volume I Number 1

June 1936

PUBLISHED MONTHLY BY

THE AMERICAN ACADEMY FOR MODEL AERONAUTICS



The Wakefield International Trophy

PRESENTED BY SIR CHARLES WAKEFIELD IN 1927

STORY ON PAGE 6

INTRODUCTION

This first issue of MODEL AVIATION, besides introducing itself, is intended to call attention to the new American Academy for Model Aeronautics. This organization will take definite form during the National Championship Model Airplane Meet in Detroit. Officers will be elected and committees are to be named. We believe that a new day for model aeronautics has arrived.

MODEL AVIATION takes pride in its connection with this worthy movement. We hope that in the months to come this publication will be able to fulfill adequately its obligation as the official journal of the Academy.

The science and art of model aeronautics deserves most careful and serious consideration. It will be the endeavor of MODEL AVIATION to cover all phases of the field, including organization, representation, scientific research, international cooperation, contest activities, technical development, and general news.

Organization which will give the model flyers representation is necessary. We believe in the principle "of, by and for the members". We are confident that the Academy will accomplish that.

Scientific research is imperative for model aviation to progress. The individual expert has done much research work in the past which has never found its way into print. It is the intention of this publication to coordinate and publish individual research reports by Academy members.

International cooperation is especially necessary now that the F.A.I. has recognized model aircraft records. This publication will gather from all available sources and publish noteworthy foreign developments and improvements.

Contest activities will be covered by publication of a calendar of all N.A.A. sanctioned contests and the results of these. Also the official N.A.A. and F.A.I. lists of records will be published.

Technical development of model aircraft is fairly constant but has been hampered by a lack of able direction and suitable facilities. One of the projects of the Academy is a slow speed wind tunnel. MODEL AVIATION will publish results of the Academy's experiments.

General news from all parts of this country and foreign lands will be gathered from member correspondents. This will give our readers more general model aviation news than could be covered in any other way.

Naturally it is going to cost something to publish this material and the cost will have to be borne by the readers. Just how much this will be depends on many factors. This issue is being mailed to a selected list as a means of introduction. The next issue will go into the matter of subscription rates.

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THE AMERICAN ACADEMY FOR MODEL AERONAUTICS

STATEMENT OF PURPOSE

A number of the country's outstanding model aircraft enthusiasts are forming a regular N.A.A. chapter. This group will consist of sincere builders and flyers, club directors, sponsors and patrons of the sport. The chapter group will act as a Council to direct and supervise the contest and research activities of the many expert model flyers. The entire organization will be known as The American Academy for Model Aeronautics. The Academy will be a strictly non profit enterprise.

Organization meetings will be held by the Council in Detroit during the 1936 National Championship Model Airplane Meet. A complete policy will be formulated during these meetings. An announcement of the results of these sessions will be featured in next month's issue of this publication.

The expert builders' group is at present without definite national status. It is expected that this expert group in the Academy will number approximately two thousand within the first year and may eventually reach a maximum, after a few years, of as many as ten thousand members. It is anticipated that membership will be based on demonstrated performance ability. Just what these requirements are will be decided during the Detroit meetings.

Thus the experts will have their own organization set up according to recognized need and free from any commercial connections. The organization would be self sustaining and self governing. It will have its own monthly publication of articles and news items contributed by members, published under the supervision of the Council. It would not act in conflict with any present organization or publication but would rather serve as a means for obtaining information that is not available now.

By requiring that all members of the Council be regular N.A.A. members, that Association would always be assured of close cooperation by the Academy. It is a recognized fact that all contest activities should be under N.A.A. sanction. Now that the Federation Aeronautique Internationale has recognized model records this sanction requirement offers added importance. The Secretary of the N.A.A. Contest Board would be an ex-officio member of the Academy Council.

Much of the foundation work has already been completed. Interested model plane leaders discussed the plan during the 1935 National Meet in St. Louis and have since agreed to carry out the organization. Nothing is being done hastily and no definite policies will be adopted except by deliberation at the Academy organization meetings. There is enthusiastic interest and support of a large number of leaders, insuring a successful launching of the plan.

The Council is not limited as to age. The chief requirement for membership on the Council is a clearly demonstrated interest in and past service to this fine scientific hobby. Various committees will be named within the Council to make definite recommendations. All who have heard of the plan express the belief that it is the very thing which the model game has long needed.

In many respects the Academy will be quite similar to the Soaring Society which is the directing organization for gliding and soaring in America. We all recognize the fine work that has been done by this group and there is a great deal of inspiration in their example for us in the model plane field.

Among the leaders who have already signified their desire to become members of the Academy Council are Captain Willis C. Brown, Mr. Ernest A. Walen, Torrey Cano, Mr. Victor Fritz, Bruno Marchi, Mr. C. E. Carmichael, Mr. Jesse Bieberman, Hewitt Phillips, Frank Zaic, Lawrence Smithline, Lieut. E. W. Alden, Mr. Percy Pierce, Mr. H. M. Jellison, John Young, Gordon Light, Carl Goldberg, Mr. Bertram Pond, Mr. H. T. Sommers, and Bill Enyart.



1936 NATIONAL MEET IN DETROIT

The 1936 National Championship Model Airplane Meet is to be held in Detroit during three days of flying, June 30 to July 2. There will be two days of outdoor flying and one day of indoor flying. June 29 will be turned over to registration of entrants and sightseeing. After the Meet is finished, one day, July 3 will be devoted to inspection of some of Detroit's industrial and aviation activities. A very comprehensive program of events has been arranged.

The Aviation Department of the Detroit Times will sponsor the Meet. Many of Detroit's civic organizations and commercial organizations are assisting in making this one of the best National Meets ever held. The chief load of directing the meet will be carried by Mr. H. S. Walesby, Aviation Editor of the sponsoring newspaper.

Advance indications point to an attendance of more than four hundred contestants from coast to coast and from border to border. Foreign countries are to be liberally represented. Great Britain is to have a team of six entrants in person. Canada will be represented by approximately forty. Entries have been promised from Australia and New Zealand. France, Germany, Italy and possibly a number of other countries expect to compete.

The regular events are on the program: outdoor stick models, cabin fuselage models, rubber powered and gasoline engined models. A new contest has been arranged, one for radio controlled models. There will be the regular indoor contests for rubber powered stick models and cabin fuselage models. The customary trophies are up for contest. These include the Mulvihill, Texaco, Bloomingdale, two Stout trophies, Balfour, Springfield, Moffett, Model Airplane News Trophy. The Lord Wakefield Trophy, having been brought back to this country last year by Gordon Light, is on the schedule. The Detroit Times is offering a new trophy to stimulate competition.

The sponsors have provided an excellent entertainment program. There will be swimming, baseball, movies, river boat ride, amusement park, lunches and the traditional banquet. Workshops will be provided for those contestants who have repairs to make and finishing touches to apply to their models. Transportation to the flying field has been provided. There simply isn't anything left out of the picture that has a proper place in it.

Meet headquarters will be the handsome Book-Cadillac Hotel. Special rates of \$1.50 per day for each contestant and official are being offered. The registration desks will be in the hotel. As far as possible, all contestants will be housed close to each other. Many old friendships and acquaintances will be renewed. There will be an air of hospitality about the Book-Cadillac that will long be remembered.

The outdoor contests will be held on Wayne County Airport. This large and well equipped field is one of the best in the country for staging a successful model plane meet. It is far from the river and lake and is surrounded by excellent roads to make pursuit of far flying models easy. Plenty of uniformed U.S. Air Service cadets and officers are to serve as timers and officials. There are to be airplanes for following distant travelling models.

Olympia Auditorium is to have the indoor events. This spacious building has a ceiling height of one hundred feet. It has been the scene of many of the large model plane events and is the best building for this purpose in that part of the country.

General Chairman of meet arrangements is Lieutenant Colonel Ralph Royce, Commanding Officer of Selfridge Field. The field managers for the meet will be Lieutenant Charles F. Greber, U.S. Navy, Commanding Officer of Grosse Isle Naval Air Base, and Mr. H. H. Strickland, Vice-President of National Air Service. As has been customary, the N.A.A. will be represented by H. W. Alden.

Complete information and entry blanks may be obtained by application to Mr. H. S. Walesby, Aviation Editor, Detroit Times. Be sure to enclose an addressed and stamped envelope with your request. Better use a large envelope, too, as the folder is a big one. And don't wait until too late. Entries close on Saturday, June 27.

It doesn't matter what your specialty is, there is an event on the National Meet program that will give you a chance to fly the sort of model that is your preference. The contest rules are wonderfully open and without restriction. An opportunity is offered to all ages of contestants as well. Get your models into flying shape and shape your course toward Detroit so as to arrive there June 29.

A MESSAGE FROM THE VISCOUNT WAKEFIELD

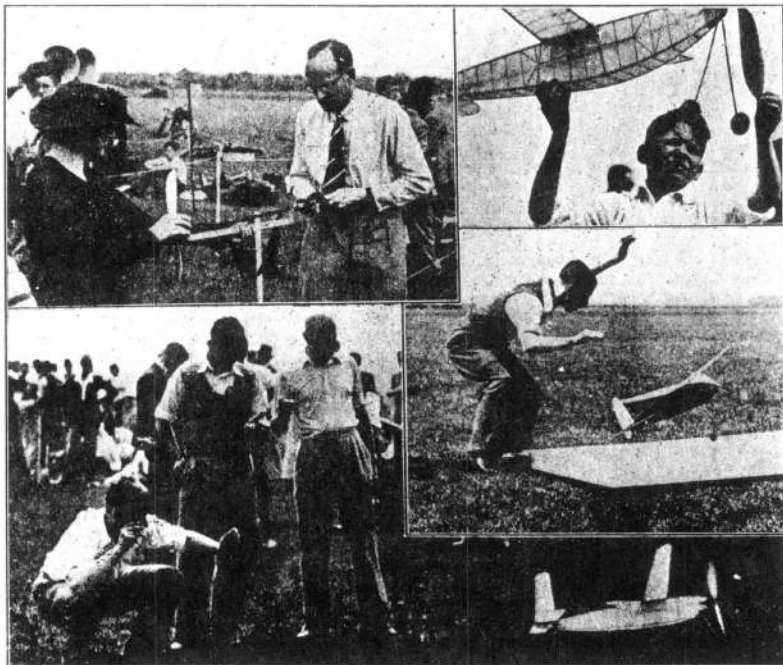


Wakefield House,
Chesepide,
London, EC 2

On the occasion of the forthcoming eliminating trials for the selection of the British Team to compete in the United States for the "Wakefield Trophy" I appreciate the Editor's kind invitation to send a personal message of good wishes.

Believing as I do that the Model Aeronautical Movement in this country is of great value in the development of British Aviation, I naturally hope that the British Team will crown itself with glory in America and return with the Trophy which bears my name. The members of the British Team may be assured of a generous welcome from our friends on the other side and of an enjoyable and keenly contested meeting. I gladly send my warmest wishes for their triumphant success.

Wakefield
of the



SOME GLIMPSES OF THE WAKEFIELD TRIALS - Top left, Mr. Allman assisted by Mrs. Allman using a motor stick; top right, Alwyn Greenhalgh who placed second; middle right, S.R. Crow "conducting" a take-off; and bottom, L.S. Wigdor "putting the flume" on his model.

THE WAKEFIELD INTERNATIONAL TROPHY

The Wakefield Trophy was presented by Sir Charles Wakefield in 1927 to the Society of Model Aeronautical Engineers, the official body governing Model Aeronautics in Great Britain. The trophy is pictured on the front cover of this issue of MODEL AVIATION.

The Wakefield Contest is held annually in the country which holds the trophy and is one of the most important international model plane contests. Each country may enter a team of six. Each model is allowed three flights and is timed by observers who, under S.M.A.E. rules, do not follow the model. Prior to 1934 the best flight of the three permitted was taken as the flight time but during that year and subsequently, the average duration of the three flights has been taken.

In the 1935 Contest which was held in England, an American model won. The builder is Gordon S. Light of New York University. Thus the 1936 Contest is to be held in the United States as one of the events on the program of the National Championship Meet. The date set for the Contest is July 1. American and Canadian teams are to be selected by eliminating trials the day before. There will be only five Americans selected as the present Trophy holder is automatically a member.

A British team of six with a manager and two officers of the S.M.A.E. has been selected. This party of nine has booked passage on the Aquitania which is arriving in New York on June 26. The National Aeronautic Association and the New York Chapter of the English Speaking Union have arranged a program for the entertainment of our British visitors during their two day stay in New York, enroute to the Nationals in Detroit.

The British Trials were held on Fairey's Aerodrome near London, May 17th. The day was one of perfect weather, 123 entrants and excellent flying. The six winners who constitute the British team are:

			age	33	4m	28.3s	average
1st	J. B. Allman	Midland Flying Club		11	3m	40.5s	"
2nd	A. Greenhalgh	Lancashire "		18	3m	35.0s	"
3rd	D. Fairlie	Wembley "		13	2m	46.9s	"
4th	H. A. Jones	North Kent "		19	2m	36.8s	"
5th	A. A. Judge	T. M. A. C.		18	2m	23.6s	"
6th	R. Copland	Northern Heights "					

Mr. B. K. Johnson, Chairman of the S.M.A.E., has been appointed as manager of the team. Mr. Harry York is making the trip as press representative and Mr. J. C. Smith, S.M.A.E. Competition Secretary is the ninth member of the party. They plan to sail from New York back to England on July 5th.

The S.M.A.E. undertook to establish a fund to cover the cost of sending a team to this country. Lord Wakefield headed the subscription list with a very generous donation of two hundred pounds. Mr. C. E. Fairey followed with twenty pounds and thus the fund was given a healthy start. Member clubs and individuals have helped until the fund reached proportions large enough to insure the team's trip.

The British team is bringing six models belonging to fellow members for entry in the Moffett Contest. They have been invited to enter any of the contests on the program. It is understood that some of the party have been successful in gasoline powered model flying and there is a possibility that they may enter the Texaco Contest.

The eliminating trials for the Moffett Contest were held at the same time as the trials for the Wakefield. The six S.M.A.E. members who are sending their models over for the Moffett Contest are:

1st	H. Simmonds	3m	19.7s	best flight	These six will send models
2nd	A. Worley	1m	57.0s	"	to be flown by proxy by the
3rd	W. Worden	1m	46.0s	"	British team of entrants who
4th	A. Gibson	1m	45.5s	"	are coming to the United
5th	G. Merrifield	1m	44.0s	"	States. In this way there
6th	H. Francis	1m	42.4s	"	will be twelve British entries

Quoting a letter from England, "I can assure you we are coming over full of enthusiasm and with the purpose of winning the Wakefield Cup back and bringing back the Moffett Trophy too, if we possibly can!! (Please excuse my optimism!)." There is no doubt about the serious intent of our British friends so it will behoove the American and other teams to look out.

Other foreign entries are expected from New Zealand, Australia, Germany, France, Italy, and possibly others. A general invitation was extended to most all foreign countries by the National Aeronautic Association.

(Wakefield Trophy photo from THE MODEL AEROPLANE CONSTRUCTOR)

WAKEFIELD CONTEST WINNERS

First contest held in 1928.

1928	Great Britain	T. H. Newell, London Club	52.6s
1929	"	R. K. Bullock, London S.M.A.E.	1m 10.4s
1930	United States	Joseph H. Ehrhardt, St. Louis, Mo.	2m 35.0s
1931	"	" " " "	4m 24.8s
1932	"	Gordon S. Light, Lebanon, Penna.	7m 57.2s
(This was disallowed because the contest was held two months later than the date agreed upon)			
1933	Great Britain	J. W. Kenworthy, Lancashire L.A.S.	5m 21.0s
(The above flight times are the best each year of three flights. In 1934 and subsequently the average of three flights was taken)			
1934	Great Britain	J. B. Allman, L. & W. K.A.S.	1m 51.8s
1935	United States	Gordon S. Light, New York University	2m 30.0s

Gordon Light's
Winning Wakefield
Model



WINNER 'CONQUEROR'
WAKEFIELD CUP 1933

GREETINGS TO THE BRITISH TEAM!

Welcome to America! We are mighty glad to have you with us to compete in friendly rivalry in our beloved hobby. We hope that after it is all over this year and you have heard our last vocal farewell, you will be able to look back in retrospection and say, "We are glad we made the trip and it has been worth while."

We hope that you and we may learn much of benefit by our meeting. Your ways are not necessarily our ways. Many of our methods may seem strange to you. But there is good in all things and by an exchange of ideas and a comparison of thoughts we can all derive benefit.

Each one of us feels honored by having this opportunity of meeting you. May there grow out of our meeting a lasting friendship. May the best interests of international model aviation be enhanced. And may the best team win.

We promise you that we are intent on observing the highest order of good sportsmanship. You are assured of our desire to offer you the best of good fellowship. We ask that you tell us what we can do to make your visit to our country more enjoyable.

May your days with us be happy, care-free and untroubled except when you try to win back the Wakefield Trophy!



OFFICIAL NATIONAL MODEL AIRCRAFT RECORDS

Approved by the Contest Board of the N.A.A. through May 30, 1936.

INDOORS

STICK MODEL AIRPLANES

Hand-launched

		CLASS B	
Junior:	Roy Carlson	Springfield, Mass.	16m 45.6s
Senior:	Wilbur F. Tyler	Boston, Mass.	20m 50.1s
Open:	William Latour	Philadelphia, Pa.	15m 17.8s
		CLASS C	
Junior:	John S. Stokes, Jr.	Huntingdon Valley, Pa.	20m 53s
Senior:	Mayhew Webster	Philadelphia, Pa.	23m 12.2s
Open:	Carl Goldberg	Chicago, Ill.	23m 29.3s

STICK MODEL AIRPLANES, R.O.G.

		CLASS A (Baby ROG)	
Junior:	William Wert	Philadelphia, Pa.	10m 26.4s
Senior:	Merrell Malley	Atlantic City, N.J.	10m 56.4s
Open:	Joseph Matulis	Chicago, Ill.	9m 59s
		CLASS B	
Junior:	Bruce Mackler	Atlantic City, N.J.	10m 22s
Senior:	Mayhew Webster	Philadelphia, Pa.	16m 53s
Open:	William Latour	Philadelphia, Pa.	14m 02.3s

STICK MODEL AIRPLANES, R.O.W.

		CLASS A	
Junior:	William Wert	Philadelphia, Pa.	7m 19.4s
Senior:	Bruno Marchi	Medford, Mass.	6m 22s
Open:	Georgevin Becksted	Chicago, Ill.	5m 38.2s
		CLASS B	
Junior:	William Wert	Philadelphia, Pa.	9m 27.6s
Senior:	Mayhew Webster	Philadelphia, Pa.	11m 55s
Open:	William Latour	Philadelphia, Pa.	13m 15s

GLIDERS, Hand-launched

		CLASS A	
Junior:	M. Hugelot	Chicago, Ill.	34.6s
Senior:	Wallace Simmers	New Lenox, Ill.	43.6s
Open:	Joseph Matulis	Chicago, Ill.	38.8s
		CLASS B	
Junior:	Robert Gelbard	Chicago, Ill.	49.2s
Senior:	Wallace Simmers	New Lenox, Ill.	58.4s
Open:	Carl Goldberg	Chicago, Ill.	47.5s

AUTOGIROS

Junior:	Raymond Steinbacher	Ridgefield, N.J.	57.2s
Senior:	Alton H. DuFlon, Jr.	Ridgefield, N.J.	2m 01.2s

CABIN FUSELAGE MODELS, R.O.G.

		CLASS B	
Junior:	Robert Jacobson	Philadelphia, Pa.	10m 44s
Senior:	Charles Heintz	Philadelphia, Pa.	13m 12.2s
Open:	Georgevin Becksted	Chicago, Ill.	11m 26s
		CLASS C	
Junior:	John S. Stokes, Jr.	Huntingdon Valley, Pa.	15m 05.6s
Senior:	John Haw	Philadelphia, Pa.	17m 14.3s
Open:	William Latour	Philadelphia, Pa.	12m 31.8s

CABIN FUSELAGE MODELS, R.O.W.

		CLASS B	
Junior:	John S. Stokes, Jr.	Huntingdon Valley, Pa.	3m 23s
Senior:	Sidney Axelrod	Chicago, Ill.	6m 32.2s
Open:	William Latour	Philadelphia, Pa.	5m 42s

OUTDOORSSTICK MODEL AIRPLANES
Hand-launched

Hand-launched		CLASS C	
Junior:	Junior Dague	Tulsa, Okla.	21m 04s
Senior:	Harry Cornish	Denver, Colo.	61m 09s
Open:	Joseph Frady	Tulsa, Okla.	27m 07s
		CLASS D	
Junior:	Fred Skafec	Akron, Ohio	8m 21.6s
Senior:	Daniel Clini	Springfield, Mass.	38m 50s
Open:	C. M. Miller	Akron, Ohio	11m 20.5s

GLIDERS
Hand-launched

CLASS B		
Junior:	Waltner Weitner	New York, N.Y. 46.5s
Senior:	Walter Farynyk	New York, N.Y. 1m 02s
Open:		
CLASS C		
Junior:	Marx Brook	Brooklyn, N.Y. 19.5s
Senior:	Henry Struck	New York, N.Y. 2m 13.5s
Open:	James McPheat, Jr.	Jackson Heights, N.Y. 31.5s

GLIDERS
Tow-launched

10W-14400000			
CLASS C			
Junior:	Marx Brook	Brooklyn, N.Y.	43.5s
Senior:	Bob File	Columbus, Ohio	23m 13s
Open:			
Class D			
Junior:	Paul Durup	Boston, Mass.	57.8s
Senior:	Dick Everett	Elm Grove, W.Va.	2m 38s
Open:	Roland Buhrig	Canastota, N.Y.	1m 18s
CLASS E			
Junior:			
Senior:	Jack Smith	Dayton, Ohio	1m 23.4s
Open:			

AUTOGIROS

Junior:			
Senior:	Ralph Kummer	St. Louis, Mo.	2m 06s
Open:			

CABIN FUSELAGE MODELS, R.O.G.

CLASS C			
Junior:	Fred Smith	Denver, Colo.	27m 40s
Senior:	Robert Cahill	Indianapolis, Ind.	33m 00s
Open:	Georgevin Becksted	Chicago, Ill.	39m 30s
CLASS D			
Junior:	Alan Starr	Atlantic City, N.J.	5m 41s
Senior:	William Ying	Rosebank, S.I., N.Y.	41m 19s
Open:	William Atwood	Glendale, Calif.	13m 14s
CLASS E (Gasoline powered)			
Senior:	Joseph Kovel	Brooklyn, N.Y.	64m 40s
Open:	C. M. Miller	Akron, Ohio	29m 11s

The Contest Board of the National Aeronautic Association has announced its policy regarding model plane records. The board will issue new record listings every two months. Reports received which indicate that new records have been established will be held for a 60-day period before final homologation and issuance of record certificates. It is considered that if no protest is received on the new record achievement during that period, the performance may stand unquestioned.

Once more, as is their custom, the Jordan Marsh - Boston Traveler Junior Aviation League staged a completely successful annual indoor classic when the New England Championships were held in Boston on Saturday, June 6. The outdoor events were held the following day and the results of the outdoor flying have not reached us. The indoor session produced eight new Boston records.

The annual banquet was a part of the Saturday program. The J.A.L. editors of the club paper "WING OVERS" put out a special edition called "LEFT OVERS" and distributed it at the banquet. The following material is taken from this special edition.

STICK MODELS, R.O.G.

1. Torrey L. Capo	12 02 *
2. Hewitt Phillips	10 20
3. Leslie Woodman	9 53.4
4. Bruno Marchi	9 12.2
5. Daniel J. Cline	7 28.3
6. Wilbur Tyler	7 18.6

STICK MODELS, Hand-launched.

1. Hewitt Phillips	14 38.4*
2. Wilbur Tyler	14 24.5*
3. Bruno Marchi	12 57.4
4. Leslie Woodman	11 09
5. Ralph Brown	11 00 *
6. Irving Sherman	10 42.4

FUSELAGE Models R.O.G.

1. Daniel J. Cline	9 08 *
2. Stephen J. Sardella	8 36.5
3. Richard K. Stuart	8 09
4. Bruno Marchi	7 52
5. Jack Golden	7 51 *
6. Levy Walba	7 00

GLIDERS, Hand-launched.

1. Bruno Marchi	42.2*
2. Hewitt Phillips	33.2
3. Everett Tasker	32.0*
4. Torrey L. Capo	31.6
5. Leslie Woodman	31.0
6. Stephen J. Sardella	30.4

* Denotes new Boston record.

WITTICISMS from "LEFT OVERS". When asked for his secret recipe for the banquet main course, the chef confided: "There is no recipe, the stuff just accumulates!" Marchi's promise to be on time carries a lot of wait. ***** DEFINITIONS: A prop is something you look for while the rubber deadens. Tyler says, "Poets are born, that's the trouble!" The Everett egg insists: He who laughs - lasts. It's always swear weather when model builders compete together. ***** How the lads were yelling around 3:59 for just one more flight. They certainly were putting all their begs in one ask it. And remember, Mr. Judge, whenever they tell you what a fine fellow you are - flattery is soft soap, and soft soap is 90% lye. Which can be followed with the remark: A contestant's greatest asset is his lie ability. Our theme song this evening should be "The Bottle Hymn of the Republic." ***** A BORE is a builder who, when you ask him if he's ever gotten any good flights, tells you. His friends call it madness but he calls it MODEL BUILDING. ***** YOUNG: brat suffering from inferiority complex. MANY A MODEL BUILDER'S SHOP: Opened by mistake. ***** Speaking of UNEMPLOYMENT: the average model builder has 12,000,000,000 brain cells. ***** STATISTICALLY SPEAKING: if all the model builders were laid end to end, a steam roller would come in handy. ***** A true model builder always looks upon a new design in two ways: Either it is not worth keeping, or it is too good to keep. ***** Captain Brown interrupts to say, "I had already done 14 minutes unofficially, when on my first official flight the model got caught on a light. Would you like me to tell you about it?" No, NO, 1,000 times NO!! ***** Cline came clean from Springfield; and let's see you make something of that.

There is more and more of similar material in LEFT OVERS. We regret that space does not permit quoting more.

CHICAGO CITY-WIDE MODEL AIRPLANE CONTEST
CONDUCTED BY
CHICAGO PARK DISTRICT ---- CRAFT SECTION
JUNE 13, 1936

Frank Nekimken informs us of this event held on Chicago Meadows Golf Course and conducted by Mr. E. C. Friedman and assisted by, among others, Carl Goldberg. This goes to press before the results have been received.

The events: Class "B" Glider, Hand-launched; Outdoor Stick Model, hand-launched; Outdoor Fuselage Model, R.O.G.; Tandem Plane Contest. A most interesting program, we call it.

It is noteworthy to run across Carl Goldberg's name as one of the officials of a meet. He has been doing some active officiating in Chicago and has a group of Chicago "Aeronuts" now. Frank Nekimken is another oldtimer who has gone on with his model work. It was not so many years ago that his name appeared in the National's line up.

Vernon B. Gray of Auckland, New Zealand, writes "This is to let you know that the New Zealand Model Airplane Association has given me permission to send my entry to your country for the 1936 Admiral Moffett Contest. There will be some more entries I think, in fact at present I'm trying to interest some of the other chaps of New Zealand to compete." Good luck, Vernon! It is recalled that in last year's Moffett Contest, Vernon Gray placed seventh.

Mr. B. K. Johnson, the chairman of the S.M.A.E. and the team manager who is looking after the British Wakefield team, writes, "I am indeed sorry to hear it is impossible to hold the National Meet at Akron, as we (over here) have always envied you the facilities of the airship shed at Akron for indoor flying. However, we will be sailing from Southampton on the Aquitania on 20th June arriving in New York on the 26th. An outline of our plan at the moment is to spend say two days in New York, then on to Detroit on the 29th until 3rd July, back to New York and to embark again on the 4th July. ***** I have been having some excellent and reliable flying with my petrol-driven model lately, controlling length of flight to two or three minutes by a delayed-action switch on the ignition, preventing the machine from disappearing altogether!!!"

L. S. Wigdor of London, England, has this to say, "I am enclosing the original plans for the development of my first gas job. Unfortunately work has not gone forward on the finally planned job. Calculations have shown that the model in the original plans has too small a stabilizer, too short a nose, and certainly too much lateral area up front. Of course the really interesting piece of calculation is the positioning of the thrust line. The latter calculations on my first gas job were so hectic that my slide rule developed a squint. I am, therefore, postponing production. Myself, being particularly lazy, I have confined my gas job, now under construction, to the orthodox tractor parasol type. I am trying out some of my own theories in this design, including a high aspect ratio wing and an engine mounted on rubber; vibration due to the motor seems to dog my aeronautical footsteps." Mr. Wigdor is an interesting correspondent and we hope to hear more from him.

Sidney, Australia, is heard from when Mr. Alan D. Brown writes, "Any information that you require on Model Aeronautics in Australia I can let you have and it would be a pleasure to supply it. I hope to be a member of Australia's Wakefield Cup team this year. You will have to look out this year as our conditions here are much the same as yours and out times, outdoors, are also as good as yours."

Paul de Neck, President of Réseau Belge, a section of the International Amateur Radio Union, writes from Brussels, "Being an old ham myself in model airplanes, having made my first flying box in 1912 or so, I took much pleasure in renewing my knowledge in slow aerodynamics and general ideas of nowadays. Having devoted all my spare time just now to short wave ham radio, I came back to air kits only when balsa wood became known in this country a few months ago; thus I am now in this game and should be pleased to learn a bit of working procedure."

Fred Stevens writes from Launceston, Tasmania, "Your indoor flying makes my head swim. I've never done any of that sort yet - we have no where here to fly though so it of no use working on them, eh wot!!! Anyway, I always do my best to try and understand the articles."

William R. Hunt, of Vancouver, British Columbia, an experienced builder of many models, writes, "I don't say I am against geared motors; it's just the general opinion. What we certainly do need is something to conserve that first splurge of power, and if gears can be made to do this effectively, I'm all for them, however I'm still a bit skeptical as to whether they will do this. The idea of some sort of governor has haunted me for years. I agree that a big prop and low power is bad medicine on gusty days, but somehow I'd rather increase the power than use a smaller prop. There are two ways of looking at model aircraft building: as a hobby or pastime; or as a logical system, capable of being put on a scientific basis. Earlier in my youth so to speak, I strove valiantly to find some scientific justification for model aircraft, but now, clothed in the alleged wisdom of age and experience, I realize that such a justification is quite unnecessary. More than that, I begin to think that altho it is capable of being treated in a highly scientific manner, such a treatment is rather futile, having about as much application to practical things as has the study of cosmic rays. I like to build me models by instinct and for the fun of it. They are a means of expressing myself." We believe that Mr. Hunt finds lots of pleasure in his model building and flying. We know that he has met with a degree of contest success as well.

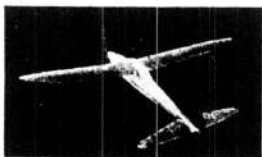
MODEL AVIATION, in keeping with its policy "of, by and for its readers", wants to make its pages an open forum for the expression of opinions, ideas, suggestions, and constructive criticisms.

Scientific articles, plans of exceptional models, unusual photographs, and other material tending to promote the progress of model aeronautics, is welcomed. Plans may be merely rough sketches but accurate and complete dimensions are requested.

The publication of scientific articles is dependent on evidence of factual demonstration. Theories are welcome but we feel that model builders and flyers want a lot more of proved fact than unproved theory.

Let us know what is going on in your town or city. We want to present personalities so that we may all know each other better. New ideas of stimulating interest are better shared with our fellow model aviators than kept under cover. Let's all pull together and make MODEL AVIATOR a real contributor to the broad subject of model aeronautics.

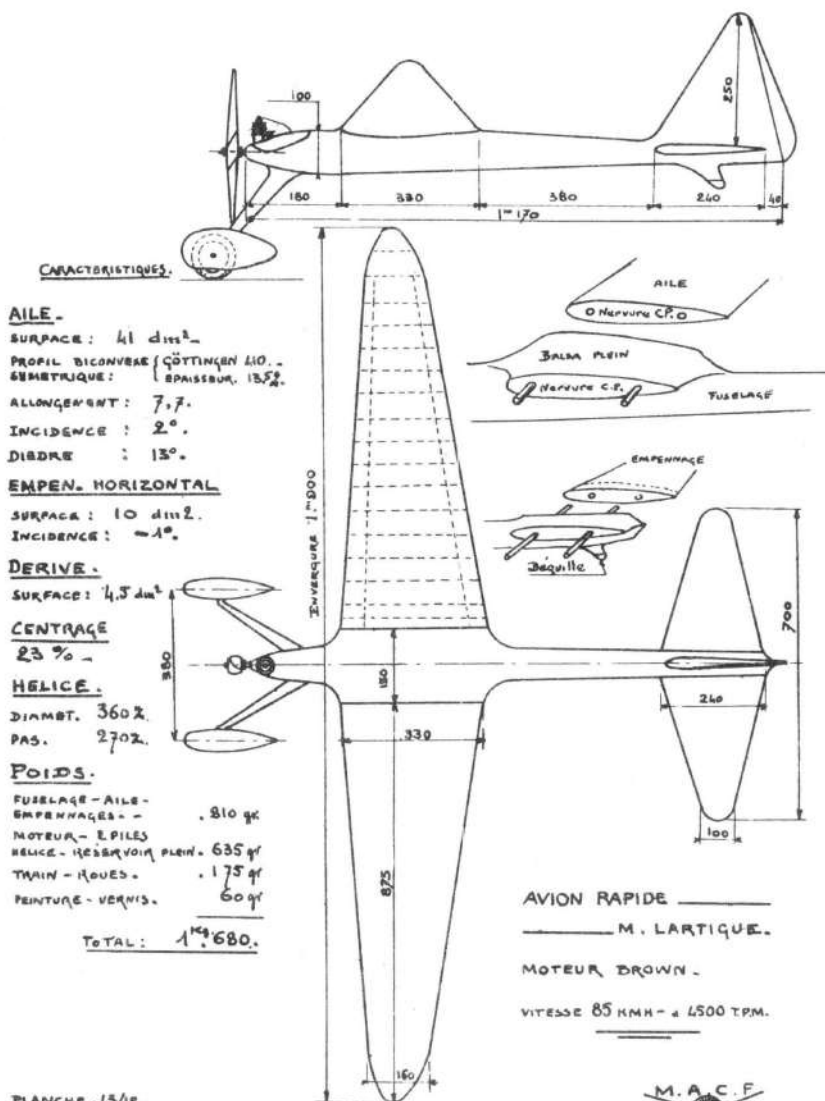
Until conditions warrant, contributions must be gratuitous.



Frank Zaic's 1935 Wakefield Entry

MODEL AVIATION is indebted to the BULLETIN of the MODELE AIR-CLUB de France for the French plans reproduced in this issue.

A recent article in one of the BULLETINS remarks, "The elements of the indoor models sent to the exposition by the Americans, astonished everyone because of the method of construction, outdoing in lightness everything that one could have raved about. This beautiful work, as it merits, was examined and admired by everyone. The session ended in admiration of the propellers, forms, dimensions, calculation of pitch, etc.

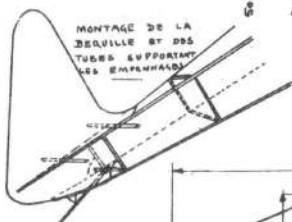
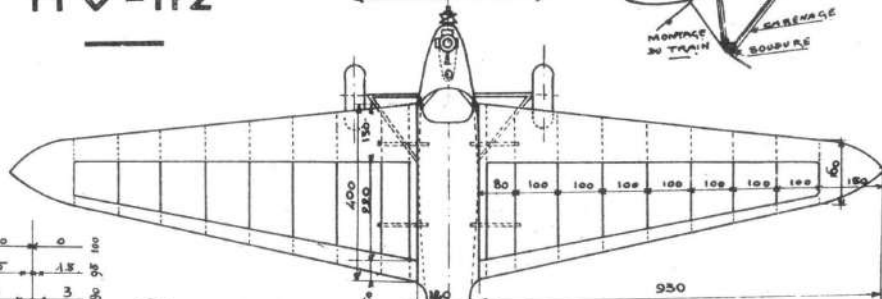
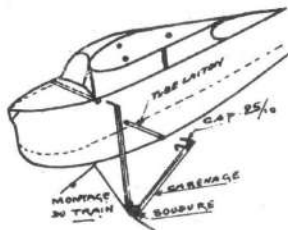
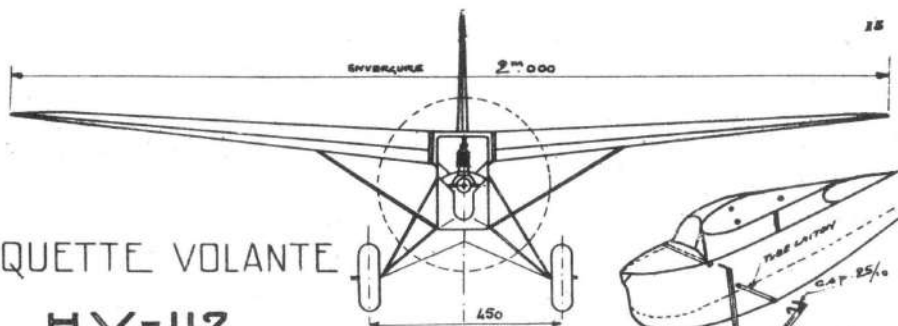


MAQUETTE VOLANTE

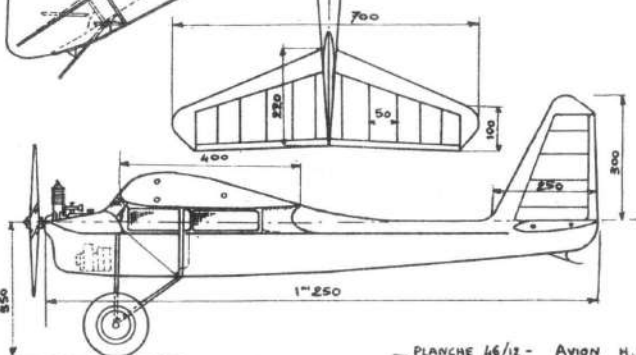
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COTES DU PROFIL BAILE - COORDONNÉES X -

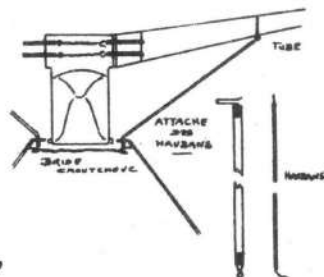
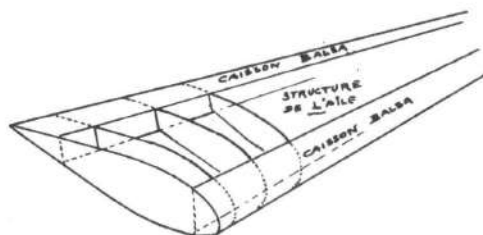
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14,5	1,8	95
9	3	90
17,6	5,8	80
25,9	8,6	70
33,5	11,1	60
40,1	13,3	50
45	15,1	40
47,6	16	30
47	15,7	20
44	15,1	15
37,5	14,2	10
33	13,3	5
27	12	0
15	5,5	0
0	0	0



MOTEUR "BROUIN"



— PLANCHE 46/12 - AVION H. VARACHE —



M.A.C.F.

The publication of the MODEL AVIATION was initiated by Lt. H. W. Alden, Navy Ret. He timed the first issue so that it would be distributed at the 1936 Nationals. By doing so, the participants would know what had been done to form an organization which would be "theirs".

Both issues, No. 1 and No. 2, were prepared in the 10th street loft.

Lt. Alden would come on a Saturday afternoon or on an evening, sit down in front my mu Underwood portable, and type out the copy. I still marvel at his ability to type out whatever he had in mind with only one try. His first copy was good for paste-up. My contribution, except for excerpts from my correspondence and magazines, was mechanical; layout, artwork, handlettering the M. A. logo, and bringing the copy to my printer. Lt. Alden paid all the expenses; printing and postage.

Lt. Alden did not originate the MODEL AVIATION title. At one time he mentioned that it had been used by someone in Brooklyn, but that he obtained permission to use the title. Whatever the origin, he must have recognized it as being just what we needed. It got us away from the "model airplane" term which tends to have a "toy" connotation.

He suggested the name "AMERICAN ACADEMY OF MODEL AERONAUTICS." He realized that we needed a name which would not associate us with the juvenile atmosphere which had been nurtured by the American Boy "Airplane Model League of America" and, especially, by some organizations which exploited model plane activities for self-promoting schemes. --The name as on the long side, but it did present us in an adult and dignified manner. It also had an aura of technical and educational aspect of model aviation. Having an organization with such potential qualities, it made it possible for Lt. Alden to invite influential persons to join us. Just look at the Advisory Board list. The Board members were outstanding leaders in their field. I am sure that with their help, many doors would open for us to present our cause and needs.

What happened to issue No. 3? --It was never finished. Academy's future almost stopped late in 1936 when Lt. Alden could no longer sustain the momentum. He was physically and mentally drained. In part, it could have been his inability to come to terms with the N. A. A. position. Whatever happened, we do not know the details. All we knew that our focal point was gone as all communications were through him. (His method of working was to ask for opinions from everyone who had something to say. Then, form a consensus of suggestions and opinions, and reconcile them with his own beliefs.) Also, his personal connections and influences were lost to us.

Judging from Lt. Alden's personality and perseverance to a cause, and the wide range of friends in aviation and elsewhere, I have no doubt that he would have helped us achieve the aims we had set forth in these two issues of MODEL AVIATION if his health had allowed him to do so. --Luckily, by now, 1936, we were all united in the cause and were able to reestablish the communication among ourselves, and do the best we could without him. This may account why some of us seem so possessive about "our" Academy.

Frank Zaic, 1980

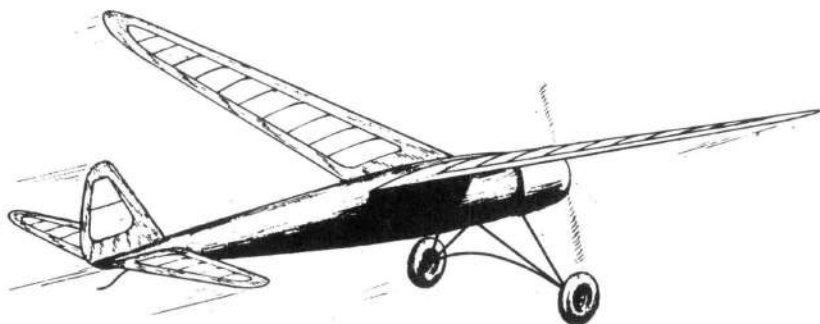
MODEL AVIATION

Volume , Number 2



August , 1936

PUBLISHED MONTHLY BY
THE AMERICAN ACADEMY FOR MODEL AERONAUTICS



1936 TEXACO CONTEST WINNER

The text is centered at the bottom of the page. Above it is a small illustration of a model airplane on a runway, with a person standing nearby. The runway is depicted with perspective lines.

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MODEL AVIATION

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This emblem, reduced to about half the
size shown, will be the basis for a pin
to be worn by Academy members. These
will not be available for distribution
immediately but, as soon as received,
will be sent to all members.

1936 National Meet

3

Well, the Nationals are over for another year, and as usual we are left with enough impressions and memories to last us for the next twelve months.

The gasoline-powered event stole the meet so far as public interest was concerned....There were almost two hundred jobs present--ranging from 3ft. to 15ft. in span....Planes of special interest at this show were the 200-300 sq. in. ships entered by Bill Atwood and Ira Hassad (using special small motors), also by Effinger and Ehling (both using Brown motors)....Boehle's Cyclone-powered 15 foot job is indicative of the fellow's enterprise and ability....Despite the headshakings of the "experts" this ship hopped off from the grass as well as from the concrete runway--something the majority of the gas buggies couldn't do.... With a little structural cleaning-up to increase the flying speed this crate would probably go places on thermals....Hewitt Phillips' retractable landing gear ship had onlookers holding their breaths for a long moment....As it took off the gear folded into place in the wings all right, but the right tip tried to do some grass cutting while the left tip tried to hook the fender of a nearby car.... The crate eventually won clear and went up for second-place time.

The general trend in gas-model design at present seems to be toward good-looking ships of highly-streamlined form....Monocoque construction is much in favor--especially on fuselages....The more ambitious builders carry this construction over to the wing and tail surfaces (paging Weiss and Schmaedig and the others whose names we didn't get)....Frank Tlusch's winning gas job had the cleanest fuselage we've ever seen....Next year we hope to see those radio-controlled ships that failed to show up this year....Just watch the public enthusiasm then!...It should just about match our own.

Highlight of the outdoor, rubber-powered events was the unexpectedly keen competition offered by the visiting British entrants....The Britons not only lifted the Wakefield Trophy--their chief aim--but also placed quite high in the other outdoor fuselage contests....Typical of the British ships were high aspect ratio wings and extra long prop runs....This latter characteristic was achieved in the majority of cases by using a motor about twice the length of the fuselage....When the motor ran out the slack rubber was prevented from slopping around inside the fuselage by means of a simple yet ingenious little device called a "rubber tensioner" (description given elsewhere in Model Aviation).... The British fellows thus didn't have to worry about a changing C.G. caused by moving rubber....After the prop went dead their ships were properly trimmed for good gliding and soaring flight as the results of the contest plainly show.... Allman of the British Wakefield Team had what might be termed a really scientific ship....He obtained a long motor run by using a geared-up prop having variable pitch blades....The result of this combination was the equivalent of constant torque or constant thrust....Allman was unfortunate in having the consistent performance of his excellent ship outshone by the thermal flights of the other jobs.

The only other variation from the usual that we saw outdoors was Bob Cahill's folding prop....Larry Smithline was testing one of the same before the Nationals--seems worth developing....Ken Ernst flew a 300 sq. in., twin-ruddered single tractor that did quite well for itself despite (or was it because of?) its extremes in size and design....The French entrant, Andre Vincere, used a hardwood prop and silk covering on his model....Vincere was only moderately successful in the meet but showed himself to be a fellow who has what it takes; he came here alone without being able to speak a word of English....Such is the power of the model game!

The Tulsa, Indianapolis, and Cleveland gangs are still holding their respective ends up--both indoors and outdoors....The Tulsa boys were the outstanding winners in this last national meet....Carl Goldberg and Frank Nekimken brought a promising group in from Chicago.

Not only did the Wakefield Trophy leave the country this year--the Koffett Memorial Trophy also went for a ride on the wings of Vernon Gray's (New Zealand) crate....Bert Pond became the jokingly badgered "villain" of the meet by proxy flying Gray's ship to first place in this event....The poor fellow must be feeling quite low--been signing recent correspondence as "Snake in the Grass" Pond.

Despite hanging lights, a wrestling ring, and a multitude of ships, the indoor enthusiasts did not do too badly for themselves....Might even say that the winning jobs did quite remarkable time considering the obstacles they had to overcome....Seems that the Akron Dock has spoiled all of us indoor builders....When we first entered the Olympia all the lights were down and we felt like crying on each other's shoulder....However we recovered quickly and took solace in the thought that we were all flying under one roof--and the same handicaps....Variations from the usual indoor design were the use of extra large tail surfaces and wings constructed with superfine trailing edges (rear spar located at about 60% of the chord from the leading edge).

When the fellows found that they couldn't break many of the existing records, instead of telling about the good flights they were getting they began to compare the various heights at which their crates "hung up"....We can still hear Bob Cahill say with fine scorn in his voice as he pointed out his pet wreck of the day to us, "No, not that one; the one higher up the wire."....Carl Goldberg seems to be making a habit of winning that open class tractor event--must be quite a strain having to make that winning time every year....The British boys were quite flabbergasted by the indoor flying in general and the microfilm jobs in particular....They went home with the avowed purpose of starting an indoor craze in Britain.

Since it is more than likely that an American Wakefield Cup Team will sail for Britain next year, it might be advisable if we started right now preparing for the eliminations....Hint to the wise--so that lucky thermal flights will be out to a minimum next year's 200 sq. in. Wakefield entries will have to meet an 8oz. weight ruling.

Conspicuous by their absence this year were, among others, Maxwell Bassett and Joe Kovel. Bassett was unable to attend due to a last minute accident and Kovel was not able to take time away from his job at the Sikorsky factory. Thus, the gasoline powered models missed two of their strongest proponents.

Most everybody commented about the fine assortment of literature on aviation matters which was presented to the contestants when they registered. The Detroit management is to be complimented on their choice of this material and the efforts put forth in procuring it. Each envelope of this literature weighed nearly two pounds. There were magazines, catalogs, air maps and other items of value.

Three new records finally came out of the meet. Chester Lanzo made a new Class D open age record for R.O.G. Fuselage models when he won the event with the great time of 48 min. 45 sec. The day before, Roy Wriston made 41 min. 10 sec. during the Wakefield trials, also a new record until it was bettered by Lanzo. Michael Kostich did 36 min. 52.2 to set a new gasoline powered record in the open class. Gordon Johnstone made a new Class B open record for indoor stick models when he did 16 min. 23 seconds. Earlier in the day Willis Brown had done 16 min. 06 sec. which was better than the existing record.

That Lord Wakefield was delighted over the success of the British team is shown by the radio gram which he sent to Mr. B.K. Johnson, the team manager: "WARMEST CONGRATULATIONS TO THE BRITISH TEAM UPON THEIR SUCCESS IN WINNING BACK THE WAKEFIELD CUP I AM DELIGHTED AT THEIR GREAT SUCCESS. WAKEFIELD OF HYTHE" It was in large part due to Lord Wakefield's generosity that the British team was able to make their trip.

A host of individuals and organizations helped in countless ways to put the meet over successfully. Among these are: American Airlines, Central Airlines, United Air Lines, Pennsylvania Airlines, A.C. Spark Plug Co., Berry Brothers, MODEL AIRPLANE NEWS, THE MODEL CRAFTSMAN, MODEL AIRCRAFT BUILDER, Pan-American Airways, Whitfield Paper Works, The Texas Co., Skelly Oil Co., Country Club Model Airplane Supply Co., Paul Guillow, General Motors, Ford Motor Co., Wayne County Airport, The Detroit Olympia, Comet Model Airplane Co., Megow Model Shop, Dallaire's Model Shop, and others. Especially helpful in conducting the meet were: Mr. H. M. Jellison, Mrs. Jellison, Mrs. Ruth Harrington, Col. Ralph Royce, Lieut. Charles F. Greber, Mr. H.H. Strickland, Miss Eleanor Prosser, "Bill" Stout, Col. J.G. Davis, Bill Balough, R. K. Allen, Irwin and Nat Polk, Charles H. Grant, Mr. and Mrs. Harold Stofer, Mr. Arthur Boehle, Bert Pond, D. K. Penny, Harry C. Copeland, Phil Zecchitella, H. L. Snyder, Edward S. Booth, Howard E. Reddick, T. R. Dudley, Ernest A. Walen, Irving Hoyser, G. L. Lawrence, Mrs. Lawrence, Bob Sommers, Bancroft Hall, Al Lewis, A. F. Shaver, G. J. MacKinnon, C. W. Clifford, Ira Fralick, Sr., John Rosich, and others.



ANDRE VINCERE, of Paris, France, although unable to speak any English, came to the National Championship Meet and won many friends in this country by his contagious smile and gracious manner. He placed in Wakefield and Moffett Contests sufficiently high enough to demonstrate that he is a keen contestant who knows model planes. We hope that Andre Vincere will come again to one of our meets and that some of us may see him also at next year's Wakefield Contest in England.

Official Results

1936 National Championship Model Airplane Meet
Detroit, Michigan. June 30 - July 2.

EXHIBITION SCALE MODEL CONTEST for MODEL AIRPLANE NEWS TROPHY

1.	LOUIS CASALE, 23, Syracuse, N.Y.	WACO TAPERWING	98 score.
	Awarded MODEL AIRPLANE NEWS TROPHY and MINIATURE SUBSCRIPTION to MODEL AIRPLANE NEWS		
	" " THE MODEL CRAFTSMAN		
2.	BRONIK SOROKA, 20, Cleveland, Ohio.	CURTISS F11C-2	97.9
	Awarded DETROIT TIMES TROPHY		
3.	Harry Walker, 22, Cleveland, Ohio.	BOEING P-12 NAVY	96
4.	Carroll P. Krupp, 28, Akron, Ohio.	FAIRCHILD 24	95.8
5.	Fred A. Mayfield, Jr., 18, Akron, Ohio.	BOEING F 4B-4 NAVY	95.4
6.	Kenneth E. Bonesteel, 17, Cuyahoga Falls, O.	CURTISS F11C-2 NAVY	94
7.	Kenneth Diget, 23, Battle Creek, Michigan.	AERONCA "LB"	93.8
8.	Donald Dodd, 16, St. Louis, Missouri.	SIKORSKY S-42	93.6
9.	Stanley Stanick, 17, Salamanca, N.Y.	FLEET TRAINER F-10	92
10.	Earl E. Brinning, 20, Detroit, Michigan.	STINSON RELIANT	91
11.	Julius Takacs, 21, Cleveland, Ohio.	COMPER SWIFT	89
12.	Fred A. Mayfield, Jr., 18, Akron, Ohio.	"MR. MULLIGAN"	88.9

BERRYLOID CONTEST for BEST FINISH on SCALE MODELS for BERRYLOID TROPHY

1.	LOUIS CASALE, Syracuse, N.Y.	STINSON RELIANT
	Awarded BERRYLOID TROPHY	
2.	BRONIK SOROKA, Cleveland, Ohio.	CURTISS F11C-2
	Awarded Gold Medal	

ELIMINATION TRIALS for U.S.A. WAKEFIELD TEAM - No age limit. These trials had 126 contestants. First six make the team.

1.	Gordon S. Light, Lebanon, Penna.	Qualified as 1935 winner & Trophy holder.
2.	Roy Wriston, Tulsa, Oklahoma.	2 17 1 16 41 10 ** Average - 14 54.3
3.	Dick Everett, Elm Grove, W.Va.	3 30 3 19.1 7 38 " 4 49
4.	William Atwood, Glendale, Calif.	1 46.2 5 35.8 2 55.4 " 3 25.8
5.	John Ginnetti, Atlantic City, N.J.	2 06 4 30 1 42.2 " 2 46.1
6.	Charles L. Tracy, Bellevue, Ohio.	2 53.1 1 59.6 2 56.2 " 2 36.3
7.	James Cahill, Indianapolis, Ind.	2 42 2 24 2 29.9 " 2 32
8.	Bruce Luckett, Jr., Tulsa, Okla.	1 55 5 25 ----- " 2 26.6
9.	Bob Jeffery, Findlay, Ohio.	3 20 2 05 1 55 " 2 26.6
10.	Vernon Boehle, Indianapolis, Ind.	1 40.2 2 56.5 2 30 " 2 22.2

**The above time of 41:10 is a new Class D Open record.

ELIMINATION TRIALS for CANADIAN WAKEFIELD TEAM - No age limit. These trials had 19 entries. First six make the team.

1.	Thomas G. Harris, Toronto, Ontario.	55 1 40 2 26 Average 1 40.3
2.	Fred Hollingsworth, Vancouver, B.C.	48 1 59.1 1 50.1 " 1 32.4
3.	Melvin Bardsley, St. Catharines, Ont.	1 20 11 2 50 " 1 27
4.	Henry Verdier, Ottawa, Ontario.	1 37 1 12.2 1 28 " 1 25.7
5.	Raymond T. Smith, Toronto, Ont.	1 30.5 1 10 1 12 " 1 17.5
6.	Paul Verdier, Ottawa, Ontario.	1 05.4 1 03.2 1 23.4 " 1 10.7
7.	John Lemick, Toronto, Ontario.	1 36 1 28 ----- " 1 01.3

ELIMINATION TRIALS for U.S.A. KOFFETT TEAM - No age limit. These trials had 169 contestants. First six make the team.

1.	Vernon Boehle, Indianapolis, Ind.	Qualified as 1935 winner & Trophy holder.
2.	Donald Kraus, Erie, Penna.	Best flight of three attempts - 16 32
3.	Jesse L. Vint, Tulsa, Oklahoma.	" " " " " 10 59
4.	Bob Jeffery, Findlay, Ohio.	" " " " " 7 20
5.	Bruce Luckett, Tulsa, Oklahoma.	" " " " " 6 00
6.	Edward Lidgard, Chicago, Ill.	" " " " " 5 28
7.	Carl Hawkins, Toledo, Ohio.	" " " " " 5 15
8.	Lawrence Smithline, New York, N.Y.	" " " " " 4 55
9.	William E. Atwood, Glendale, Calif.	" " " " " 4 13.2
10.	Kenneth Ernst, Indianapolis, Ind.	" " " " " 4 04

ELIMINATION TRIALS for CANADIAN MOFFETT TEAM - No age limit.
 These trials had 19 contestants. First six make the team.

1.	Henry Verdier, Ottawa, Ontario.	Best flight of three attempts -	2 26.4
2.	Raymond T. Smith, Toronto, Ont.	" " " " "	1 40
3.	Paul Verdier, Ottawa, Ontario.	" " " " "	1 03.8
4.	John Lemick, Toronto, Ontario.	" " " " "	1 03
5.	Ernest Barrie, Galt, Ontario.	" " " " "	1 01
6.	Owen Corfield, Port Dalhousie, Ont."	" " " " "	11

WAKEFIELD CONTEST - FINALS - for WAKEFIELD CUP

1.	Albert A. Judge	Great Britain	8 17	2 16.5	1 56.3	Average -	4 09.9
	Holds WAKEFIELD CUP for one year.						
	Gold medal.						
	Subscription to THE MODEL CRAFTSMAN.						
2.	Roy Wriston,	U.S.A.	1 40	9 15	1 13	"	4 02.7
	DETROIT TIMES TROPHY						
3.	Robert Copland	Great Britain	4 35.2	2 10.9	3 25.2	"	3 23.8
4.	Dick Everett	U.S.A.	2 30	3 41.3	2 46.3	"	2 59.2
5.	J. B. Allman	Great Britain	2 30.8	2 29	3 10.1	"	2 43.3
6.	Gordon S. Light	U.S.A.	4 43.5	1 53	1 23.5	"	2 40
7.	Denis Fairlie	Great Britain	2 36.3	2 20	1 20.5	"	2 05.6
8.	Andre Vincere	France	1 32.5	1 27	2 28	"	1 49.2
9.	G. Dubois (Brown)	France	1 20	1 50	2 13	"	1 47.7
10.	John Ginnetti	U.S.A.	2 06.2	1 24.1	1 20	"	1 36.8
11.	Charles L. Tracy	U.S.A.	55	1 46	2 02	"	1 34.3
12.	W.G. Alexander (Marchi)	New Zealand	1 12	1 51.8	1 06.5	"	1 23.4
13.	A. Pearce (Pond)	New Zealand	51	16	2 52.1	"	1 19.7
14.	Alwyn Greenhalgh	Great Britain	06	1 44.1	1 55	"	1 15
15.	William E. Atwood	U.S.A.	1 45	1 56	-----	"	1 13.7
16.	Harry A. Jones	Great Britain	1 07	07	2 16.3	"	1 10.1
17.	H.J. Robinson (Lanzo)	New Zealand	1 01	1 13	1 14	"	1 09.3
18.	Fred Hollingsworth	Canada	07	08	3 00.5	"	1 05.2
19.	Paul Verdier	Canada	54.5	1 05.1	1 13	"	1 04.2
20.	Henri Varache (Lanzo)	France	55	09	2 01.5	"	1 01.8
21.	Henry Verdier	Canada	18.5	1 18	1 19.7	"	58.7
22.	W.B. Mackley (Cahill)	New Zealand	1 30.2	1 09	10.5	"	56.6
23.	Melvin Bardsley	Canada	20	14	2 13	"	55.7
24.	J. Finlayson (Chadwick)	New Zealand	46	07	1 00	"	37.7
25.	Raymond T. Smith	Canada	07	1 16	-----	"	27.7
26.	R. MacGregor (Hoyser)	New Zealand	43.1	40	-----	"	27.7

MOFFETT CONTEST - FINALS - for ADMIRAL MOFFETT TROPHY

						Min.	Sec.
1.	Vernon B. Gray (Pond)	New Zealand	Best one of three flights -			44	14
	Holds MOFFETT TROPHY for one year						
	Miniature trophy permanently						
	Subscription to MODEL AIRPLANE NEWS						
	" " THE MODEL CRAFTSMAN						
2.	Bob Jeffery	U.S.A.	" " " "	"	"	10	58
3.	A. Worley (Copland)	Great Britain	" " " "	"	"	9	45
4.	Bruce Luckett	U.S.A.	" " " "	"	"	8	40
5.	W. Worden (Judge)	Great Britain	" " " "	"	"	7	40
6.	A. Gibson (Jones)	Great Britain	" " " "	"	"	6	15
7.	Jesse L. Vint	U.S.A.	" " " "	"	"	5	10
8.	Vernon Boehle	U.S.A.	" " " "	"	"	3	25
9.	H. Simmons (Allman)	Great Britain	" " " "	"	"	2	34.9
10.	Edward Lidgard	U.S.A.	" " " "	"	"	2	15.3
11.	Ray Smith	Canada	" " " "	"	"	2	07.6
12.	Andre Vincere	France	" " " "	"	"	1	42.2
13.	Donald Kraus	U.S.A.	" " " "	"	"	1	40.6
14.	Paul Verdier	Canada	" " " "	"	"	1	33.8
15.	W.B. Mackley (Everett)	New Zealand	" " " "	"	"	1	31
16.	John Lemick	Canada	" " " "	"	"	1	26
17.	Ernest Barrie	Canada	" " " "	"	"	1	18
18.	H. Francis (Fairlie)	Great Britain	" " " "	"	"	1	16
19.	H.J. Robinson (Light)	New Zealand	" " " "	"	"	1	12
20.	A. Pearce (Pond)	New Zealand	" " " "	"	"	1	01
21.	Owen Corfield	Canada	" " " "	"	"		31.5
22.	F.T. Beales (Sommers)	New Zealand	" " " "	"	"		25
23.	Henry Verdier	Canada	" " " "	"	"		17.6

STOUT CONTEST for OUTDOOR CABIN FUSELAGE MODELS, R.O.G. Age limit - under 21.
193 Contestants

	Min.	Sec.
1. Ervin Leshner, 17, Philadelphia, Pa. Awarded 1000 mile trip by United Air Lines Life subscription to MODEL AIRCRAFT BUILDER \$10 merchandise order by THE MODEL CRAFTSMAN Subscription to MODEL AIRPLANE NEWS Holds STOUT OUTDOOR TROPHY for one year and permanent miniature.	36	01
2. Robert Copland, 18, London, England Awarded WHITFIELD TROPHY	20	07
3. Joe Nagy, 16, Cleveland, Ohio	18	01.6
4. Robert B. Shea, 19, Boston, Mass.	17	04
5. Jean S. Chadwick, 19, Syracuse, N.Y.	10	08.8
6. Charles Belsky, Chicago, Illinois	9	38
7. Roy E. Stoner, 15, Rockford, Illinois	6	38
8. William Ying, 17, Staten Island, N.Y.	6	23.6
9. Torrey L. Capo, 19, Quincy, Mass.	5	02
10. Fred Hollingsworth, 19, Vancouver, B.C.	4	57
11. Kenneth Ernst, 20, Indianapolis, Ind.	4	55.1
12. Albert A. Judge, 18, London, England	4	31.5
13. John Kubilis, Jr., 18, Chicago, Ill.	4	00
14. Mike Karlak, 19, Cleveland, Ohio	3	52.1
15. Lawrence Eisinger, 16, Staten Island, N.Y.	3	26
16. Fred A. Mayfield, Jr., 18, Akron, Ohio	3	24.1
17. James McCoy, 14, Wilkensburg, Penna.	3	13.7
18. George E. Henderson, Jr., 19, Asheville, N.C.	3	12
19. Edward Naudzius, 17, Detroit, Michigan	3	09
20. James Cahill, 18, Indianapolis, Indiana	3	02
21. W. Hewitt Phillips, 18, Belmont, Mass.	2	58
22. Carl Hawkins, Jr., 19, Toledo, Ohio	2	56.2
23. Lawrence Harlow, 15, Indianapolis, Indiana	2	46.8
24. Reuben Snodgrass, 17, Tulsa, Oklahoma	2	43
25. Bob Apgar, 15, Minneapolis, Minnesota	2	39
26. James Sions, 16, Martinsburg, West Virginia	2	37
27. Denis Fairlie, 18, Wembley, England	2	34
28. Thracy Petrides, 16, New York, N.Y.	2	31.6
29. Bronik Soroka, 20, Cleveland, Ohio	2	26
30. John Haw, 20, Philadelphia, Pa.	2	24.8
31. Robert Toft, 16, Minneapolis, Minnesota	2	24.4
32. Dick Everett, 18, Elm Grove, West Virginia	2	22
33. Gifford Hefley, 20, Norman, Oklahoma	2	22
34. Edward Lidgard, 17, Chicago, Illinois	2	17
35. Frank Ehling, 19, Jersey City, N.J.	2	16.8
36. Ed Yambor, 18, Cleveland, Ohio	2	16.1
37. Raymond Heit, 16, Brooklyn, N.Y.	2	15.8
38. George M. Allen, 19, Topeka, Kansas	2	11.5
39. Bob Chatelain, 19, Findlay, Ohio	2	07
40. Alvin S. Gaskill, 19, Atlantic City, N.J.	2	02
41. John Foster, 16, Indianapolis, Indiana	2	00
42. Bob Jeffery, 18, Findlay, Ohio	2	00
43. Alfred F. Broz, 18, Cleveland, Ohio	1	58
44. Richard Obarski, 17, Chicago, Illinois	1	58
45. Gordon Schindler, 17, St. Paul, Minnesota	1	56

CONTEST for OUTDOOR CABIN FUSELAGE MODELS, R.O.G. - Age limit - over 21.
35 Contestants.

	Min.	Sec.
1. Chester Lanzo, Cleveland, Ohio (New Class D Open record) Awarded the MEGOW TROPHY Subscription to THE MODEL CRAFTSMAN	48	45
2. Richard Korda, Cleveland, Ohio Awarded DETROIT TIMES TROPHY	12	04.6
3. Vernon Boehle, Indianapolis, Indiana	6	30
4. John Young, New York City	3	46
5. J. B. Allman, Birmingham, England	3	32.5
6. Dick Bodle, Akron, Ohio	3	31.2
7. Roy Wriston, Tulsa, Oklahoma	3	15.2
8. Louis Garami, Jackson Heights, N.Y.	2	29
9. Ira J. Fralick, Syracuse, N.Y.	2	00.8
10. William E. Atwood, Glendale, California	1	50.4
11. Irving L. Hoyser, Syracuse, N.Y.	1	41.8
12. Robert J. Cahill, Indianapolis, Indiana	1	35.2
13. Frank Zaic, New York City	1	33
14. Raymond E. Podolsky, St. Louis, Missouri	1	28
15. Jesse Bieberman, Philadelphia	1	23
16. Joseph P. Matulis, Jr., Chicago, Illinois	1	14.5

MULVIHILL CONTEST - Age limit under 21. 192 Contestants.

Min. Sec.
41 41

1. Bruce Luckett, Jr., 16, Tulsa, Oklahoma Awarded 1000 mile trip by American Airlines Life subscription to MODEL AIRCRAFT BUILDER \$10 merchandise order by THE MODEL CRAFTSMAN Subscription to MODEL AIRPLANE NEWS Holds MULVIHILL TROPHY one year, miniature permanently.	
2. Alvie Dague, Jr., 16, Tulsa, Oklahoma Awarded DETROIT TIMES TROPHY	23 03
3. Jesse L. Vint, Jr., 17, Tulsa, Oklahoma	10 00
4. Robert Toft, 16, Minneapolis, Minnesota	9 31
5. Mike Karlak, 19, Cleveland, Ohio	8 44
6. Albert F. Broz, 18, Cleveland, Ohio	8 17
7. Frank Ehling, 19, Jersey City, N.J.	7 36.8
8. John Foster, 16, Indianapolis, Ind.	7 09
9. Frank W. Franz, 19, Detroit, Michigan	7 05
10. James Cahill, 18, Indianapolis, Ind.	6 40
11. Edmund B. Swort, 17, Chicago, Illinois	6 33
12. Torrey L. Capo, 19, Quincy, Mass.	6 02
13. John S. Romanowski, 20, Jersey City, N.J.	5 51.4
14. Steven Thomas, 20, Akron, Ohio	5 43.2
15. Reuben Snodgrass, 17, Tulsa, Oklahoma	5 30
16. Ervin Leshner, 17, Philadelphia, Pa.	5 17
17. Roy A. Carlson, 16, Springfield, Mass.	5 02
18. Leon Klesman, 16, Chicago, Illinois	4 58
19. Wallace Simmers, 17, New Lenox, Illinois	4 34.5
20. Leo Bailey, 18, Akron, Ohio.	4 33
21. Alvin S. Gaskill, 19, Atlantic City, N.J.	4 14
22. Daniel J. Cline, 19, Springfield, Mass.	4 09
23. W. Hewitt Phillips, 18, Belmont, Mass.	3 58.5
24. Bronik Soroka, 20, Cleveland, Ohio	3 51
25. Lawrence Smithline, 19, New York City	3 47.8
26. Jean S. Chadwick, 19, Syracuse, N.Y.	3 33.8
27. John Stimadorakis, 19, Atlantic City, N.J.	3 32
28. Raymond Heit, 16, Brooklyn, N.Y.	3 30
29. Myron W. Burd, Hamilton, Ontario	3 25
30. Walter Dickinson, 16, Newark, N.J.	3 20.2
31. Fred Hollingsworth, 19, Vancouver, B.C.	3 01
32. Hugh Schneidewind, 14, Belleville, Illinois	3 00.1
33. Robert Segna, 16, Bellevue, Ohio	2 56.5
34. Harry Zawislak, 17, Chicago, Illinois	2 54.6
35. Carl Hawkins, Jr., 19, Toledo, Ohio	2 54
36. Joe Nagy, 16, Cleveland, Ohio	2 50.9
37. Florence Lanzo, 18, Cleveland, Ohio	2 50.1
38. Lawrence Eisinger, 16, Staten Island, N.Y.	2 50
39. Carson Carroll, 15, Indianapolis, Ind.	2 46.8
40. Arthur Koslow, 15, Philadelphia, Pa.	2 43
41. Barbara Maschin, 18, Westfield, Mass.	2 41
42. Donald Kraus, 17, Erie, Pennsylvania	2 40.5
43. Joseph Calio, 16, Albany, N.Y.	2 36
44. Richard L. Sloane, 18, Columbus, Ohio	2 35
45. Charles L. Tracy, 19, Bellevue, Ohio	2 25.1

OUTDOOR STICK MODEL CONTEST - Age limit over 21. 38 entries.

Min. Sec.
6 30

1. Sheldon Bell, Toledo, Ohio Awarded HALFPOUR TROPHY for one year Gold medal Subscription to THE MODEL CRAFTSMAN	
2. Richard Korda, Cleveland, Ohio Awarded DETROIT TIMES TROPHY.	5 32
3. Melvin Bardsley, St. Catharines, Ontario	4 15
4. Vernon Boehle, Indianapolis, Indiana	3 56.5
5. Robert J. Cahill, Indianapolis, Indiana	3 17
6. Jacob Friedman, University City, Missouri	3 16
7. Frank Nekimken, Chicago, Illinois	3 12
8. Michael J. Roll, Dearborn, Michigan	2 50
9. Frank Zaic, New York City	2 47.6
10. Vernon A. Hanson, Minneapolis, Minnesota	2 41
11. Dick Bodle, Akron, Ohio	2 38
12. Owen Rothrock, Detroit, Michigan	2 30
13. Gerald Weisinger, Hackensack, New Jersey	2 18
14. Roy Wriston, Tulsa, Oklahoma	2 10.2
15. Ernest A. Walen, Springfield, Mass.	2 06
16. Irving L. Hoyser, Syracuse, N.Y.	1 58
17. Ira J. Fralick, Syracuse, N.Y.	1 57.9

18. Joseph P. Matulis, Jr., Chicago, Illinois	1	55
19. Chester Lanzo, Cleveland, Ohio	1	54
20. Gordon Johnstone, Detroit, Michigan	1	54
21. Teen Becksted, Chicago, Illinois	1	53.5
22. Fay Stroud, Detroit, Michigan	1	50
23. Jesse Bieberman, Philadelphia, Pa.	1	49.5
24. Mrs. Martha Dodd, St. Louis, Missouri	1	44.5
25. H. T. Sommers, St. Louis, Missouri	1	30

TEXACO CONTEST for GASOLINE POWERED CABIN MODELS - R.O.G.

Age limit - over 16 and under 21. 97 contestants.

	Min.	Sec.
1. Francis J. Tlush, 19, Lyndhurst, N.J. Awarded \$25 merchandise order by THE MODEL CRAFTSMAN Life subscription to MODEL AIRCRAFT BUILDER Subscription to MODEL AIRPLANE NEWS Holds TEXACO TROPHY for one year and permanent miniature	45	34.5
2. W. Hewitt Phillips, 18, Belmont, Mass. Awarded MODEL CRAFTSMAN TROPHY One (1) TLUSH SUPER ACE MOTOR by the Tlush Brothers.	30	12
3. Joseph H. Buehrle, 17, North Little Rock, Arkansas Awarded smaller TEXACO TROPHY	27	50
4. Michael Granieri, 16, Newark, New Jersey	26	40
5. DeWitt Ross, Jr., 16, Tulsa, Oklahoma	26	33.5
6. Roderick Doyle, 20, Alameda, California	26	15
7. Hubert Bodinet, 17, Chicago, Illinois	22	21.8
8. Carl Hawkins, Jr., 19, Toledo, Ohio	22	00
9. Fred Gerling, 19, Columbus, Ohio	20	11
10. Harry T. Wetzel, 16, Santa Monica, California	20	10
11. Reuben Snodgrass, 17, Tulsa, Oklahoma	20	00
12. Frank Broeg, Jr., 17, Burlington, Iowa) John Igoe, 16, " " ")	18	48.2
13. E. Carlton Harris, 19, Buffalo, New York	18	16.8
14. Alvie Dague, Jr., 16, Tulsa, Oklahoma	18	00
15. William Effinger, Jr., 19, Brooklyn, New York	17	06
16. Jack Forbes, 16, Rolla, Missouri	16	00
17. Kenneth Ernst, 20, Indianapolis, Indiana	15	03.1
18. Bernarr Anderson, 20, Akron, Ohio	14	12
19. Joe Dallaire, Jr., 17, Detroit, Michigan	13	45
20. Dale Koozer, 17, Mansfield, Ohio	12	20
21. Ira J. Hassad, 20, Los Angeles, California	11	40.5
22. Henry Stadelmeier, 17, New York City	11	30
23. Herbert J. Greenberg, 20, Newark, New Jersey	11	13.4
24. Carroll Krupp, 18, Akron, Ohio	10	25
25. Leo Vartanian, 19, Chicago, Illinois	10	05
26. Richard Waxenberg, 17, Burlington, Iowa) Harold Zabloudil, 17, " " ")	9	10.3
27. Thraoy Petrides, 16, New York City	9	05.8
28. William Owens, 16, Chicago, Illinois	8	30
29. Wendell Reynolds, 17, Jackson, Michigan	8	25
30. Edward J. Huntzinger, 18, Toledo, Ohio	7	34.4
31. Raymond Heit, 16, Brooklyn, New York	7	09
32. Steven Thomas, 20, Akron, Ohio	6	45
33. Franklin Dewey, 18, Grosse Pointe Shores, Michigan	6	36
34. Edward I. Manulkin, 18, Philadelphia, Pa.	6	11
35. Edward Lorenz, 18, Columbus, Ohio	5	32.5
36. Walter Good, 20, Kalamazoo, Michigan	4	58.2
37. Walter Dickinson, 16, Newark, New Jersey	4	41.8
38. Joseph W. Hillebrand, 16, Detroit, Michigan	3	40
39. Frank Kiewicz, 19, Detroit, Michigan	2	35
40. Bruno P. Larchi, 20, Medford, Mass.	2	30
41. Gifford Hefley, 20, Norman, Oklahoma	2	30
42. Robert Mende, 19, Flint, Michigan	2	18
43. Sanford Caplin, 18, Cleveland, Ohio	2	09.3
44. Robert Owens, 17, Chicago, Illinois	2	07
45. George J. Austermann, 19, Baltimore, Maryland	1	46

GASOLINE POWERED MODELS - OPEN AGE CLASS.

Age limit over 21.

43 Contestants.

	Min.	Sec.
1. Mike Kostich, Akron, Ohio (New open age record) Awarded MODEL CRAFTSMAN TROPHY BABY CYCLONE ENGINE by Major C.C. Moseley Subscription to THE MODEL CRAFTSMAN Subscription to MODEL AIRPLANE NEWS	36	52.2
2. Melvin H. Yates, Joliet, Illinois Awarded the WHITFIELD TROPHY	27	32

3.	Dick Bodle, Akron, Ohio	25	27
4.	Raymond E. Podolsky, St. Louis, Missouri	24	59
5.	Vernon Boshle, Indianapolis, Indiana	24	39
6.	Harold Stofer, Indianapolis, Indiana	24	36
7.	Winford Davis, Kansas City, Missouri	23	12.8
8.	Richard Staab, Akron, Ohio	21	45
9.	William E. Atwood, Glendale, California	21	44.2
10.	Michael J. Roll, Dearborn, Michigan	20	44.6
11.	Louis E. Schock, Los Angeles, California	19	45.4
12.	John S. Young, Kansas City, Missouri	15	51.3
13.	Alan D. Booton, Asheville, North Carolina	13	42
14.	Bob File, Columbus, Ohio	13	13
15.	Emanuel Radoff, Newark, New Jersey	7	13.4
16.	Eddie Stender, Lyndhurst, New Jersey	6	17.2
17.	P. J. Sweeney, Chicago, Illinois	6	16.4
18.	Jack V. Tighe, Chicago, Illinois	4	53.3
19.	Frank Dallaire, Detroit, Michigan	4	09.8
20.	Floyd Steinberg, Flint, Michigan	4	07.2
21.	Hubert B. Lacey, St. Louis, Missouri	3	37.5
22.	Ben Sheresshaw, Irvington, New Jersey	2	43.3
23.	Sherwood R. Castles, Lyndhurst, New Jersey	2	37.2
24.	Charles J. Tlush, Lyndhurst, New Jersey	2	35
25.	Frank Zaic, New York City	2	32

STOUT CONTEST for INDOOR STICK MODELS - HAND-LAUNCHED
122 Contestants

Age limit under 21

		Min.	Sec.
1.	John Haw, 20, Philadelphia, Pa. Awarded round trip Detroit to Washington by Central Airlines Life subscription to MODEL AIRCRAFT BUILDER \$10 merchandise order by THE MODEL CRAFTSMAN Subscription to MODEL AIRPLANE NEWS Holds STOUT INDOOR TROPHY for one year and permanent miniature	18	10
2.	Bruno Marchi, 20, Medford, Mass. Awarded CENTRAL AIRLINES TROPHY	18	01.4
3.	Wilbur Tyler, 19, Everett, Mass. Awarded COMET TROPHY	17	52.5
4.	John Ginnetti, 20, Atlantic City, New Jersey	17	52
5.	Roderick Doyle, 20, Alameda, California	17	20
6.	Donald Godfrey, 17, Detroit, Michigan	17	02
7.	Torrey L. Capo, 19, Quincy, Mass.	16	59.2
8.	W. Hewitt Phillips, 18, Belmont, Mass.	16	46
9.	Dick Everett, 18, Elm Grove, West Virginia	16	40
10.	John Foster, 16, Indianapolis, Indiana	16	33
11.	Lawrence Smithline, 19, New York City	16	30
12.	Roy Marquardt, 18, Burlington, Iowa	16	26
13.	Robert Jacobsen, 16, Philadelphia, Pa.	16	16.1
14.	Roy A. Carlson, 16, Springfield, Mass.	16	11
15.	Wallace Simmers, 17, New Lenox, Illinois.	15	50
16.	Fred A. Mayfield, Jr., 18, Akron, Ohio	15	33.3
17.	Frank Kiewicz, 19, Detroit, Michigan	15	16
18.	Jean S. Chadwick, 19, Syracuse, New York	15	15
19.	Sidney Axelrod, 17, Chicago, Illinois	14	47
20.	Frank Haynes, 20, New York City	14	30
21.	Maurice Arnold, 17, Columbus, Ohio	14	30
22.	Walter Good, 20, Kalamazoo, Michigan	14	23
23.	Jack Greenwell, 19, Toronto, Ontario	14	12
24.	Ira J. Hassad, 20, Los Angeles, California	14	07.2
25.	Edward Kobyleski, 16, Chicago, Illinois	14	06
26.	Lynn Radcliffe, 15, Syracuse, New York	14	03
27.	William E. Gough, Jr., 19, Chicago, Illinois	13	55
28.	Bruno D'Angelo, Philadelphia, Pa.	13	19.2
29.	James Bohash, 17, Detroit, Michigan	13	15
30.	Lawrence Eisinger, Staten Island, New York	13	10
31.	John S. Stokes, Jr., Huntingdon Valley, Pa.	13	10
32.	Daniel J. Cline, 19, Springfield, Mass.	13	05.4
33.	Edward Naudzius, 17, Detroit, Michigan	12	45
34.	Clement Turansky, 18, Ambridge, Penna.	12	10
35.	Mark Furnas, 16, Joliet, Illinois	11	55.1
36.	Victor Bohsen, 17, West Orange, New Jersey	11	52.4
37.	Thracey Petrides, 16, New York City	11	50
38.	George M. Allen, 19, Topeka, Kansas	11	49.2
39.	Albert W. Courtial, Jr., St. Louis, Missouri	11	47
40.	Scott Burke, 18, Detroit, Michigan	11	28

SPRINGFIELD CONTEST for INDOOR STICK MODELS - HAND-LAUNCHED

		Min.	Sec.
1.	Carl Goldberg, Chicago, Illinois Holds SPRINGFIELD TROPHY for one year and permanent miniature Subscription to THE MODEL CRAFTSMAN	19	26
2.	Roy Wriston, Tulsa, Oklahoma Awarded DETROIT TIMES TROPHY	17	56.1
3.	Joseph P. Matulis, Jr., Chicago, Illinois.	17	55
4.	Ira J. Fralick, Syracuse, New York	16	45
5.	Gordon Johnstone, Detroit, Michigan (New Class B record)	16	23
6.	Willis C. Brown, Arlington, Mass.	16	06
7.	Chester Lanzo, Cleveland, Ohio	14	44
8.	Fay Stroud, Detroit, Michigan	14	32
9.	William E. Atwood, Glendale, California	14	21
10.	Michael J. Roll, Dearborn, Michigan	11	15
11.	Ernest A. Walen, Springfield, Mass.	10	38.5
12.	Robert J. Cahill, Indianapolis, Indiana	10	33.3
13.	Jesse Bieberman, Philadelphia, Pa.	9	00

BLOOMINGDALE CONTEST for INDOOR CABIN FUSELAGE MODELS - R.O.G.

		Min.	Sec.
1.	Alvie Dague, Jr., 16, Tulsa, Oklahoma Awarded round trip Detroit to Washington by Pennsylvania Airlines Life subscription to MODEL AIRCRAFT BUILDER Subscription to MODEL AIRPLANE NEWS Holds Bloomingdale Trophy for one year and permanent miniature	16	17
2.	John Haw, 20, Philadelphia, Pa. Awarded Guillov Cup	14	54
3.	Albert W. Courtial, Jr., 19, St. Louis, Missouri Awarded DETROIT TIMES TROPHY	14	31.8
4.	John Ginnetti, 20, Atlantic City, New Jersey	14	00
5.	William E. Gough, Jr., 19, Chicago, Illinois	12	55.8
6.	Walter Good, 20, Kalamazoo, Michigan	12	10
7.	Lynn Radcliffe, 15, Syracuse, New York	11	45
8.	Ervin Leshner, 17, Philadelphia, Pa.	11	33
9.	Roy A. Carlson, 16, Springfield, Mass.	11	30
10.	Daniel J. Ciani, 19, Springfield, Mass.	11	05.2
11.	Torrey L. Capo, 19, Quincy, Mass.	11	00
12.	Herbert J. Greenberg, 20, Newark, New Jersey	10	55
13.	Edward I. Manulkin, 18, Philadelphia, Pa.	10	42
14.	Paul H. Gustafson, 16, Columbus, Ohio	9	39.5
15.	Roy Marguardt, 18, Burlington, Iowa	9	38
16.	DeWitt Ross, Jr., 16, Tulsa, Oklahoma	9	25
17.	Paul Verdier, 15, Ottawa, Ontario	9	07
18.	Jean S. Chadwick, 19, Syracuse, New York	8	15
19.	W. Hewitt Phillips, 18, Belmont, Mass.	8	07
20.	Richard L. Sloane, 18, Columbus, Ohio	8	02
21.	Thomas Cunningham, 19, Chicago, Illinois	7	15
22.	Fred Hollingsworth, 19, Vancouver, B.C.	6	44
23.	Wallace Simmers, 17, New Lenox, Illinois	6	43
24.	Ted Just, 14, Johnstown, Penna.	6	02.1
25.	Seymour Stein, 16, Akron, Ohio	5	00.

INDOOR CABIN FUSELAGE MODELS - R.O.G.
19 Contestants

<u>INDOOR CABIN FUSELAGE MODELS - R.O.G.</u>		Age limit over 21
19 Contestants		
		Min. Sec.
1.	Joseph F. Matulis, Jr., Chicago, Illinois Awarded JIMMIE ALLEN TROPHY Gold Medal Subscription to THE MODEL CRAFTSMAN	11 21.5
2.	Jesse Bieberman, Philadelphia, Pa. Awarded AMERICAN AIRLINES TROPHY	10 25
3.	Teen Becksted, Chicago, Illinois	9 37.5
4.	Ira J. Fralick, Syracuse, New York	8 05
5.	Chester Lanzo, Cleveland, Ohio	7 35
6.	Roy Wriston, Tulsa, Oklahoma	6 38
7.	John T. Dilly, Galt, Ontario	5 50
8.	Ernest A. Walen, Springfield, Mass.	4 47
9.	Nigel Jones, Bralorne, B.C.	4 13

FORMATION OF THE AMERICAN ACADEMY FOR MODEL AERONAUTICS

During the National Championship Meet at Detroit, a provisional council and executive officers were named to conduct the affairs of the American Academy for Model Aeronautics. The officers will continue to serve as elected by the council until the first annual meeting. The officers and council are listed on page two of this journal.

It will be noticed that a wide distribution geographically and representation by every branch of model aeronautics has been achieved in this initial panel of leaders. Committees will be named from among the group to make recommendations and help to formulate plans for the Academy's future. It is expected that all of those who are interested in model aviation will help the movement along by the simple act of joining the Academy.

Regular membership is open to all model plane builders and flyers who have done at least two minutes indoors or one minute outdoors. The membership fee entitles the member to the new F.A.I. Sporting License which, in the future, will be necessary for N.A.A. competition under the new F.A.I. requirements. MODEL AVIATION is also included in the membership dues. Those over 21 - \$3.00. Under 21 - \$1.50.

Associate membership is offered to all those who do not actually build and fly models but who are, for some reason, interested in model aeronautics and want to follow the subject understandingly. Associate members will not receive the F.A.I. sporting license but will receive MODEL AVIATION. Same dues a regular members.

Patrons are those who wish to assist in the advancement of model aeronautics and who shall have contributed to the Academy, at one time, the sum of not less than two hundred fifty dollars.

Corporate Members are those members of the industry or allied industries who contribute annually to the Academy. The income from these members will be used to enable the Academy to refrain from carrying advertisements in MODEL AVIATION. The dues of Corporate Members range from a minimum of \$50 to a maximum of \$500.

Honorary members, to the number of ten annually, will be elected by the Council in recognition of outstanding ability or achievement.

JORDAN MARSH - BOSTON TRAVELER OUTDOOR MEET, July 11.
Reported by Al. Lewis.

A junior record for tow line gliders came to Boston at the first summer outdoor contest conducted by the Jordan Marsh - Boston Traveler Junior Aviation League.

Ralph Brown, 14, of Arlington, flew his Class C tow line glider for 9 minutes 30 seconds in the meet held at Smith Playground, Allston, on Saturday, July 11. This exceeds the officially listed record.

Other winning places went to Frank Barrett, Jr., of Brighton, who won the hand launched stick model event and the cabin fuselage contest. There were three different events in the meet which was sanctioned by the National Aeronautic Association. G. Bancroft Hall was contest director.

Glanders.		Min.	Sec.
1.	Ralph Brown. Tow Line, Class C. (New junior record)	9	32
2.	Hewitt Phillips. Tow Line		38
3.	Leslie Woodman. Hand-launched		35.2
Stick Models, Hand-launched.			
1.	Frank Barrett, Jr. Class C.	4	30
2.	Robert Shea " "	1	50.8
3.	Sidney Wallerstein " "	1	45
Cabin Fuselage, R.O.G. Class C.			
1.	Frank Barrett, Jr.	2	52
2.	Robert Shea	2	10
3.	Morris Sulkin	2	03

The Frederick L. Ames Memorial Trophy will be awarded at the end of the summer to the contestant who makes the longest duration flight with any type of outdoor model during the series of summer contests to be conducted by the League. The second meet of the series was scheduled for August 1, and the third, September 5. All the points won by the contestants during these summer meets will be added and the totals halved. This number of points will be credited to the standings for the 1937 point system.

REPORT OF INDOOR MEET, Lakehurst, N.J., August 1, 1936.STICK MODEL AIRPLANES, Hand-launched

CLASS B		Min.	Sec.
1.	Hyman Oslick, 17, Philadelphia, Pa.	19	46.4
2.	Ernest A. Walen, Open, Springfield, Mass. (New open class record)	18	46.5
3.	Arnold Cohen, 16, Philadelphia, Pa.	18	19.2
4.	John S. Stokes, Jr., 15, Huntingdon Valley, Pa. (New junior record)	18	12.2
5.	Edwin Oates, Open, Thompsonville, Conn.	14	45
CLASS C			
1.	Robert Jacobsen, Philadelphia, Pa. age 16	22	28
2.	John Haw, 20, Philadelphia, Pa.	21	29.8
3.	Edwin I. Manulkin, 18, Philadelphia, Pa.	21	28.8
4.	Lawrence Smithline, 19, New York City.	18	01
5.	Mayhew Webster, 19, Philadelphia, Pa.	13	49.2

STICK MODEL AIRPLANES, R.O.G.

CLASS A (Baby ROG)			
1.	Ervin Leshner, 17, Philadelphia, Pa. (New senior record)	11	50.8
2.	Hyman Oslick, 17, Philadelphia, Pa. (Exceeds old record)	11	38.8
3.	Arnold Cohen, 16, Philadelphia, Pa.	9	30.2
4.	Roy A. Carlson, 16, Springfield, Mass.	9	19.8
CLASS B			
1.	Ernest A. Walen, Open, Springfield, Mass. (New Open class record)	17	42.8
2.	John S. Stokes, Jr., 15, Huntingdon Valley, Pa. (New junior record)	17	19.3
3.	Hyman Oslick, 17, Philadelphia, Pa. (New senior record)	17	03.8
4.	Arnold Cohen, 16, Philadelphia, Pa.	13	41.2

STICK MODEL AIRPLANES, R.O.W.

CLASS A			
1.	Colman Zola, 19, Brooklyn, N.Y. (New senior record)	7	41.1
CLASS B			
2.	John S. Stokes, Jr., 15, Huntingdon Valley, Pa.	7	42.8

CABIN FUSELAGE MODELS, R.O.G.

CLASS B			
1.	John S. Stokes, Jr., 15, Huntingdon Valley, Pa. (New junior record)	14	15.3
2.	Ervin Leshner, 17, Philadelphia, Pa.	13	07
CLASS C			
1.	Jesse Bieberman, Open, Philadelphia, Pa.	7	26.4

SCHEDULED MODEL PLANE MEETS

Metropolitan Model League Outdoor Contest, (New Jersey Division), August 15th., Newark Airport. Contest Director - Nathan Polk, 265 Halsey St., Newark, N.J.

Mississippi Valley Model Airplane Tournament, August 21 and 22, St. Louis, Mo. Indoor and outdoor, rubber and gasoline engine powered models. Write to the Stix Baer and Fuller Model Airplane Club, St. Louis, Missouri, for entry blank.

American Legion Model Airplane Contest, August 29 and 30, Indianapolis, Ind. Indoor and outdoor, rubber powered and gasoline engine models. Contest Director, American Legion Model Aviation League, 777 N. Meridian St., Indianapolis.

Third Annual Lebanon Model Plane Meet, August 29, Lebanon, Pennsylvania. For outdoor rubber and gasoline powered models. Contest Director, Gordon S. Light, 1404 Oak Street, Lebanon, Pennsylvania.

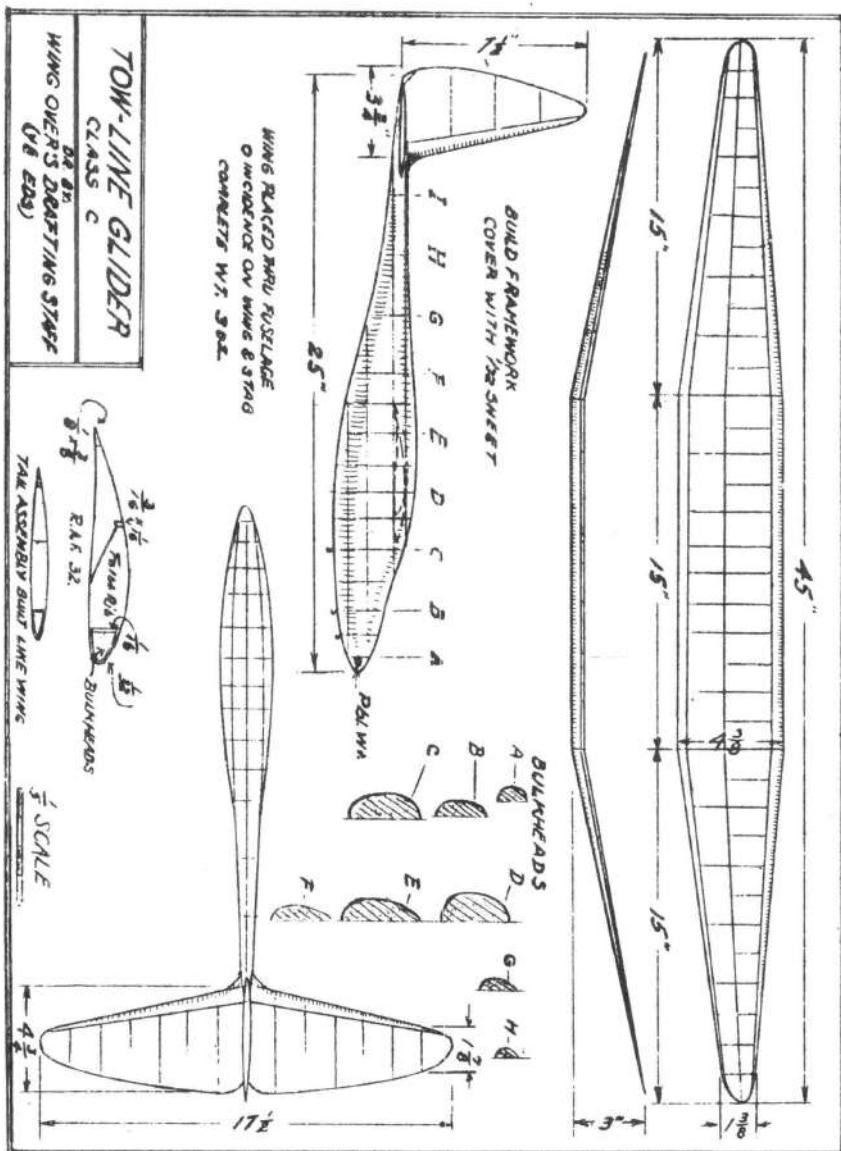
Scripps-Howard Junior Air Races, August 30 to September 2, Buffalo, New York. Director, Ed. Clarke, National Junior Aviation Editor, Cleveland Press, Cleveland, Ohio.

Canadian National Model Aircraft Contest, August 31 to September 2, Toronto, Ontario. Indoor and outdoor, rubber and gasoline powered models. Write to Mr. Elwood A. Hughes, General Manager, The Canadian National Exhibition, 6 Adelaide St., East, Toronto, Ontario.

INDOOR MEET, Lakehurst, New Jersey (in the large hangar, Naval Air Station), September 5. Any type of indoor model is eligible. Contest Director, H. W. Alden, 1106 Edgewater Ave., Ridgefield, N.J.

New York State Championship Outdoor Model Airplane Meet, September 9, Syracuse, New York. Rubber powered and gasoline powered models. Model Airplane Contest Director, 721 Chimes Building, Syracuse, N.Y.

Fourth Annual Kresge Model Plane Meet, September 26, Newark, New Jersey. This year limited to gasoline powered models. Contest Director, Ben Sheresshaw, Model Airplane Club, Kresge's, Newark, New Jersey.



The glider plan shown above is taken from WING OVERS, the journal of the Jordan Marsh - Boston Traveler Junior Aviation League. It is an excellent example of clean design and should prove to be a good performer.

The League reports that a slow speed wind tunnel is under construction as a club project. Accurate testing of models will occupy League members and give valuable data. The information which these tests produce will be offered to the Academy in the form of reports. Such reports supplementing those from the Academy wind tunnel and other sources will prove most helpful in solving aerodynamic model problems.

A MESSAGE FROM THE ACADEMY PRESIDENT

Our organization depends on every member doing his part to insure its success. The officers will endeavor to carry out the wishes of the members and will make every effort to lead the way to a successful association. This requires the united help of the membership.

There is definite need of unified study and investigation into the various fields of science pertaining to the subject of model aeronautics in order to make the best possible progress in improved methods and performance. New ideas, new methods, improved designs, higher achievement, - all will result from united effort.

We need a closer interchange of knowledge gained from individual experiment. The AMERICAN ACADEMY for MODEL AERONAUTICS will serve as a center for gathering and publishing material of benefit to all. Advanced model builders and flyers will gain invaluable assistance by this cooperative effort.

It is with the greatest enthusiasm that the council members have undertaken to organize the ACADEMY. It is most gratifying to me, personally, to know that we have a sincere and conscientious group all united in this effort. There is every reason to believe that accomplishment will exceed expectation.

WILLIS C. BROWN

MODEL AVIATION will print papers of scientific and technical interest to members. In general, it provides an opportunity for members to publish articles disclosing new knowledge and new applications in the field of model aeronautics. It will include short notes and critical comments. Papers read at meetings of the Academy will be presented in full and digested. The news of the Academy is furnished members through MODEL AVIATION.

ACADEMY PROJECTS

Construction and operation of a slow speed wind tunnel for testing actual flying models, airfoils, propellers, fuselages, etc. The results of these tests will be made available to Academy members.

Creation of a fund for sending a team to England for the 1937 Wakefield Contest.

Experiment and development of radio controlled model flight.

Development of a practical recording altimeter for registering model flights.

Establishment of a laboratory for testing model plane materials with a view toward scientific application to models.

Collection of a library of model plane writings.



The Academy emblem or seal will be used to decorate the Academy's letterhead, membership cards, publications, etc. It will form the corporate seal when the incorporation of the Academy has been accomplished. The symbol of the central torch, for knowledge, and wings, for flight, is most fitting to the purposes of the Academy.



SOCIETY OF MODEL AERONAUTICAL ENGINEERS

(S.M.A.E.)

The Body governing Model Aeronautics in Great Britain, by agreement with the Royal Aero Club



THE BRITISH TEAM - WAKEFIELD CUP WINNERS. Back row - Copland, Fairlie, Jones and Allman. Front - Judge (with winning model) and Greenhalgh.

CONGRATULATIONS!

Farewell and congratulations to the British Team! You won the Wakefield Cup in fair competition and thus accomplished your immediate mission. But you did more than merely win the Cup, you captured our admiration and affection. You made us happy to have been privileged to compete with you. It has been an honor to have met you and formed personal friendships with you. You did much to benefit model aviation by making a journey to our country. We are certain that your visit will have a lasting beneficial influence.

We are glad that you came to America. We hope you will come again. We look forward to next year and expect to have a team from this country in your Wakefield Contest. May our team leave behind them as good an impression as you and your companions left with us!

MODEL AERONAUTICS

MAY, 1937

15 cents

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IN THIS ISSUE—

**Five Plans:-
Indoor, Glider
and Gas Models**

**World Wide
Model News**

**Experimental
Data**

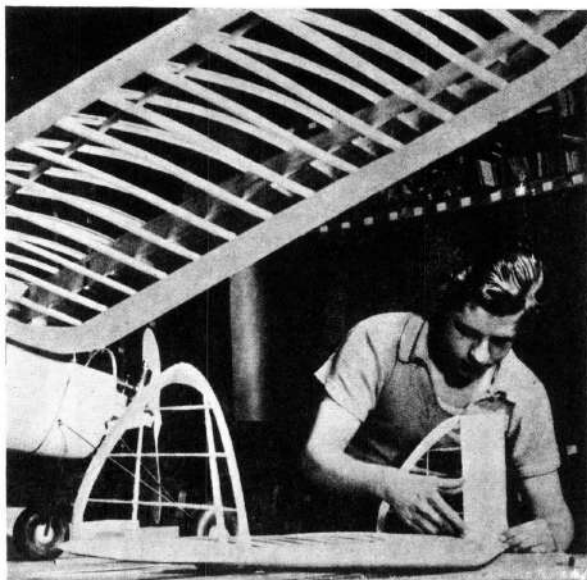
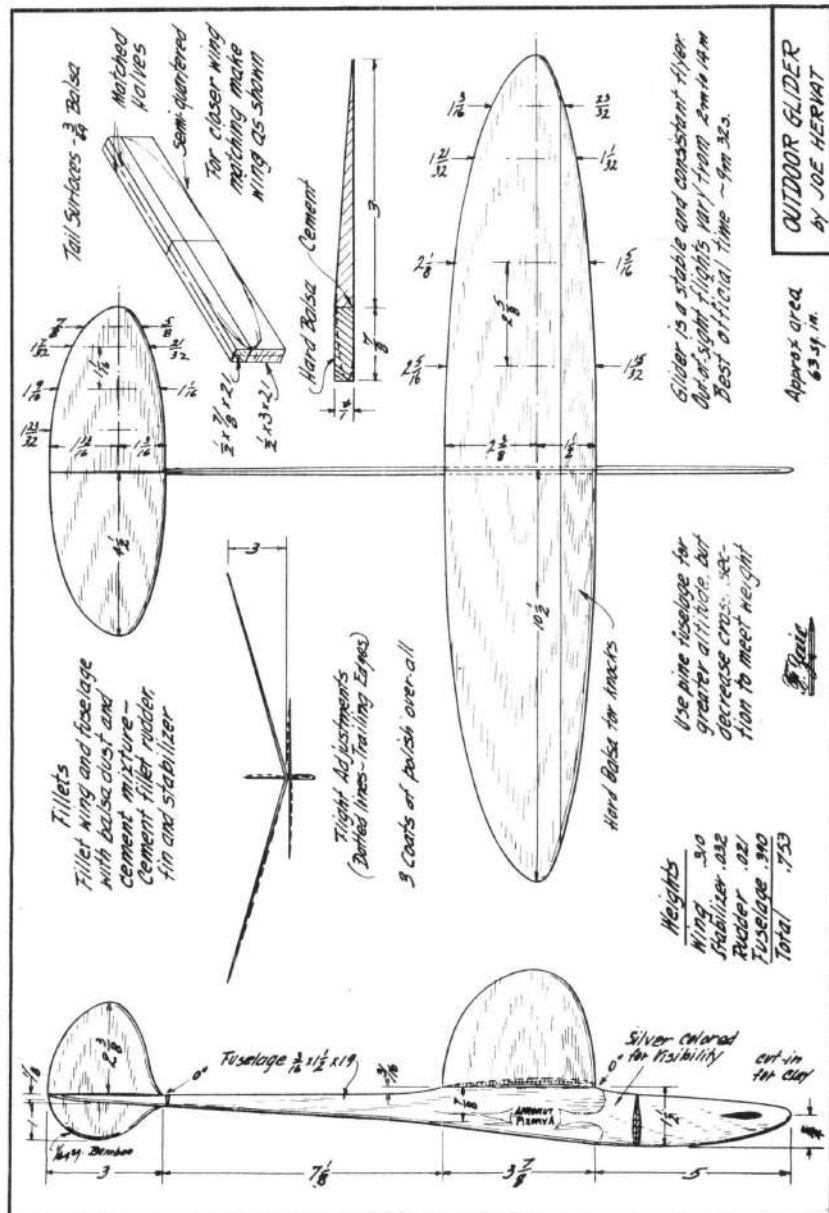


PHOTO BY W. FARYNK

Devoted Entirely to Science of Model Aeronautics



MODEL AERONAUTICS

VOLUME I
NUMBER 1

Edited by Frank Zaic
Published by MODEL AERONAUTICS PUBLICATIONS

MAY
1937

N. A. A. IN MODEL PLANE ACTIVITIES

The National Aeronautic Association has finally declared publicly that it assumes full responsibility for promoting and conducting our annual National Championship Model Plane Meet. In the past the N.A.A. was satisfied to have the Meet promoted and managed by private individuals in the name of N.A.A., the chief requirements being that the N.A.A. contest regulations should be observed. Under the present status N.A.A. assumes a new responsibility.

During the time that the game was struggling along, being tenderly nurtured by its friends, the governing body was content to let others carry the load. Now that the infant has grown into a lusty and interesting child, we find the former somewhat disinterested N.A.A. suddenly so very much interested that it is seemingly endeavoring to take our youngster away from us. We think the model game should by every right known continue to belong to those who have for such a long time given it the necessary attention and care that has brought it to its present place of importance. We believe this can be accomplished if all of us will pull together as a united group and show the correct attitude of leadership and constructive attention. We hope that the N.A.A. intends to let us do this.

It is not generally known among the model plane fraternity that practically all of the past work in its burdensome and thankless details was done by unselfish individuals in the name of N.A.A. This was at a substantial financial profit to the N.A.A. which of course was a financial loss to the individuals concerned.

The nationwide organization as regards memberships, dues, chapters, etc. for the Junior N.A.A. is out of our hands. These matters are decided by the N.A.A. policy which has always been very flexible, possibly even unstable. We hope that N.A.A. will be able to give its Junior members enough in practical value to justify its active participation in the Junior field. We hope that we may be called on to assist wherever possible.

The future of model plane development depends largely on what the experts can and will do for themselves. Our own separate and independent organization is clearly necessary. We can't in good conscience wait for other to carry the load for us and still expect to have our interests managed to our liking.

The group of sincere experts who have so long held the sport together and made America the World's leader in Model Airplane performance will continue its active forward-looking program. We laid the foundation for our own separate organization in 1925 at St. Louis, and consolidated it in 1936 at Detroit, giving it the name: "AMERICAN ACADEMY FOR MODEL AERONAUTICS." Our next step is to further strengthen our position by construction conferences during the 1937 National Championship Meet.

NOTE: This editorial was prepared by Lt. Alden while aboard a Navy receiving ship stationed at Brooklyn Navy Yard. ---F.Z., 1930

MODEL AERONAUTICS SCIENTIFIC NEWS

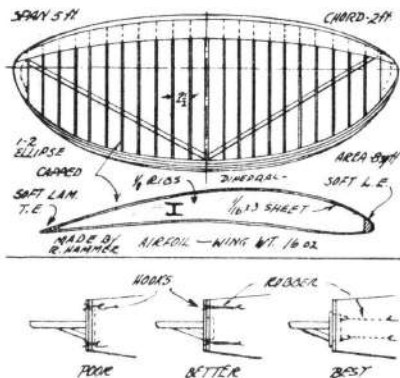
The progress of model aeronautics seems relatively slow to those whose horizon is limited to the local efforts and to one or two magazines. But those of us who have an opportunity to review foreign magazines and correspondence, realize how much is being done to advance the Science of Model Aeronautics. Countless number of excellent ideas have been forgotten because they were confined to a local group. We hope that you have all made a habit of keeping a notebook of bright flashes.

With so much model material passing through our fingers we simply itch to start a digest of model material which is being printed throughout the world. However, such a dream is hard to realize as we would have to print a book every month. The best we can do at the moment is to give you few high lights of what it is being done.

National

Boston wind tunnel is slowly nearing completion. The tunnel proper, propeller and motor connections are all finished. Hewitt Phillips is finishing the scales. It is hoped that the boys will exercise sufficient will power to complete it this summer. --John Stokes also report a tunnel under construction. Roy Marquardt will try to start his class again in wind tunnel construction.

A letter to N.A.C.A. inquiring for low speed test possibilities brought a reply to the effect that although some of their tunnels are good for low-speed runs, the existing balance equipment is not accurate enough to measure low forces. It is possible that later on some of the educational institutions will make low speed investigations.



Free flight tests were made by John Zaic and editor in separate tests. Both experiments showed Clark Y as having the best L/D. However, the loading was less than the present weight rules which may account for the results.

Several tests were made on Bowden detachable engine mounts. It was found that bending moments have to be small, and that the rubber must have about 3 inches of play. Large bending moments and short rubber lengths resulted in damages similar to motor mounts integral with the fuselage. This assembly is worthwhile trying.

Another interesting test made by the MODEL AERONAUTICS LABORATORY is the Low Aspect Ratio Wing for gas models. The general outline is shown on the drawing. The purpose of the test was to find out if it is practical for model work. This design permits large area with minimum weight as well provide simple means of carrying the ship

The results were very encouraging. The model was stable even when the wing was used on a normal fuselage and tail. The adjustments were very generous as it is hard to stall such a wing. It goes into a mush instead of a sharp drop. The glide, because of the low wing loading, (and possibly because of a larger chord which influences more air per area), compared favorably with standard designs. On one occasion it flew when other ships were smashed or grounded because of high winds. The short span makes light construction possible as the inertia moments are short.

At the moment there is considerable amount of propaganda being spread about the dangers of flying gas models. It is therefore desirable that we design gas model with lowest permissible wing loading as such models will fly slower and have less mass inertia. The Low Aspect Ratio Wing offers this opportunity. It is hoped that more builders will try it.

GREAT BRITAIN

In the days gone by, England was quite an influence in the model world. But since 1927 the Americans undoubtedly caused most of the design changes. However, the English are coming again into prominence, especially since their designs have been thoroughly belanzalized. For some strange reason, the thermals are getting more numerous over the English countryside and numerous models are lost. It may be a freak in atmospheric conditions but we still remember how we were envied for our Yankee wea-

ther. We might mention that their designs are now following the high powered formula which might account for the results.

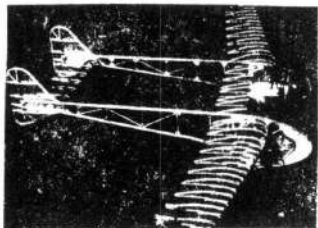
Their activities have been greatly increased by appearance of two model magazines. We are almost tempted to say that these magazines measure up to ours. We like them as they have more personal appeal by inclusion of letters and other things dear to the hearts of model builders. Lack of general aviation news is not missed a whit.

The English lads have actually gone one better on us. Mr. D.A. Russell has made a windtunnel, and is now conducting tests. He is making valuable contributions in simplifying theory for model use, and the editor agrees with his views. It really is a pleasure to see such data in model magazines. We wish we had it in our early days. We hope to see Mr. Russell this summer and have a powerful powwow with him. It would be grand if we could obtain a summary of his findings for the Year Book.

GERMANY

For some reason or other, balsa is used sparingly in Germany. This lack of balsa has brought about interesting constructions. The normal model is of spruce or similar hard wood and plywood, sectioned and hole-lightened to a large degree. They also developed metal framework construction which is marvel of metal work. The special sections are all homemade with a combination of which will do almost everything. The photos show sample of their work.

The building interest is centered mostly in gliders and fuselage models. The gliders have spans anywhere from few feet to ten with comparatively high loading. The high wing loading makes them fast and the results are comparable with full size gliders. Their designing influence is felt in most of the surrounding countries where weather is unsettled and rough. We all know that heavy models have an easier time in gusts.



Metal Framework Case -
Model - --- Model - ---

Their model literature is more in the experimental side of aerodynamics, such as ornithopters, rotors, and the like. It seems that they consider model buildings a step towards full size ships, while we here hold model building as a hobby although a large portion of the boys do drift into aviation.



Radio Controlled
Glider - --- Blue Sport



FRANCE

France is steadily growing into greater prominence. They had a belated start but they are getting good. Their designs are influenced both by English and American models, but they are beginning to be on their own. With the institution of their International Contest their work is becoming known to others. This year's competition was won by our friend Mr. A. Vincere, against a field which included contestants from England and Belgium.

RUSSIA

Personally, we know very little about model activities in Russia. It seems that they do strong for large glider designs and fuselage models. A news release disclosed that they are planning mass production of small gas motors and models to go with them. We will undoubtedly hear more from them as soon as they send representatives to International Contests. Model building is taken very seriously there. It is already part of their regular school work.

Belgium, Netherlands, Italy and other countries are also coming to fore as indicated by the formation of a large number of clubs. It looks as though one of these fine days we will have model representation in the Olympics. This also presents a new problem as to what to do with all the world records that are claimed here and there. Federation Aeronautique Internationale has already taken steps to get an order for admitting model aircraft records. The first draft did not seem to be a good compromise of the various activities. It is hoped that this year a more favorable study will be made.

INDOOR CLASS "C" TRACTOR

By Edward L. Manulkin

For the past two years, my fondest hope and ambition was to be the first to enter that era of Indoor Model Building, which a thirty minute flight would begin. No doubt this dream, as was thought, entered the minds of most indoor flyers, at some time or other, but was passed off as pure fantasy. However, we are now at the point, where the thirty minute flight seems imminent and in my opinion it will probably be made this coming season in some huge airdock as Lakehurst or Akron.

The plane which I had in mind encompassed most of the indoor developments to date. The wing at the first glance seems to be an ellipse, but a close examination however, will disapprove this fact. The reason for this difference is that somehow practically every elliptical wing I have seen to date had an uncontrollable tendency to washout. The outline shown does not wash-out readily. The fairly high aspect ratio made it possible to spread the area out generously to a 37 3/8" wing span. A very slow turning 15 1/2" diameter propeller and a strong motorstick made up the salient portion of the design.

Before actually starting construction, let me point out a few things. The wood must be the lightest possible. To secure it may be a bit difficult but have patience and you will be well rewarded. Make sure it is free of knots and worm holes: (mineral spots which are usually prevalent in very light wood, do not harm anything but the looks of the wood. However, make sure that they are not knots). Also pay close attention to the different types of cut in the balsa. These are shown in a table on the plans. These play an important part in the structural value of the model.

First draw full-size plans from the sketch to work upon. Then select a piece of 3/32" sheet for the center section spars. From this cut a piece of 3/32" sq. x 15", taper and round as shown. Do the same for the tip spars. It is important that the airfoil is copied exactly, therefore, a full-size template is given. It may be transposed to a sheet of cardboard or aluminum and cut out to make the actual working template. When you have completed that, carefully proceed to cut 19 ribs 1/32" sq. from a piece of 1/32" C stock.

The elliptical shape of the wing necessarily means that spars must be curved also. This is easily done by drawing the spars through the middle finger and the thumb, applying pressure at the same time. In this operation the middle finger is held about an inch or so in back of the

thumb. In this manner all curved spars are formed around a hot soldering iron. Proceed as usual pinning the spars on the plans and cementing the ribs to them. In the taper cut 1/3 off the front and 2/3 off the rear of the total portion of the rib to be removed. Make sure that everything is lined up, the ribs vertical to the spars, etc. The end ribs where sections join may be bulged out to counteract the drawing tendency of the microfilm. The rest of the surfaces are built in the usual manner. Cover the wing in three sections, using apple green and wine red on the wing and slightly lighter film on the tail. The motor stick and tail boom are made from proper sized blanks and formed around a teardrop of proper dimensions. Make sure that the seams are straight and that both sticks are perfectly straight, neither drooping or otherwise. Carefully cap the motor stick and butt joint the tail boom on at the correct angle. It is important that this angle corresponds to the measurements on the drawings.

The propeller is always an important factor. However, all that can be said is to take plenty of time to carve carefully. Select a soft block and pay careful attention to the propeller layout. The camber is deep, also this camber is uniform throughout the blade and it measures 3/16" deep. It is made quarter-grained from a block measuring 16" in diameter. The finished prop is only 15 1/2" in diameter. Shape it carefully, and finally polish and sand with 10-0.

The model is very easy to adjust and within the space of a few trial flights it will be flying smoothly.

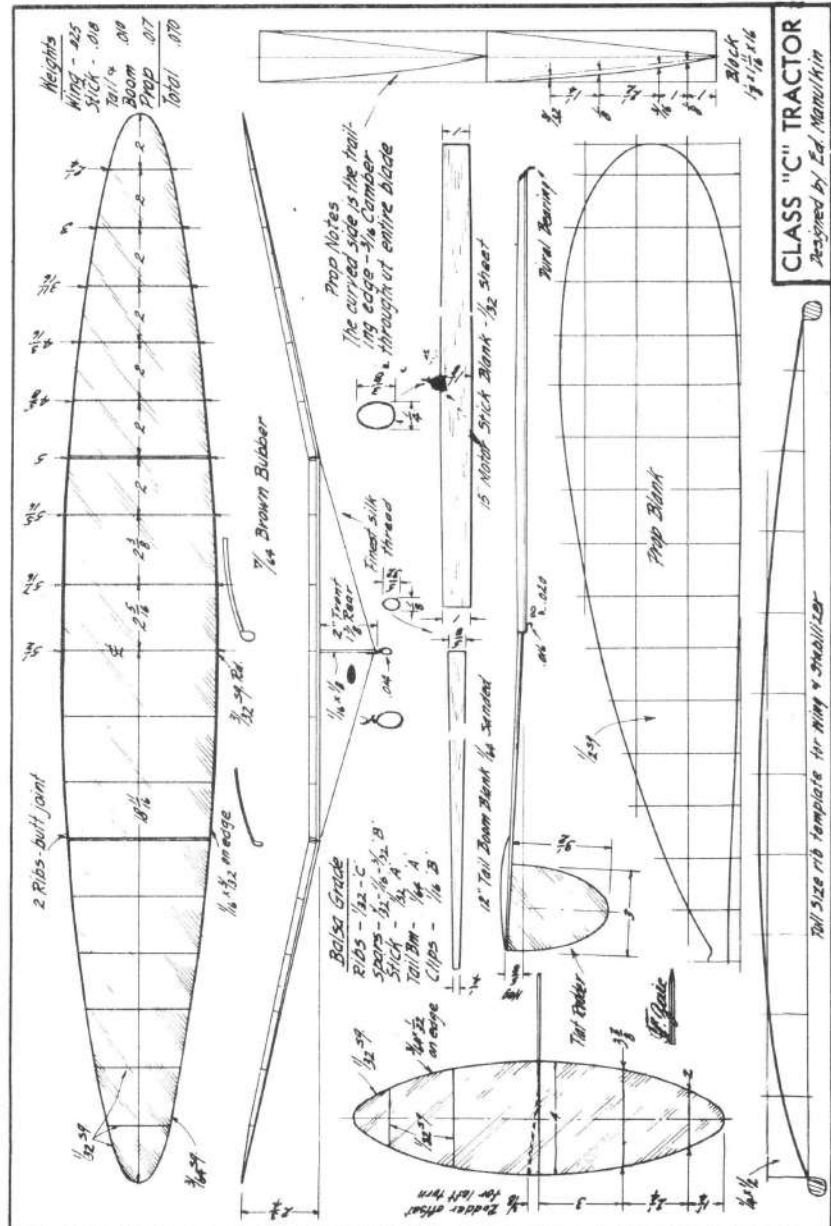
For armory or low ceiling places use a 26" loop of fresh 7/64" brown rubber. For altitude flying a 24" loop will suffice. Prewind at least three times.

The original took three flights at Lakehurst which were timed as follows.

Trial	Turns	Time
1	1200	15m:31s
2	1500	19m:45s
3	2200	21m:29s

In the last trial it was caught on the top of the Los Angeles about 100 feet up. Modellists who witnessed this flight agree that it would have flown 28-30 minutes if it had not been caught.

In conclusion, I can only state a self-made proverb: "Spend time on your model, and your model will spend time on you."



THE STREAMLINED CYCLONE

By Bob Jeffery

This model was developed as an experiment with streamlined gas models. This accounts for its small size. The Baby Cyclone proved to be too fast and powerful for the ship, making it rather hard to adjust and fly. With the motor turning about 2500-3000 revolutions per min. the model flew at about 20 miles per hour, gliding at 10-14 m.p.h. When first built, the wing was warped, causing several crack-ups before the trouble was located. On the initial hop the wing folded in the middle at approximately 250 ft. of altitude. The model dove in with only half of the wing. However, the only damage was to tear off the landing gear and break the front

bulkhead. The motor had a few repairs also. The great strength of the balsam-covered body was proven by this crackup.

Under power the model circled tightly to the left, gliding in a shallow right turn. It climbed at approximately 500 ft. per minute. On its last flight it flew for 15 minutes, with initial power run of 6 minutes on 3/32 ounce of fuel. It was lost because of lack of roads to follow it. When last seen it had about 300 feet of ceiling. The above flight was made on February 9, 1937 with fair weather but choppy wind.

The large 9" pitch 15" diameter propeller was used to slow the motor down as very little power was needed to fly this ship. I would suggest using the recommended propeller for the Cyclone if the new "D" series is used which can be slowed down with timer.

FROM CALIFORNIA

By Elbert J. Weathers

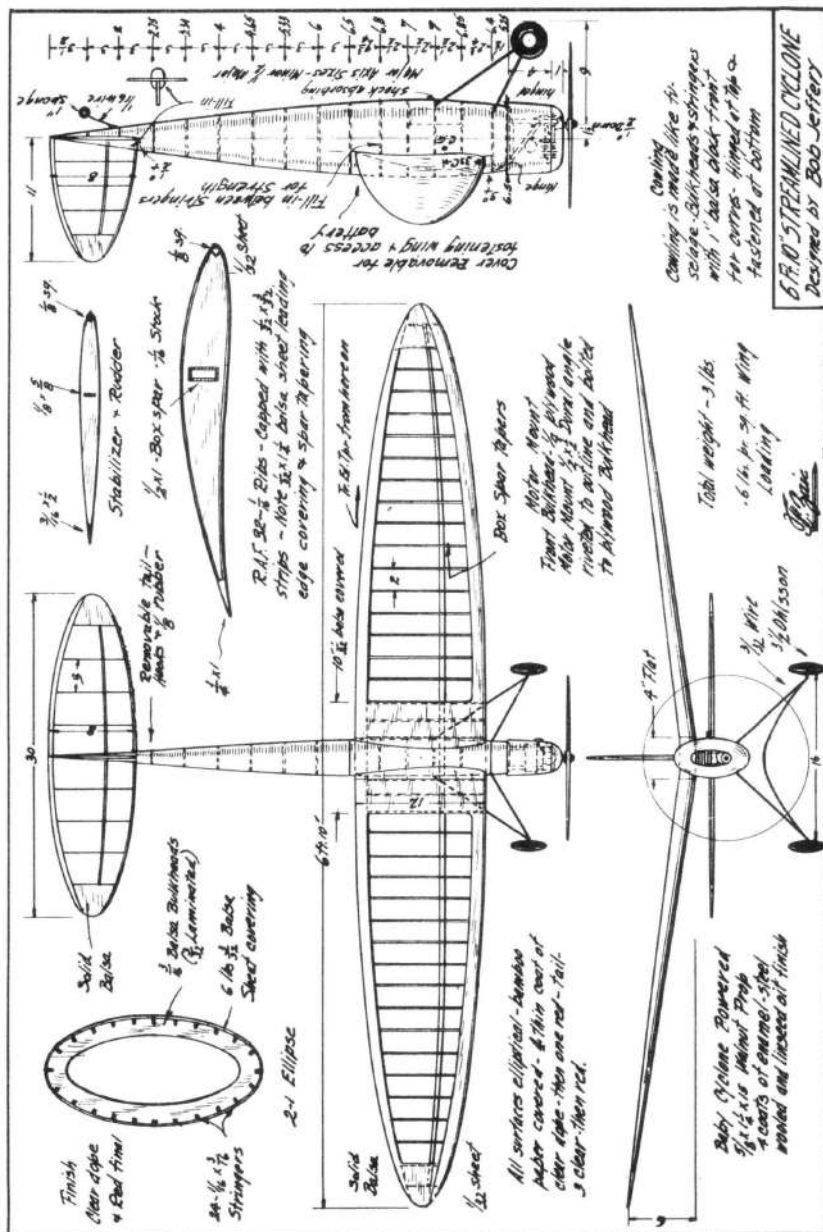
My new gas job, of which I sent you a photo, is covered with bamboo paper, which is, incidentally, lighter and just as tough as the customary bamboo paper, and I buy it right here in San Diego's China town at 2¢ a sheet. The covering has two coats of brushed nitrate dope (clear) first, followed by a primer coat (sprayed) of aluminum. Then two sprayed coats of white pigmented dope were applied, with brilliant red trim added with a brush. I would like to tell you about my method of doing such type of painting on a gas model, or any model for that matter. This method insures a clean-cut line along the edges for the trimmings. One merely uses the colored dope in a large drafting pen, outlining all the areas to be trimmed in. The rest is then filled in with a brush. Another kink which was used on this gas model is that of using shellac on all the structures on the nose of the ship to protect all cemented joints from the fuel, which seeps back to some extent, behind the firewall on almost all jobs.



I wonder what your opinion might be regarding the "precision-type" of contest? We builders here on the Coast have pioneered it, we believe. I think it advances the design and workmanship of gas jobs much better than the customary duration meet.

Thermals

The precision type of contest is very good for local meets, especially where an audience is present. It undoubtedly calls for considerable skill and knowledge to meet the exact requirements, and Lord knows that some of us are pretty careless with gas model construction. However, for the National Record list, the fairest and the simplest, is the fuel allowance. This system, to our opinion, is the most impartial. It provides incentive to have the motor running most economically, design the models with minimum resistance for slower revolutions per minute, fairly strong models to obtain extra fuel, and the most important point; simple method of comparing National Record list. The cubic-displacement rules governing the automotive racing is just another way of using fuel allowance. It is the policy of those of us who have a hand in framing the rules and contest regulations to keep them as wide open as possible. We know from experience that it is only by farsightedness of some of our leaders that we are not cluttered up with detailish and specific rules. The fact that our rules are accepted almost universally is a good proof of our fairness.



YOUR FLITTING AERONUT

Roy Marquardt

TOURIST CAMP, SAFETY HARBOR, FLA.
February 3, 1937

Don't worry too much about missing out on your sunshine. It has been raining steadily for the last two days in the sunshine city, of the sunshine county, of the sunshine state.

I have a case of something or other supposedly affected by sunshine only, which accounts for my knocking off school for a year and in the company of my mother touring the South. Incidentally, it really isn't expensive, we are living on about sixty dollars a month. The only drawback is trying to build gas jobs in a house trailer.

There is no doubt that we need a good technical paper. I should think that one important feature would be an up-to-date list of coming contests. I personally would take twice the number I do, if I knew where and when, and I think lots of others are in the same fix. By all means get lots of ideas no matter how small. We would be much further along with our hobby if we weren't so selfish—and laziess can be our only excuse in the future because we're sure to get more out of co-operation than selfishness.

Could you use an article on model instructions? I think that lots of the advanced builders are earning cash by teaching aviation and the business could stand a little coordination. I've taught aviation for about eight years. It paid most of my college tuition last year.

February 10, 1937

As this is another glorious sunshiny day and I cannot get out of the trailer without getting soaking wet, I might as well finish this correspondence.---I'll start with gas jobs. Although I built my first gas job only last year, I've since supervised construction of 3 K.G.s, a Miss America, and have had time to build a California Chief and a Red Zephyr.

I've found that most of the trouble develops in test hopping and electrical hookups. I believe that the graduate glide method is the best. Final glides should be made from heights of at least 20 feet so that all "anti-level" tendencies are given time to develop. If power hops of seconds are then made it is next to impossible to crackup because a good glide is assured when power cuts out. All electrical connections should be made with great care. A prop spinner with cowling streamlined into it is a great help in keeping dirt from the points besides making for cleanliness of lines. By all means use external starting batteries. The light

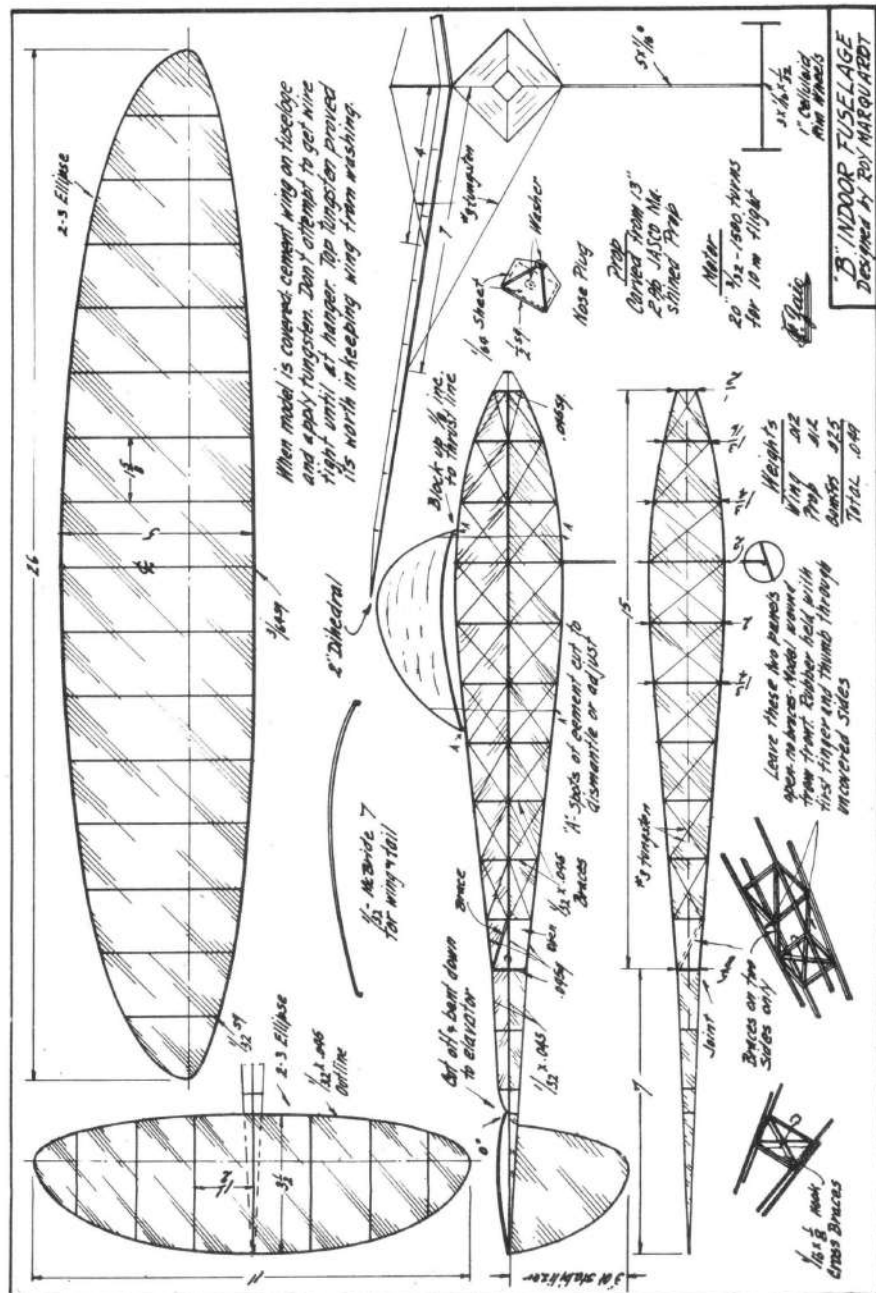
test practical "jacks" can be made by tearing apart old radio tube sockets. A super light switch can be made by discarding the mounting on the small knife switches and mounting the parts directly on the ship. A neat arrangement combines socket and switches on a piece of birch plywood just under the wing.

Instead of running rubber from the wing under the fuselage, mount hooks near the top of the body to catch rubber. This saves on the amount of rubber used and leaves only the rubber running with the airstream which reduces the drag of this type of mount to practically nil. For short test hops keep gas in a bottle with an eye-dropper mounted on lid. (Obtained from druggist, or from discarded nose dropper type of medicine bottle.) This eliminates the possibility of dirt getting into the gas due to a funnel or eye-dropper dropping in the dirt in the excitement.

I've found a finish which I think far outshines the finishes generally used. The secret is all in a straw hat dye sold at most drug stores. (Trade Name is Colobrite). This stuff has a very high gloss, every bit as good as the best enamel, and yet is highly transparent. Best of all is that it is very light being a dye rather than a paint. Yet it has body enough to fill silk. It soaks into doped surfaces making them softer and less liable to split. I find that a glossy black wing and elevator, and a red fuselage and rudder combination is very good for visibility against sky and trees.

The following letters were simply filled with more first hand information on every type of model design, indoor, outdoor, and gliders. At the moment he has just perfected a push-puller that gets 3 minutes on 500 turns and which on final test with 800 turns got up to 500 feet under power in about 1 1/2 min. (Checked against a training ship.) Starting to come down it caught a thermal, and poor Roy had to hot foot for about two miles where a palmetto swamp stopped him. Not that he minded getting wet, but it seems that Southern swamps are the best place in the world for certain creatures. "With almost tears in my eyes (or was it sweat) I watched it disappear at an altitude of 900 to a 1,000 feet, until it was lost after a 21 minute flight."

"This particular model is weighted up for new contest rules. Two days later I finished another one. After two glides, I put on 600 turns and the crate ticked off 15 minutes. After that I decided I've better make no more tests if I want to enter the contest here." Complete data on this new and sensational and revolutionary design will be found in the next issue: also further ramblings with our Flitting Aeronut.



AROUND THE WORLD IN 15 MINUTES

Wakefield Notes

The official rules for the Wakefield Competition are by now well known. The general contest rules are as follows:

Individual flights of five seconds or under not to count as competition flights.

If two or more fuselages are employed, the total cross section area must conform to the $(L/100)^2$ formula.

The time of any flight shall terminate when the machine touches some solid object or passes out of sight, the time keepers remaining at the point from which the machine is released, and no attempt shall be made to follow the machine by any means whatsoever. No optical devices such as binoculars, telescopes or coloured glasses shall be used to observe the machine in flight; the out of sight rule being solely dependent on the time keepers unaided eyes. No notice shall be taken of remarks by onlookers as to the visibility on the machine or termination of its flight.

Harry York, London, writes: "With regard to Fairley's, the lay of the land is trees and trees and trees, and rivers and rivers, with few odd church steeples thrown in. All jokes to one side, I should say that Fairley's Aerodrome is about three-quarters the size of Wayne County Airport, and about forty-five minutes run by car from the center of London. Our big idea is to get you in London and turn you loose to enjoy yourself while we run the competition, without your being conscious what is happening."

"I am very pleased to hear that you are almost certain of coming this summer. The S.M.A.E. is in a bit of a quandary at the moment, as to how to entertain you fellows on the same regal scale as you did us last year. Besides the International Petrol Competition for the Bowden Trophy, we are trying to run a competition during your stay over here for gas models, the first prize being \$250. If I win that I will come back with you, & if you win it, perhaps you could stop over here a bit longer."

"Our Wakefield fund totaled \$2100. This covered the expenses of eight men, six contestants and two managers. We three, Mr. Greenhalgh Sr., Mr. Trevethick and myself paid our own expenses. When

we arrived back in England there was about five dollars left in the teams fund."

Thermals

We sincerely hope that the N.A.A. Wakefield Cup fund will succeed in raising the needed funds. The minimum needed for a team of six is about \$1,600. In case the fund does not reach this figure, we will have to be satisfied with as many as we can send. However, it seems that we American do things on the spur of the moment and it is quite possible that our doubts are baseless. In the meantime, won't you try to help swell the fund with your contribution? You might be one of the six, and just imagine how you would feel if you were the fifth and only enough funds for four! (Send funds direct to N.A.A.)

London, England

Since writing last I have raised the British indoor record to 18m:52s officially with a Class B tractor. At present I have just made one with full 150 square inches with which I hope to obtain some real duration. We shall soon be challenging your own records.

Harry York has been taking some tips from your supply companies and is now stocking indoor balsa and has his own microfilm solution which is very good. However, I have been using a solution made from a formula that Lawrence Smithline gave me.

How are you getting on with your Wakefield job? I have just finished mine. It is all monocoque. I suppose you have received the full details by now, i.e., total minimum weight 8 ozs. wing area 190-210 square inches.

---Robert Copland

Thermals

A few years ago we were led to believe that facilities for indoor flying were scarce in London, but we knew that sometime or other the do-or-must do spirit would overcome this minor obstruction. We are glad to read in "The Model Aeroplane Constructor" that "The first indoor meeting showed that Albert Hall is an ideal place for such events. Mr. Copland was not so happy when his plane landed on the organ." All the ear marks of a new virus. Might

AROUND THE WORLD IN 15 MINUTES

mention that admission to the hall was only by a ticket. It seems that they nipped in the bud the rough-house antics that so often spell the end of our armories.

Indoor duration bores a well known British modelist. "It is true that duration is the easiest to compete, and therefore most popular. There are even less snags than when flown outdoors, but after years and years they are inclined to become boring, so I am trying to develop other competitions in place of fewer duration." Then he goes into a description of pylon racing with the models attached by a thread to its rotating top. "Will our British fellow indoorist take care of this lad?"

Auckland, New Zealand
February, 1936

I am sending a model for the "Moffet" contest this year. Might put a 1" diameter tube down the center of the fuselage, just in case the lads in the U. S. A. have trouble with the rubber. I can't imagine 18 strands of 1/8" breaking without doing any damage. It will not add very much weight and it will give the chap who is winding more confidence, hence more winds, more winds more power, more power the greater the climb, greater climb, the greater are chances of losing a model in an upcurrent. Oh yeah? Don't take any notice of me. I'm mad, in fact I am just getting over a wild night out. Hence the shaky writing. Boy, am I seeing spots! The girl friend says I made a fool of myself last night. But who cares, I enjoyed myself! Whoa! I am getting away from the subject and we were talking about planes not dames.--I've just finished reading the book on the "Le Pou". You know that contraption of a Frenchman. Boy! He is a bit of a lad on the border line of being a genius. You know what a genius is; about halfway between a crash and the Wow-House!

March 12, 1937

Thanks for the congratulations for winning the Moffet. She must have sat on a bumper of an upcurrent. I've just finished this year's "Moffet" tub. Area 137 $\frac{1}{2}$, span 36", cleaned up considerably. I am also beginning to work on a Wakefield model for 1938. Actually I am more interested in gas models and indoor flying. No bad in one way as no big halls have been grown in New Zealand.

--Vernan Gray

Thermals

We are at loss for words! Guess we better step out tonight as we went to win the Wakefield badly. Seriously, Verny is a practical builder and he is one of the New Zealand leaders of many years standing. An enclosed photo shows him holding the Trophy and his face simply beams with a happy smile. We sincerely hope that late Moffet rule changes will not handicap you too much in defending your position. (His 1937 job is lined up for the 1938 Year Book)

"Xenia", Plumstead Cape, South Africa

It gives me great pleasure to drop you a little information of model activities in South Africa. At the moment there are two distinct clubs starting all over the Union. One is for the miserable scale jobs that sometimes fly by accident. This section is being run on business principles--plenty of profit. The other section "Pure Flying Machines," is the real thing of this section. I am the Squadron Leader for Cape Wing and your new acquaintance Mr. Lilly is our Wing Commander. He asked me to answer your letter as he is very busy and lazy, or so he says.

I have several model experts here who would give the American experts a real tough time in contests. Watch out for our entries in the 1937 Finals! We are able to design our own planes for our own conditions, and have had good results. Only yesterday I lost my latest design G4 after 17 minutes, 2,000 feet up. My G3 as built by one of the youngsters recently did 14 minutes on a vertical thermal up to 1,500 feet, and she alighted only 400 yards from the take-off point. The South African records, all held by old Lilly (nearly 60 now!), are as follows:

SAILPLANE (Bob Fife design) built by Lilly, flown by Plessis--53m
FUSELAGE--30 min. (watch stopped)
GAS MODEL (Cyclone)--20m into clouds

Truly a good record maker but he has gone crazy over my G4 as she climbs vertically on a 13" diameter, 13" pitch propeller, turned by 12 strands of 8/16 flat rubber. The first 300 feet just take 30 seconds. Mr. Lilly has exchanged an Elf powered gas job complete for a model built by myself to the G4 plans! His opinion is that if he can get such efficient results from rubber then he is dropping gas power as it entails too much trouble. But man! If you chaps from America could see where he gets his records then I think you will understand that conditions are very largely his mainstay.

AROUND THE WORLD IN 15 MINUTES

There are several builders here that would appreciate letters from American Experts, that is, from those who would be willing to exchange ideas. I might mention that scale model builders drop their jobs when they see a pure flying model do its stuff. Unfortunately indoor flying is out of question as our buildings are not suitable for it.

Good luck old man. I am starting to write a book on propellers from A to Z, but it is going to mean some work. This is for use among S.A.M.A.C. (South African Model Airplane Club) members.

V.C. Gracie

Thermals

It seems that we Yanks have firmly lost the "Hot Air" (thermals) monopoly. However, we are told that Texas has real whoppers which have to be explored before long.--We are writing for some of their models for the Year Book collection so that we may see just what they have. Mr. Lilly must be a grand guy to keep up model work for such a long time. Wonder what we will be doing when we get to that age. Couldn't we somehow form a 60 club now? How about having a pow wow in 1975 on the 200th floor of the International Aeronautics Building, 83 East 10th Street? Won't you all remember this date? We certainly would like to have a try at your up drafts, Mr. Gracie! In the meantime, some of you can get a personal description by sending your name and address as a correspondent to one of the lads way down the Cape.

Paris, France

Monsieur P. Cartier, president of the MODELE-AIR-CLUB de France sent us rules governing their international rubber powered model contest which will be held on May 16th. Since this date has by now passed, we cannot send American entries for the 1937 meet, but we can remember to prepare for the 1938 contest. The 1935 meet was won by G. Dubois, Fr. and in 1936 by Mr. Liggett, England. It seems that 1936 was a regular landslide for the Britishers. So, boys get to work, or they might begin to think that they are almost as good as the Americans.

The rules for the Internationale Coupe de France are as follows:

Wing area: 13 dm² plus/minus 5%.
(L/100)² fuselage cross section.
Minimum weight: 10 grammes.

Tail area not to exceed 33% of wing area. Average of three flights to count. These rules for the 1937 meet. 1938 rules will be announced later on during the year.

The French Club is very active in scientific and contest model work. Although they had a rather belated start in this field, they are coming up fast. Their monthly bulletin is a real revelation of data, news and plans, and it undoubtedly is responsible for the continuous and increasing interest in the model building in France. We will have more news from them as Monsieur Guillemaud has promised to be our official correspondent for France. Luckily, he can write his reports in excellent English so that we won't have to guess what "supérieurs, boulenées, alle and etc." mean. (Incidentally, keep on plugging at the foreign languages as you can never tell when you will need them.)

Galt, Ontario

Work and dentist cramping my style. I hope the teething will not affect my eating. Imagine saying "No" when they pass the chicken.--Quiet up here, but there are going to be plenty of activities by the end of the month. Jim Haffey doing splendid work. If he would only take it a bit more seriously, he would go places. Toronto boys have armory practices Friday, but I don't know for how long as they make a gas job session out of it. Remember when a couple of lads in Guelph, in a moment of carelessness, let the ship take off and demolish itself against City Hall auditorium. Enclosed find sketch of a small outdoor tractor I made for a friend's kid. It is an excellent performer as it got flights better than 3 minutes in zero weather. See you at the Nationals.

John T. (For Thumb) Dilly

Ed: See next issue for tractor plans.

Indianapolis, Ind.

Rubber model support waning. Almost all open class boys swinging over to gas models, and of course discourage the up-and-coming youngsters. Had a successful gas model exhibition. They go so far as to use prop wash to clear indoor ships from girders.

Jim Cahill

AROUND THE WORLD IN 15 MINUTES

Detroit, Mich.
December, 1936

I suppose you've noticed the change of address. I left Kenosha about two months ago to make good in the big city. I just got a job with Henry Ford. It came just on time as I was beginning to have doubts about my future in Detroit.--I met Mike Roll, and I am now helping him prepare his little engine. It's a honey of a job, and I hope that he can market it soon. He is going to try to price it as reasonable as possible.--Thanks for your advice as to my staying out of the building game. You should know what it is all about by now.

April 24, 1937

It is high time I get to answer your last letter. I have been unusually busy for the past few weeks, in fact, work has tied me up so tight at present that I believe that my last model has been built. Believe me, I've looked forward to this year's Nationals for a long time, since 1927, when I entered my first contest and placed 3rd. I had hopes of finishing ten years of model competition in a grand style. Now, that I am on my own and out in the world, I find that making a living is far more important than satisfying a childhood ambition. You couldn't really imagine how badly I feel not being able to build models anymore.

Of course I expect a few weeks of slack, but that will be so close to the contest that I will be unable to accomplish a fair entry. Even though I might have time, I haven't got the facilities. What a life!

At present we are very busy at the Lincoln Zephyr plant. I received a slight raise and was promised another after 6 months which is coming to pass this June. Although I get a very nice check, I still have an urge to drop everything up here and return home (Wisconsin) and build models. I am really desperate!

Joe Hervat

Thermals

Most of us who have passed the twenty mark can remember those trying days. There really is only one choice that of building up a future for oneself. Model building is a very fine hobby, but it should not interfere with the normal growth of personality. It is undoubtedly greatly beneficial in stimulating concentrated thinking, self-reliance and fellowship. The job-

by is very good for the take-off into future endeavor. But if you hesitate by burying yourself in model work, part of you never grows up and somehow one has to make a greater effort later on to carve a place in the social world. It is no fun being a "social outcast" as our civilization is based on mutual interchange of friendliness. So, Joe, if you can't find time to make models after work, simply try to be with us at contests. We find it quite satisfactory to play the role of a "kibitzer" and simply build our ships in talk. Some of us who are getting a bit tired of building models find model talk very stimulating, especially when aerodynamics sprout up. It just occurred to us that it would be a fine thing if you could organize the Ford Model Aero Club. You can never tell how much of a privilege you could command of you have a heart to heart talk with Henry. If you do find time to see him put in a good word for us. Also always remember, "Once a 'nut, always 'nut."

Pittsburgh, Penna.

I have a suggestion to make. Your policy of straight-forward talk might be carried out to a great extent by giving the absolute truth on several motors now on the market. The sale of these motors to inexperienced novice builders is bound to tear down the work and overshadow the possibilities in owning a good motor than anything I can think of now. You and I know that these motors are of no use whatsoever even to an old hand at gas work, and to let a boy or a man invest in one of these as his first attempt is practically suicide. Is it possible to come right out and warn people of these frauds? Your "No advertisement" policy may permit it.

Thermals

We regret that we are unable to do anything about the glib and super-super-ace-of-perfection write-ups on mediocre products. Most advertising is prepared by professionals who have little technical knowledge--just the idea of selling, regardless.--One solution is to have the advertising mediums establish a minimum quality requirements. Another step would be to set up integrity experimental station where new ideas can be tested without bias. The results to be released to the boys to guide them in their purchases. ----- Gentlemen, the matter of setting fleece is in your hands!

THE SAGA OF JOHNNY BOLD

T'was in the wee hours of the morn
When Johnny Bold gave commands
to wheel
His Super Soarer 30-1 to the hill.
It was sight to see him zoom into
the skies!

But our admiration soon changed to cries
As we saw the rear struts come
tumbling down!

We watched with open mouths, ex-
pecting anytime
The slow disintegration of the 30-1.
But nothing happened to the pilot No.1
Blissfully unaware of the coming crash
Piloting his ultra-super-modern 30-1.

The trailing edges vibrated like reeds,
And prayers for his safety were said
in all creeds.

By golly! The wings on the fuselage
remained

As Johnny Bold straight for a fluffy
cloud aimed.

He never reached his goal underneath
the cloud

Because the soarer was above the cloud
When he arrived where the cumulus
had been.

Flying after that had to be seen
Or the story teller would be
termed screwy

For telling a soaring tale so woozy
About Johnny Bold and his Super 30-1.

At about ten the soarer was out of sight,
And from watchers on the hill
came a sight

Of sorrow and sadness to see Pilot No.1
Playing with Lady Luck in his Super 30-1.

We thought it was a matter of time
Before he would check in his time.
The day passed with nervous wrecks
everywhere.

Then weeks, then months without a sign
nowhere

Of Johnny Bold in his Ultra-Modern 30-1
Until one day in the Year of 1941
A stratosphere balloon found Johnny Bold
Playing with the incoming terrestrial
bolts.

They tried to tow him down by valving
out helium.

But of no avail, and all they could say
was helium.

They kept on valving until the bag was
draping.

And not until then did the gondola
begin dropping.

It was a queer sight way up in the skies
To see the sphere suspended by the stays
From Johnny's Ultra-Super-Soarer 30-1.
When they finally reached the terre-firm
The anchored the 30-1 good and firm.

When asked for an explanation of the
strange behaviour

Johnny Bold told his friends and
neighbors

That it must have been the Katzmayer
effect thing

Which gave his Super-Ultra-Modern 30-1
something

That made him independent of the measly
thermals.

It seems that when the struts and the
wings parted pals

They started vibrations in the wings

Which set up a peculiar aerodynamical
means

Of powerless propulsion to wherever
he pleased.

He kept mum of how he kept up the
vibrations.

But I surmise that his teeth in fear
did chatter

Providing plenty of the Katzmayer-
Effect vibrations!

ADDENDUM

We regret that this first issue is
behind schedule, but circumstances would
not have it otherwise. As we mentioned
in the circular, the issuance of this bu-
letin depended on the response. The re-
sponse was small, 74 yearly subscription
and 97 single copies. This is rather a
discouraging number to work with, but
since we had an idea we felt that we should
issue one edition for your approval.

At this point we would like to thank
those of you who did response, and we
trust that this fills the expectations.

Our idea is to write more on the
personal and scientific side of the hobby.
Our world wide personal correspondence &
perusal of foreign magazines provide us
with inexhaustible source of material
which we would like to pass on to you.
We are literally saturated with model in-
formation and we would like to spread is

as much as possible before the hand of
Fate leads us into other fields of endeav-
or. We hope that you will find this
bulletin a needed addition to your read-
ing. If you like the style, and the idea
itself, won't you please spread the gos-
pel so that we can eventually put it over?

The small paid circulation made it
impossible to obtain outside services,
necessitating the writing, setting-up,
editing and mailing of the edition by
one man in his spare time. Since this
person is going on a prolonged trip it
will not be possible to delegate the job
to someone else. Therefore the next is-
sue will be out in October with inside
information on how they do it abroad.--
It is hoped that by then the circulation
will be more encouraging.--In the mean-
time, the balance of the subscription will
be refunded to those requesting it.--
So, until October "Bumier Thermals!"

MODEL AERONAUTICS BULLETIN is published every second or third month. Its purpose is to bridge the gap between the issuance of the Model Aeronautics Year Books. Also to voice an independent and an unbiased opinion of model builders.

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MODEL AERONAUTICS PUBLICATIONS

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In mid-1932, appraising the economics of the time, our parents decided to move the family to Europe, but my brother, John, and I remained here. John had just graduated from High School, and I was working in a patent drafting office and going to night high school. We were able to retain the kitchen and a bedroom from the original family accommodations at a reduced rate of \$16.00 per month. (No heat but had hot water.) In Fall, John also started to attend night high for extra credits. Both of us were deeply involved in building and flying models and going to contests. (Our first models were build in 1926.)

Later in the year, John suggested that we print a Logbook in which to record model flights; time and comments. Although I was keeping a Logbook, in which to record my full size glider flights, I did not believe that a Logbook for models would be a paying proposition. -- Luckily, John did not give up the idea, and talked to Jerry Kittel about it. He was all for it, and suggested that, besides having the ruled pages, the book should also include plans and hints. -- This looked more like it, and it was decided that Jerry would print the Logbook and sell it through his company, MODEL RESEARCH LABORATORY. I do not know how many 1932 MODEL AIRPLANE GUIDE & LOGBOOKs Jerry sold, nor what were the financial arrangements between John and Jerry. I do not remember if John received any income from this book.

NOTE: Jerry's basic selling item at that time was the MRL Brown Rubber. We did not know what led him to have it, until I mentioned this fact to J.P. Glass. It seems that in 1931-32, J.P. made a torque test stand to determine the quality of the various rubber thread sold at that time. His friend and classmate at MIT, Bob Clary (originator and "coiner" of MICROFILM), took photos of the test stand. He showed the photos to Jerry during one of his visits. They must have also talked about the variations and concluded that there was room for improvement. Whatever, the outcome was that Jerry wrote to rubber companies for samples and/or information on what they could do for him. It seems that the U.S. Rubber Co.'s lab became interested in the project. The result was the Brown Rubber. --- And Jerry was in business. It should be mentioned that Jerry had the advantage that his father was a manufacturer and a businessman so that Jerry was not a stranger to the ways of commerce and advertising. MRL, which he started, would give the rubber an aura of scientific research, and the brown color its singular distinction. Whatever the reason, Jerry did all of us a service. (J.P. also mentioned that some of the black rubber compared favorably with the brown which was notorious for let us "down" under hot and humid conditions.)

When Jerry was accepted by MIT in 1933, he offered to sell us MRL. But since we were interested in making it under our own "JASCO" banner, we did not accept his offer. He did sell it to Carl Goldberg who was attending Wisconsin U at that time. However, the Logbook was not part of the sale because it was a joint effort between John and Jerry. -- And thus, the Logbook reverted to us. I do not remember how many books, if any, we received from him. We did buy his table top hand press, type cutter and cover stock. -- It should also be mentioned that Jerry's main contribution to the year books, besides printing the first Logbook, and unknown to him, was his introduction of offset printing to us. Although this method was nothing new to him, because of his father's business, it was a revolutionary revelation to us.

Although we planned to print a new Logbook in 1933, we did not do so. Income from JASCO was in pennies. John registered for Fall semester at CCNY but changed his mind soon afterwards. The family, in one of its letters, mentioned that there was an opening for him to study mechanical dentistry. This made him decide to join the family late in 1933.

Towards end of 1933, work at the patent drafting office slowed down. At times the salaries were postponed, and I had many no-work days. This gave me more time for JASCO and to work on the 1933 Logbook. --(The 1933 Logbook is identical to the 1932 except that plans signed "F. Zaic", instead of "F. Z." were added) -- The first sale of the 1933 book is noted in the Cash Book as being made to Turansky on April 10, 1934 for the sum of 25¢. --I am not sure how many copies were printed, but the cost was \$17.00. (The 4 1/4 x 8 1/4 pages were printed only on one side. I bound the book by inserting collared pages between folded brown cover, which I printed, and hand stapling along the left side of the 4 1/4" dimension.) --I sold 44 copies between April and July, 1934, as noted in the book. The actual total was more as I carried a batch with me to the 1934 Akron Nationals. The enthusiastic reception of the Logbook made me decide to try again. I also found that what the builders wanted was more and more plans.

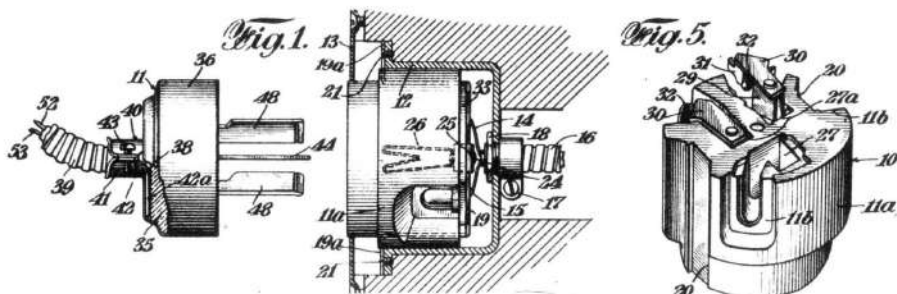
In a way, I had sensed the need for an annual book for model plane developments several years before the original Logbook. --In fact, ever since I started to make radio sets and trying to meet the technical and code requirements for amateur radio license. During this period, I read and studied the American Radio Relay League's monthly, QST, and annual Handbook. --It could be stated that they were my models for the year books. (ARRL also influenced the structure of the AAMA.) I now had an idea of the Year Book format. All I needed was time. This came sooner than expected.

By mid-1934, work at the office was almost zero. Since we were a close knit group, we presented a problem to Mr. Kahn; which one of us three should be the first one to go. He solved it by letting all of us go into the current world of depression. --I was called back later to do a rush job. By then, the other two had found work or left the area, and I was asked to return on full time basis. But by now I had taste of liberty. I thanked Mr. Kahn, but no. --By same token I did not look for another job. I had \$200.00 in the bank, and a \$300.00 cash value life insurance. I felt that I had enough of a financial security not to worry about the future. Besides, JASCO was trickling pennies. ---And that is how I got "free" from work, and how all of the odd and ends seem to click for production of the next book. From Jerry I learned how easy it was to reproduce plans and typed text by offset process. I also had now wider range of correspondence to enable me to locate plans. Drawing the plans would be no problem to me. I could not possibly have had a better training for model drawings that my patent drafting experience. How did I become a patent draftsman?

After graduating from grammar school, for no reason that I can recall, I opted for business school. But after few months, I told the family that I was not cut out for office work. What do you want to do? --In time, I found myself working in a hat factory, packing and running errands. In the meantime, I enrolled in night school, taking up a three year course in mechanical drawing. Eighteen months later I was offered a job in a radiator and fender repair shop. After a bit over a year, I had a salary of \$20.00 for a 44 hour week. But by then, I also realized that my hands were getting enlarged and calloused, and I was sure that inhaling the muriatic acid flux fumes was not too healthy. I decided to give the usual two weeks notice. ---And would you believe it! In the evening of the day I quit, my drawing teacher, Mr. Taylor, asked me if I would like to be interviewed next day, Saturday, for a drafting job. He sent several of us, but it seems that Mr. Prager and Mr. Kahn liked my sample drawings as they told me to come to work on Monday morning. The pay? \$10.00 for a 44 hour week.

Patent Drafting is a specialized form of drafting. Its main function is to illustrate inventions as clearly as possible. For this reason, every effort is made to give the drawing a three dimensional effect. At one time, the specialized shading made the patent drawings works of art. Perspectives and exploded views are normal. Scaling down is necessary as the drawing has to fit 7 1/2 x 9 space.

And, so, I gradually acquired the art of patent drawing. My teachers were from the old school. --While searching in the Patent Office I ran across a patent that I recognized as being drawn by me. See drawing. I did not do the lettering. They were done by the bosses. They had a unique style by which they were identified in the trade. --Speed was also essential as the cost was based on time. So that drawing two or three models in a day was not unusual, even though I had to scale them with proportional dividers.



August 8, 1934 diary entry! "I am getting material ready for the year book. (1934). I will probably be rushed at the last minute. At any rate, the hope is high that it will get me out of the financial worry. The total cost will be around \$90.00. Quite a lot, yet small for such an undertaking." I must have worked fast as the first entry in the Cash Book is dated Sept. 18, 1934. --Total sales for 1934: 580 copies at 35¢ = \$203.00. Production & postage: \$116.00. In 1935: about 300 copies, \$108.00. Total profit for two years: About \$175.00. --I still had no concept of book production when I prepared the 1934 edition. I changed the size to 5 1/2 x 8 1/2, but the pages were still printed on one side. I had to collate, enfold them within the cover and staple by hand. The 1933 Logbook was printed by National. Someone moved from National to Welcke, and persuaded me to change with him. This proved to be most fortunate later on. Welcke Offset Co. was a small family business, and I received a more personal and sympathetic reception without which the future books would not have been financially possible. Name of the new book: 1934 JUNIOR AERONAUTICS YEAR BOOK.

Work on the 1935 edition started in October, 1935. Decided to update it by titling it "1935-36". Was not too happy with the JUNIOR used for the 1934 book. Had a feeling that MODEL AERONAUTIC YEAR BOOK title would have a more aeronautical atmosphere. At the same time I also felt that publishing it by the MODEL AERONAUTICS PUBLICATIONS would, seemingly, give the books substantial background. --Some of its drawings were made in the Academy's office in the Rockefeller Center where I was a physical presence. (The office was provided free by the Center through the efforts of Mr. Gardner, ex. sec., of the Institute of Aeronautical Sciences. When the demand for office space increased, I had to leave, removing the three pieces of furniture that Lt. Alden provided.) --Financial Statement for the 1935-36 Year Book. List price: 50¢:

<u>December, 1935</u>		<u>All of 1936</u>
Printer----203.00	Sales-----723.00	Sales-----741.00
Cover----- 37.00	Expense----446.00	Expense---390.00
Advertising 130.00	Income---277.00	Income--- 351.00
Env. & Mail 46.00		
Bunty-----30.00	Total Income from 1935-36 book---628.00	
Expense---446. 00	1935 Income from 1934 Book-----175.00	
	Total book income for two years--803.00	

Cash Book shows that I had to pay Welcke on installment plan. Had second printing in 1936. --Incidentally, JASCO income in 1935 was \$263.00 but had a whopping loss of \$908.00 in 1936.

By 1937, the Year Book format and procedure were set. The major effort was made to collect as many plans as I could. Also, keep up extensive correspondence with anyone who had something to say or was developing a new design. At the same time I tried to summarize all I knew about model aerodynamics; hoping that someone will check me and show us where we were right or wrong. My daily schedule: Work on the book and/or correspondence at home until mid-afternoon. Go to JASCO. Open the mail. Check with the boys who came to help after school. Cut balsa if stock was low. (I did all the cutting as I did not want anyone to get cut with the saw.) After supper; night school, five nights a week. Going to night school was a sort of a social activity, and it was a warm place during winter. I used to check the coed composition before registering for a particular course. Since youngsters were allowed to go to work, after leaving grammar school, many tried to earn the high school diploma at night. Took at least six years to do so. Many adults, who missed it in their teens, also now made the effort. Attendance at my school, Washington Irving Eve. High, was over 5,000. ---During Summer evenings, movies were my favorite pastime, even though, at times, the cash was so low that I may just have had enough for a 10¢ chocolate supper and 25¢ for the movies, knowing that the next morning mail would bring breakfast money.

I do not have the cash book for 1937 edition, but have a feeling that I ordered 5,000 copies. I finished the book early in the year so that the cash situation was good enough so that I could attend the 1937 Wakefield contest in England. I prolonged the trip to almost four months. (Left enough cut balsa to take care of JASCO during the slack Fall period.) The total cost did not exceed \$500.00 Steamer round trip cost was \$150.00. To conserve cash, I traveled at night, 3rd class, and took every advantage of invitations to stay with friends and correspondents. --Also stayed with the family for about six weeks, and relaxed in the Alpine area of Slovenia, just south of Austria, where they were living. While there, I also wrote several articles for the Model Airplane News which helped with the expenses. --In those days, if you were a member of the Wakefield team, you had to find your own sponsors or use your own money.

1938 was a tight year for cash. Although JASCO was almost breaking even, the living expenses were met from day to day. Major ones, like buying new clothes or paying utility bills, were postponed into future. Part of the cash problem was caused by the fact that I was late with the 1938 book. It was not finished until June. In spite of cash problem, or lack of it, I ordered 10,000 copies. I do not know where I got the nerve to do so. When Welcke suggested something on account, I replied that I have orders and will pay as soon as I get the books. --I did not, however, tell them that I was manager of the Wakefield team and was due in France early in August. And that I was planning to take 500 books with me to help with the expenses. The idea was to hand-deliver most of the 500 books to Harry York, my distributor in England, and sell others to whoever wanted them. As it happened, I had to pawn one camera and a typewriter, clean-out JASCO cash box to help me accumulate \$75.00 for one way trip to Paris and a bit of extra cash. --The plan worked. When I met Harry in Paris, I told him to buy me a return ticket and leave it with the American Express in Paris. Sold enough books at retail to stay solvent and did not have to ask for help. But I did make sure that, wherever I was at the moment, I had enough money to buy train ticket directly to Paris from where the boat ticket would bring me to the ship. And it almost happened that way.

I stayed with the family again for a while. I timed my return home to give me time to attend the Italian Nationals in Rome. I counted on several meals. I got my ticket to Paris via Rome at a special discount. Made a 12 hour stop in Venice. Spent 30¢ as I had sandwiches my mother prepared. Night train to Rome. At the contest I was asked if I had any books with me. No. How about sending them from the States if we pay for them now? --Fine. Now I had money for souvenirs and food. I had to spend the liras in Italy, but I was able to save the dol-

lars. ---Harry kept his promise, and I found the return ticket, and a check for \$80.00, at the Am X. And, thus, I returned to New York with money, in contrast to the 1937 return when I docked with 15¢. Cost of this trip, about \$300.00

1939 was the year which changed the future of many others besides me. The family sensed the upcoming situation in Europe and returned to the States. With their return, my life-style had to be changed. I could no longer adjust my time to suit the year book requirements; like working at all hours and live on \$1.00 per day, 50¢ for food and 50¢ for my rooms. I now had to fit into a new routine with emphasis on making JASCO the major income producer. I had only time to draw the plans shown elsewhere in this book. By end of 1939 most of 10,000 copies of the 1938 Year Books were sold. Welcke got paid in full earlier in the year.

The change can be seen in the 1942 JASCO catalogue in which Thermic kits were introduced. Heretofore, I did not believe in kits, feeling that everyone should have the experience and enjoyment of making his models from scratch. --John found work as a mechanical dentist for which he trained in Europe. Brother, Albin, worked with me at JASCO. But not for long as he was one of the early ones to be inducted through the Selective Service. --When war was declared, I was uncertain what to do, volunteer or what. In one of my letters to Herb Weiss, who was working for the Coast Artillery Board at Fort Monroe, Va., I expressed my uncertainty. In reply, I received a telegram from the Board, offering me a position as an engineering draftsman. I decided to take it. It would put me in a war effort position and give me time to retire JASCO in an orderly manner. I left the shop in charge of Bill S., who was working after school, telling him to fade out JASCO supplies, etc. I started to work for the Board on March, 1942

The reason that JASCO did not fade out was that one day my sister, Christine, visited the shop and decided to continue the business. Somehow, she talked father into joining her. From then on he did all the cutting until he was joined by Thurston, a Swede who preferred breathing balsa dust instead of paint fumes. I was able to come home every other week-end. While at Ft. Monroe, I designed Thermic 50 for pine strips, and also added the Trooper. (I also made the Floater at this time, but mainly to check the angle of attack during glide.) Balsa was no longer available. It was used for life rafts. In raft production there were cut-offs which were available for model use. Imagine a block 4 x 12 x 12, then a cut away into it to form a deep arc. This was the left-over that had to be cut into pieces that could be used in kits. Where my father got the patience to do it, I still wonder. --The Board requested deferment for me and was granted two. Later on it could not request more. I was asked if I wanted to be inducted locally. If I did, I would have two weeks of basic on the beach, and then come back to the job, but in uniform. I was promised rapid promotions. But I declined, saying that I did not want to spend the rest of the war in this air conditioned place. (Another one of those famous last words!) ---And that is how it happened that I was furloughed from the Army (as a civilian) to be inducted in the Army, which, luckily, at that time was building up the Air Corps. Time: April, 1943.

At the reception center I was classified as a Squadron Draftsman, meaning that after the Basics I could be assigned to an active squadron. While going through Basics, I started to work on the Glider Design. By chance I had an inflammation of the calf so that I had few more months in the basic camp before being sent to Salt Lake City to join the 760th Squadron of the 460th Group. (B 24s). I had no duties and I could give full time to the book, working on my small board and handwriting the text which I sent to the printer who made proofs which I could use for offset printing. --Had more time at Chatham, Ga., from where I sent the almost finished book to brother John to complete. --We sailed in a convoy which passed my picture window at the Board, on January 13th, 1944. Arrived in Italy on Feb. 12th. Why the urgency to work on a book under such circumstances? Like many others, we had no idea what the future had in store for us.

In a way, writing the Glider Design under the circumstances mentioned, set me up for an ideal job in the squadron. No sooner did we get our tents up when orders came that each squadron must have a Public Relations Officer or PRO, (Eventually got a sergeant rating out of it.) I was "volunteered" by the orderly room as it was a common knowledge that I was a "writer". --The best part of this job was that I was able to operate from my own tent, at my own pace. And I had the power of the "press". No one cared how I did it, as long it was done. --I should mention that being attached to the Operations, and the PRO job, enabled me to meet many crew men who were model builders and knew me. By one of those inconceivable coincidences, Bill S., the boy to whom I entrusted the "fadeout" of JASCO, arrived with a replacement crew in my squadron. --Did have a flights on practice missions but was too wise by now to volunteer for the real thing. --After V Day, left Italy on June 6th, and sailed to Natal, Brazil. Left Natal Sept. 12th and was discharged on Sept. 15th, 1945.

When I returned home, I found that father and Christine had managed to change JASCO from a happy-go-lucky business into a going concern with national distribution. After updating the kits back into balsa construction and adding new ones, I began to miss the year book excitement, and eventually worked out a plan by which, I thought, I could get back to publishing. The basic idea was to enroll at Cornell U under G.I. Bill. This would provide tuition, subsistence and time. Took entrance exams. Did not make it. (5,000 applicants for 500 places.) Still, decided to move to Ithaca as I had always planned to eventually live Upstate. Rented an office for \$30.00 per month, and found room with Jewells at \$1.00 per night. Also checked at the University what I could take as an "outsider". Was advised that I could enroll as local resident at half credits, and that G.I. benefits will allow for enrollment and half of the subsistence, providing there was room in the class I wanted and prof approved. With the new Chevy delivered, I was all set.

It took a while to assemble the 1951-52 book. I had just got a hint of the Circular Airflow concept when I started the book. By the time I was finished going into all possible ramifications of the Circular Airflow, I realized that I had something special. I could hardly wait for the book to be distributed and startle the model world. --Well, I had a pre-war list of 15,000 addresses. I sent a note to everyone that the new book was ready, and that the list price was \$1.50. Waited for the avalanche--and waited. I believe that I received about 800 orders. Quite a contrast to the 1938 sale of 10,000 copies. I tried again with 1953 book. Same results.--By now I had to admit that we had lost a generation of model builders who were free fliers, and that the Control Line was now interesting many new comers who would normally have taken-up free flight. And at the same time, the interest in model building and flying may have been at a low ebb. My old readers were readjusting their lives to new responsibilities. --Financially, by now, I had used up my War Bonds, the income from the Glider design that Christine had banked for me. I had some income coming, aside from the G.I. help, by doing drawings for Al Lewis who was editing the Air Trails at that time, and by going to Philadelphia to help J.P. Glass meet some technical proposals. ---By 1954, I was advised by the University that I was no longer eligible for G.I. help unless I took up full credit or full time program. And thus my stay in Ithaca came to an end as I could not spend full time going to classes. Still, we got the 1951-52 and the 1953 Year Books from this period of my time. ---

I would have liked to stay in Ithaca. It was just what I had hoped it would be. I still consider it as my home town. I would have remained there if the books had been a financial success. I had hopes and expectations that I would make my future living from the books, but it was not to be. --I did not want to look for work in Ithaca as I still needed freedom of some sort to try again. --And it just so happened that at that time, early in 1955, J.P. Glass asked me if I would be interested in working full time for his company, the Clifton Precision Products. I decided to do so. The pay was on the generous side, but the best part was that

we had a sort of tactical understanding that I would work in my own manner, with respect to the time, as long as the projects or developments were on schedule at all times; conditions which lend themselves to have another try at the year books. And that is how the 1955-56 book got started in my 8 x10 boarding house room.

I found a very interesting Financial Statement clipped to my 1956 IRS return which details the expenses incurred in the publication of the 1955-56 book.

<u>PRODUCTION</u>		<u>SALES</u>	
Type, 30 galleys---	\$360.00	1400 Retail \$2.00 ---	\$2,800.00
Cover-----	150.00	1100 Wholesale 70¢--	770.00
Print, 3M books---	985.00	500 Contributors, etc.	000.00
Binding-----	240.00		\$3,570.00
	\$1,735.00		
<u>ADVERTISING</u>		<u>ART & Etc.</u>	
AMA List 12M---	\$120.00	23 Dwgs. ----	\$230.00
Brochure 15M---	290.00	10 Plans-----	50.00
6¢ Stamps 14M---	840.00	Cover Dwg----	45.00
Addressing-----	200.00	Airfoil Article-	24.00
2nd List 15M---	260.00		\$349.00
2¢ Stamps 14.5M-	290.00		
Addressing-----	200.00	<u>BOOK MAIL</u>	
Mag. Adverts-----	400.00	Env. & Ship. --	\$190.00
	\$2,580.00	8¢ Stamps-----	240.00
			\$430.00
		<u>THE BOTTOM LINE</u>	
		Production--	\$1,735.00
		Art Work----	349.00
		Advertising--	2,580.00
		Book Shipping--	430.00
			\$5,094.00
		SALES-----	3,570.00
		Loss-----	\$1,524.00

The advertising budget will give you an idea of the effort made to publicize the new book. It almost looks frantic. But I was determined to make every effort to reach higher volume so that the price could be kept low so that no one will have "money" excuse for not getting the book. (AMA membership list was available at that time for controlled direct mail solicitations.) Also, as you will note, I now had money with which to pay for services I used to do myself. Not itemized, are the trips which I considered as business expenses, and which totaled to \$3,216.00. (Trips to New York, 1954 to West Coast and Mexico, 1955 to FAIs in Europe, 1956 to Vienna to accept the Paul Tissandier Diploma and attend the Soaring Meet in France.) IRS questioned the trips, but we compromised by agreeing that half of the time could be considered as business expense. The 1955-56 book was reprinted in 1978 and showed a profit of \$89.00.

The 1957-58 book finances were similar to the 1955-56, except that the advertising costs were lower. Production for 3M books: \$2811.00. Advertising: \$565. Travelling: \$1044.00. And some other odd and ends. Sales: 564 at \$2.00= 1128.00 1600 @.70 (wholesale)= 1120.00, or for a total of \$2248.00. Claimed a tax loss of \$2400.00.

As the 1957-58 dedication indicates, I met Carmen during this period, but the book did not suffer as our dating was mostly on week-ends. We were married in 1959. And so that 1959-61 book was prepared under more pleasant circumstances. We lived in an apartment with wooded vistas on three sides. I got regular meals and attention. I do not have itemized expenses for the 1959-61 book, but the IRS return has production costs: \$6704., Advertising: \$873.00, Other odd and ends brought the total expenses to: \$10,053.57. The sales were \$9,822.00. I finally got wise and increased the price. The total loss was only \$143.57. --Although my time was for "free" I was able to deduct my travels.

In 1962 we moved to California (25 miles N.W. from center of L.A.) with expectations to be a part of a growing company. --I had stock interest in a small company which was being merged with one which was organized by one of the

original founders of the Litton Industries. The reason for merging was to obtain capital for machinery etc. --Within six months we realized that our position was in minority, with respect to stock, and we reached an impasse. The management wanted to see orders before investing in machinery, in contrast to the original understanding of having good production facilities before soliciting business. The upshot of it all was that I found myself without a job in new surroundings. And from then on, we had to pioneer the West the hard way.

Worked most of the 1963. Then came a long stretch of unemployment. The Aero Space industry was in a doldrum. Unemployment checks helped. Wrote the Circular Airflow with help of two months of disability checks, earned with a hernia operation. (Very likely caused by stone work in our yard.) --Then, took a chance in re-printing the past issues. Luckily, we had a neighbor, Dick Manning, who had a graphic shop and made most of the negatives that Welcke did not have. He also let me use his facilities to make up "flats", the layout of negatives so that when the sheet is folded all of the pages will come out right. And, also, develop the printing plates. All this was done over week-ends. He also introduced me to the lowest-price printer, source of paper and binders. With prices more in accord to the basic business practice, our investment eventually came back with some extra cash. In the meantime, I was also working on the 1964-65 book on almost full time basis. It took about nine months.

During this 22 months period, helped by nine months of unemployment checks, we were able to print the CIRCULAR AIRFLOW and the 1964-65 YEAR BOOK, and also reprint the old books. In the past I was reluctant to reprint the "past" as I felt that they had information which did not bear up later on. However, I was influenced by financial needs as well as numerous requests for old copies. (We had to venture more than half of our savings to give the reprint a try.) Perhaps a review of the IRS returns during this period will give you an idea of the sums involved.

	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
Sales	214.00	3,275.00	5,150.00	2,154.00	3,482.50	2,301.00
Net Profit	-123.00	529.50	347.24	-577.73	-178.84	10.00

From 1969 on, the sale averaged about \$2,500.00 per year with Net Profit also averaging about \$250.00. Most of the sales now were to distributors and dealers which helped keep the books in circulation. --A side help was that we were able to charge part of the house area and utilities to the books so that the net profit was higher, in that sense, when we had outside income high enough to be taxed.

As soon as the 1964-65 book was off the press, I automatically began to collect material for the 1967-68 book. But I did not encourage the contributors to send in the final manuscript or plans. I told them that I will let them know when I needed the material. --I was working for Disney at that time. (I had answered a WED ad in December, 1965. My resume was read by the engineering department manager, who was a model builder way back, and knew me.) I stayed at Disney's until the Pirates of Caribbean project was finished, late in 1966. --Aero Space situation improved and I found a position with the Litton Systems in the Guidance and Control Div. (Inertial Guidance etc.) ---Knowing from past experience that Aero Space has its ups and downs, and that I may have time for another book, I got an idea of starting a Year Book Club to help finance the book. The proposal, reprinted here, was sent out in September, 1968. I made a deal with the postmaster at "Thermal," Calif. to have the letters sent from his place by buying the stamps from him. Besides the mailing, the proposal also received good press notices, and I also placed the note in the supplies that were mailed from my Odds and Ends.



FRANK ZAIC

Box 135 • Northridge, California 91324

•Now is the time for all good model builders and fliers to come to the aid of the Year Books--JOIN THE YEAR BOOK CLUB!!

1966/68 Year Book? It's becoming an embarrassing question. In fact, so embarrassing that I am planning to start, with your help, a YEAR BOOK CLUB! Its only reason for existence will be to assure the publication of the Year Book.

The idea of the YEAR BOOK CLUB to finance the Year Book, is not as far fetched as it may sound. Each time we send a subscription to a publisher, we are paying for a magazine which will be delivered over the course of a year. The publisher is using our money for production costs. No reason why we cannot do likewise with the Year Book.

Perhaps I should have tried to do something like this a long time ago to get the books out on an annual schedule, rather than trying to arrange my affairs so that I would have time and money to prepare the books for the printer, and then count on the pre-print orders to bail me out of hock. It's a harrowing experience and takes an enomourous amount of time--nine months of 60-hour weeks or 18 months of spare time.

Facts: The basic need is a \$10,000.00 working capital. With this money in the bank, I can have all the routine work done outside, and may even have secretarial help to answer your letters and hound you for plans and articles. (I have to play safe these days and hold on to my day time job.) This sum will also take care of the printer and binder so that no time will be lost raising production costs. After you get a book editorially finished and pasted-up, it is quite a let down to have to go out and beg for orders.

\$10,000.00 sounds like a lot of money. It is for one man to raise, but if it is spread among 1,000 members (dues to be \$10.00 per edition), it should be easy, relatively speaking. The real problem will be to find 1,000 brave members. Perhaps 500 of you might join without hesitation, as some of you have already sent money for the 1966/68 book. But to get the remaining 500 members will take a bit of arm twisting. Just remember that you are doing it for a worthwhile cause. Clubs could help more than they realize by using club funds for membership in the YEAR BOOK CLUB. (This notice is going to 950 clubs. Would appreciate if the secretaries would pass it around at the next meeting.

Benefits; Each member will receive two books---one of them will be hard cover bound. Possibly a pin and membership certificate. So that actually you will be ahead of the game if you sell the soft-cover copy. Of course, you would be doing a world of good if you pass the extra copy to your local or high school library.

(over)

Talk this YEAR BOOK CLUB plan over with your friends and club members. At a small cost to you, we can have the sort of publication we want and need. I have world-wide connections which would be a shame to let go now. There is no problem in having 300 plans per edition, if that is what is wanted. Many would like to be published. Many would like to have answers. The solution is to assure the publication of the Year Books through the YEAR BOOK CLUB plan. And 1,000 members can do it very nicely. (Note: Membership will be limited to 1,000. Others will be able to buy the regular soft cover book, but not the hard cover edition.)

Funds: Will be placed in a special bank account. We may have trustees to keep check. If by chance something goes amiss, the dues will be refunded on a prorated basis.

Your decision may have more influence on the future of model aeronautics than you can imagine. Please let me know as soon as you can what you think of the idea.

I had hoped for at least 500 replies, and hope for 500 more in time to come. But the response was disappointingly small, trickling in ever so slow. Six months after the mailing, we finally received about 150 memberships, most of them from friends. ---Well, it was a sort of a rejection not easy to take.

I used to wonder how the "book" would end. The response, or the lack of it, was the answer. The Year Book "reader" had always been a special person to me. Such a "reader" was not an individual, in the real sense of the word, but a sort of an amorphous being. Amorphous, in a way, like the sound of the violins, in a Symphony Orchestra, which sound as one. --In the past, I almost felt traitorous to the "reader" if I did not publish a year book for him, regardless of the circumstances. But the rejection of the Year Book Club offer, to share the responsibilities of the Year Book publication, freed me from whatever obligations I may have felt towards the "reader".

Time did bring about the conditions I had anticipated in the aero space. Late in 1968, Litton had to retrench and I was "freed" again. I could have started on the new year book, but, in all fairness to Carmen, who went back to work in 1965, I could not expect her to subsidize the Year Book by keeping me alive while I worked on the book. --And then use up our savings to pay for the book production on a slim chance that it would be a financial success. --Instead of working on the book, I decided to develop a series of models for the juniors. --My only regret in doing so was that I was unable to publish that material and plans I already had on hand, and those that were awaiting my word to send them in. I did not like the idea of disappointing the contributors after the effort they made to share their ideas and new designs, but it could not be helped under the circumstances. --- I was recalled by Litton, after 18 months of layoff, to work on temporary basis. Later on I was offered regular status, but I managed to compromise on a three day week so that I could keep up the kit business. --The long week-ends could have been used for year books if the response to the club proposal had been more encouraging, but that is the way events happen to evolve.

Yet, when I think of it, the results may have been for the best. Lack of enthusiastic response indicated that the need for the type of information contained in the Year Books was no longer needed, or that it could be obtained from other sources. --But there is no way getting around the fact that my ego was bruised more than I would like to admit. --Still, I have the memory of the 10,000 books printed in 1938, and that the Year Books will be used as a historical reference for that period of time when Free Flight ruled the skies.

I hope that, after reading the Year Book Story, you will not be under impression that publishing the Year Books was all work and no pay. Actually, to my way of thinking, I received full payment for the work; perhaps not in cash but in a more lasting way: The Year Books made the world a friendly place for me.

CIRCUMSTANCES & COINCIDENCES

Most of us, at one time or other, look back into our past and try to recall the circumstances, incidences and/or coincidences which had influenced us to do what ever we did, or what we are doing now. --With respect to the Year Books, it could be that, Chronologically, I just happened to be "there" at the right moment, with certain qualifications, to satisfy the particular sets of circumstances and coincidences present at that time. --But there is one coincidence which I cannot explain: Why was the FAI General Assembly held in Vienna in the same year, 1956, in which I received the Paul Tissandier Diploma?

Excerpt from an AMA Press Release, Washington, D.C., April 5, 1956:

"The Diplomas are awarded annually by the FAI in memory of Paul Tissandier, early French airman and the first treasurer general of the FAI, for outstanding accomplishment and service to sporting aviation. Zaic is the first American in the field of model aviation to receive this honor."

Other Americans to receive Diplomas are Colonel Roscoe Turner, noted speed flyer of the 1930's; William T. Piper, president of Piper Aircraft Corporation; and Wayne W. Parrish, editor and publisher of American Aviation Publications."

NAA notified me that I could attend the Assembly to receive the Diploma in person if I could manage the trip on my own. I was able and willing. I had to complete a circle which began when I was born. ---I was born in Slovenia when it was a province of the Austria-Hungary Empire, thus making me a subject of the emperor, Franz Josef. ---I arrived in New York when I was ten years. For many years thereafter I wondered and questioned, "Where do I belong?" A question faced by many newcomers to thisland. ---By returning to Austria as the "first American to---etc.", the question, "where do I belong", was answered and the circle completed. But the question, "Was the 1956 Assembly, and my receiving the Diploma in the same year, a coincidence?" remains to be answered.

September, 1980
Northridge, Calif.

Reply from Jim Cahill to a request for historical information.

July 6, 1979

Dear Frank:


About the model history, neither Bob nor I have any American Boy magazines. The only one in our old club on the east side who may have some is Paul Schaefer, who had large stacks of American Boy and Aero Digest magazines at one time.

I am enclosing a copy of a letter from Carl to Bob in 1930, with his indoor stick plans. Also, a copy of a 1931 Dayton newspaper with Jack Purvis of Toronto and the first free-wheeling prop that we ever saw or heard of.

Last Labor Day, Bob and I were both in Indianapolis and tried to reinforce our memories on folding props. Remember that in September 1933, he left for college in W. Lafayette and I started into high school. He may have had some correspondence with Wally Simmers which I did not see. Several years ago, Wally said that he learned a lot by watching Bob at contests.

1933-34 I faintly remember seeing in an Aero Digest a description of an Austrian or German sailplane with an engine and propeller on a pivoting pylon, which folded down into the fuselage after the engine stopped. I believe this started us talking about folding propellers. The Chicagoans later started on feathering props, but we never considered them for several reasons.

3-35 I took the 1935 Stout winner (Yearbook) and cut the propeller blades apart diagonally, then added hinges so that the blades would change pitch as they hinged. I glued sheet aluminum on the top surface of the blades near the hinge. Then I used a piece of long music wire glued and tied to the hub to bear down as a leaf spring on top of each blade. The blades were supposed to go to high pitch at first, against the wire spring force, then gradually go down to low pitch, then fold for the glide. This was a complete failure because the blades usually folded and caught on the landing gear as soon as I launched it into the wind. I took off the contraptions, glued the prop together, and painted it orange so that the diagonal cuts could not be seen, and flew it as a free-wheeler.



6-35 After we returned from the St. Louis Nationals, Bob took the (convertible) stick version of his 33 minute Moffett eliminations (Yearbook) and made a (non-working?) folding prop for it and tried a large number of test glide comparisons with the free-wheeling prop from our front porch to the street.

7-35 Bob made a 300 square inch stick-cabin with a two blade folder. The prop kept rotating until the motor was wound backwards enough to stop it. Sometimes the blades would fold on the sides of the body and sometimes on the top and bottom. He flew this in a contest in Indianapolis and also at the Scripps-Howard meet in Cleveland that summer. A copy of an August, 1935, clipping shows this model in Cleveland with a two-blade folder. I don't think it was ever flown with a free-wheeler. I don't recall it ever flying longer than three minutes. First, we did not have adequate winders to wind the big motor tight enough to climb to gain decent altitude; second, when the prop was rewinding the motor, the prop had very high drag causing a rapid sink. Sometimes it landed before the prop folded.

3-36 We had an increased wing loading rule. I took "Buzzard II" of the August, 1935 clipping, planked the body with 1/32 sheet on the top surface of the wing, calling it "Logwagon." Then I ca

new prop with a thick hub and used hinges which were the same as those I used on "Clodhopper II." There were then articles in England about the "White" rubber tensioner and other methods to use long slack in the motors, without bunching in the glide. I put a small screw in the back surface of the nose plug. Then I wound another piece of music wire around the prop shaft and soldered it to the shaft, to stop the prop in the right position for a good glide. After about every second flight, the music wire would be ripped loose from the prop shaft because it wasn't strong enough. Also, one blade kept drooping down when folded. So, I gave up and started building "Clodhopper I" with a free-wheeler. This had a very high aspect ratio wing, (3-3/4 chord) very long motor run, and just missed the 1936 Wakefield team (7th). Bob started working at Chrysler full time in June and did not compete much that summer. There were others in our model club who saw our three attempts to fly with folding props, but no one else tried one, because the free-wheelers worked.

11-36 I started making drawings for the 1937 Wakefield with new wing-loading rules. I made sketches of two ships. One with a rectangular planked fuselage, would have opened on top to hide the prop inside. Also, it had retractable two-wheel landing gear, which, according to my interpretation of the then current rules, would have had to be pulled down (by a wire hook catching on the ground) on every landing. I gave up on this and went to "Clodhopper II." The wire hook on the spinner for more strength and moment-arm and the one-bladed prop solved the two problems with the "Logwagon" two-bladed folder. Also, the landing gear was set back so that the blade would not hit it. I built most of "Clodhopper II" on my study table (with three roommates) in college and finished it about ten in the morning of the 1937 eliminations. So far as I know, this was the first successful flight with a completely predictable and reliable folding prop.

While you are delving into old model history, who first used downthrust and sidethrust? I made an Aram Abgarian Mystery Tractor which only flew for 15 seconds in our contest and surely could have used downthrust, but I don't remember when we started bending thrust bearings on indoor models. I do know that Vernon Boehle used sidethrust on his 1934 Mulvihill winner in the Yearbook (not shown on the plans). My 1934 Stout winner did not have sidethrust. On his way home from Akron to California, Bill Atwood stopped at Boehle's house while he was selling a big engine to Louis Schweitzer. They discovered that they had both been using sidethrust. That fall (1934) Boehle let the rest of our club in on the secret. I don't know exactly when Boehle started using sidethrust. He did very well outdoors in 1932 at Atlantic City and had a sensational showing at New York in 1933. This was overshadowed by Bill Brown and Maxwell Bassett's gas jobs. Boehle did a lot more flying than the rest of us because he had a field just across the road from his house. Another note - I think Gordon Light used the first lifting stabilizer that we saw (1932 Wakefield?).

Well, Frank, that's about my limit for now. Hope that some of it will help you.

Yours,



(Asked Wally Simmers for his early recollections: He replied that he started to develop the folding prop in 1934. He reasoned that the model is basically a glider. Therefore, use high power to get it up, and then fold the prop to prolong the glide. Was not happy with his 1934 design, but the 1935 folder worked. While attending the 1935 American Legion in Indianapolis he found that Bob Cahill flying with a folder.) F.Z. 1980

INDEX

Since it is the purpose of this book to present the reprints in their original form, its pages are not double-numbered. That is, a page number for the book as a whole, and a page number which may already appear in the reprint. Where possible, the plans are indexed to the page numbers shown in the reprint. Therefore, to find a particular plan, it will be necessary to, first, locate the reprint, and then the plan.

1934 JUNIOR AERONAUTICS YEAR BOOK

<u>Indoor Models</u>	<u>Outdoor Models</u>
Tractor---Carl Goldberg---19	H. L. Glider--C. Zola-----17
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ROG---H. W. Owen	Fuselage---J. Zaic
Fusealge-A. B. Penn	Pusher----F. Zaic

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