USE BLACK LINES ABOVE TO OUTLINE CONTROLS.

U.S. ARMY

PA33 INSTRUMENT PANEL

PA33 AIR SCOOP FRONT

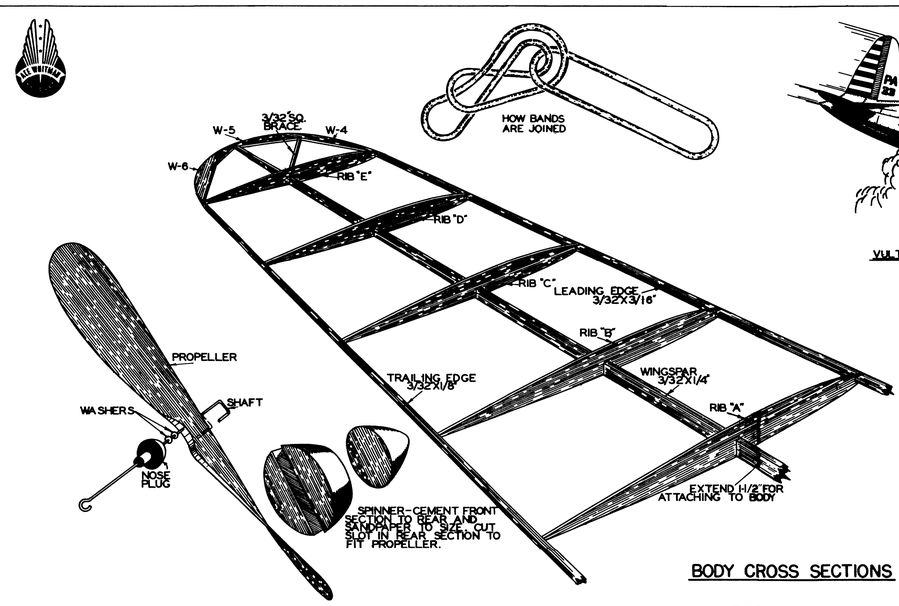
HINGES

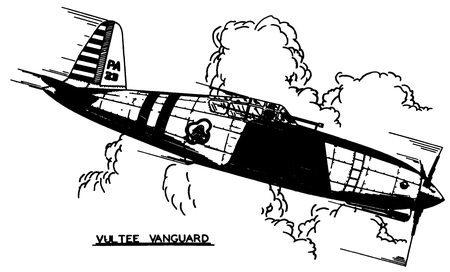
SQUADRON IDENTIFICATION LETTERS PA33

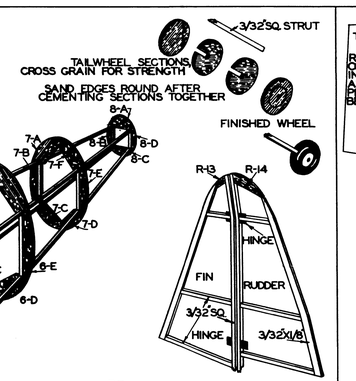
WING LETTERS

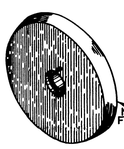
PILOT

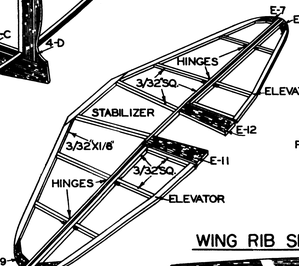
WING WALKS

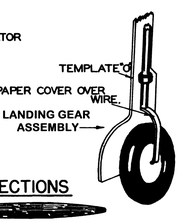


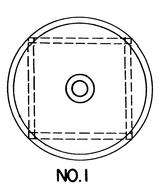




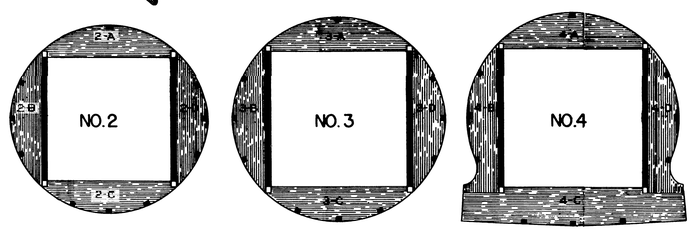


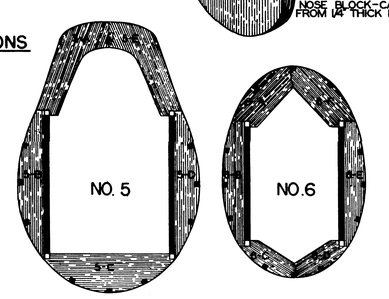


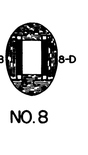




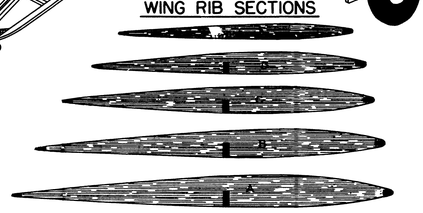
BODY CROSS SECTIONS







WING RIB SECTIONS



DETAILED INSTRUCTIONS

Study plans, perspective sketches and instructions carefully and thoroughly before attempting model construction. Time and patience are required to make this exact scale model. Always bear this in mind. The following few additional tools and materials, other than those supplied, are necessary to build this airplane model: A razor blade (preferably one with a heavy rounded back); a small board upon which to work and cement parts; about fifty small thin pins; a pair of pliers for bending shaft; some small pieces of sandpaper; and a piece of waxed paper 12 x 36 inches.

STEP 1 • SANDPAPERING

Material: Wood Block and Sandpaper (not furnished)

For sandpapering obtain a small block of wood and fold sandpaper tightly around it. Rub sandpaper covered block with an outward motion LIGHTLY and SQUARELY on all balsa strips. Avoid rounding edges of square longitudinal pieces.

STEP 2 • SPARS, ETC. Material: Sanded Balsa Strips

From the sanded strips select the correct sizes as required on the plan for leading edge, spar and trailing edge. Do this before any notches are cut in ribs so that fit will be very close or tight. A good close or tight fit requires less cement Consequently, less weight will be added to the finished model

STEP 3 • WING—RIBS—WING TIPS

Material: Printed Balsa Rib Sheet

With a razor blade cut out illustrated ribs and wing tips from rib sheet as they are needed in the process of building the wing. This will prevent pieces from being lost. Begin assembly by working over the wing in the top view. It is advisable to place a piece of waxed paper over plan to prevent wood parts from adhering to and tearing or soiling plan when they are removed.

While working over plan hold down balsa parts with small thin pins.

The wings are assembled in two units, namely, right and left panels. Place spars and trailing edges in position and insert ribs beginning with A, B, C, etc. After all ribs are in place, fit leading edges in position and complete wings by inserting all curved pieces. Cement all joints carefully and when they are thoroughly dry remove wings from plan.

STEP 4 • ELEVATORS AND STABILIZER

Material: Balsa 3/32" sq. 3/32"x1/8" and Printed Rib Sheet

The tail is assembled in two units, namely stabilizer and elevator. Sandpaper all strips as explained in Step 1, before cutting to required lengths. Use waxed paper and pins in assembly. Cut cross members and cross braces to required sizes and cut curved tips from rib sheet. First, place cross members and then front and rear edges in position. Pin down firmly. Apply small amount of cement to cross braces and curved pieces before inserting and pinning down into position. When all pieces are in their proper places, allow cement to dry thoroughly before removing from plan. Two black strips are printed on rear of plan. These are to be used for paper hinges. Cut off hinges to required sizes and slit balsa cross members at positions indicated and insert hinges. Apply cement only to outer edges of hinges.

STEP 5 • RUDDER

Material: Balsa 3/32" sq. 3/32"x1/8" and Printed Rib Sheet

The same kind of materials are used for both longerons and stringers. Smooth with sandpaper, cut to required lengths and cement into positions indicated BY NOTCHES IN FORMERS as stringers are purposely not shown on plan. They run length-wise along outside of body to help round out body and support

STEP 9 • TEMPLATES Printed on Plan

All stiff paper templates are shown in full size on plan. With carbon paper trace these templates onto stiff paper. Use plain white paper about the same thickness as the box material. Cut out traced forms to exact size, bend to required shape and cement into position during the process of assembly. Apply cement to proper edges and hold or pin into position until cement is thoroughly dry.

STEP 10 • NOSE BLOCK Material: Balsa 1/4"x2-3/8"x2-3/8"

Mark off the exact shape of nose piece on balsa block. Cut around outside marked line with razor blade or scroll saw. Sandpaper edge until smooth. Drill hole in center for nose bearing.

STEP 11 • PROPELLER AND SPINNER Material: Balsa

A machine cut propeller is supplied. However, it is not completely finished. Sandpaper corners and edges round. Propeller must be balanced. Do this by piercing propeller center with or very thin wire which in turn is stuck to the edge of a board thus permitting propeller to revolve FREELY. When propeller is properly balanced it will remain stationary, on its shaft in any position. Sandpaper heavier blade until balance is attained. The nose spinner is cut to shape, ready for use. Cement the two pieces together to form the complete spinner.

Notch back of spinner to fit propeller hub. Apply a liberal amount of cement to notch surfaces and press propeller into notch. While cement is drying, rotate entire unit, adjust until spinner turns truly with propeller blades.

STEP 12 • BEARING, ETC. Material: Furnished

The bearing, shaft and washers are all furnished ready to use. Note that the shaft is placed first through the bearing then through the washers and next through the propeller. Bend shaft over into a "U," pull back into hub of propeller and cement securely. Be sure shaft is aligned properly with blades so they will revolve truly. As tension of rubber motor will hold nose bearing in position DO NOT cement it to motor cowl. This will permit propeller unit to be readily removable from front of ship. Now insert rear motor hook into position shown in side view. Cement securely.

STEP 13 • LANDING GEAR AND TAIL WHEEL

Material: 3/32" sq. 3/32"x 3/16"- Paper Templates

The main strut of landing gear is 3/32" thick. This must be built up from the surplus leading edge stock. Cut to correct length and cement two pieces of 3/32"x 3/16" together to obtain a piece 3/16" sq. Then trace templates on to stiff paper and cut them out carefully. Now form and assemble these parts into complete landing gear mechanism as shown. Method of inserting wheel struts is shown on front of plan.

The tail wheel is made from two separate pieces. Cut them from the rib sheet. Cement pieces together "cross-grain." This is done to attain extra strength and to avoid warping. After cement is thoroughly dry, round outer edges to a tire shape. Now insert tail wheel strut. The landing gear and tail wheel are not attached until the final assembly.

STEP 14 • COVERING, ETC.

All individual complete parts are to be covered all around or on all sides. First sandpaper all rough edges and make all corners slightly rounded. Fit the tissue paper first, a section at a time, then apply cement and finally attach tissue and allow it to dry. Cover all parts completely and apply as much tissue in one section as possible without undue wrinkling. Cover body sections, where stringers are used in narrow longitudinal strips applied between each stringer over entire length of body. This prevents undue, wrinkling and produces a much smoother appearance when tissue is tightened by shrinking, as explained. With a very fine atomizer or insect gun, spray entire covering of framework very lightly with water; Allow parts to dry. The tissue shrinks as it dries. This gives the parts a smooth tightly stretched covering. When parts are completely covered and dry they are ready for final assembly.

STEP 15 • WINDSHIELD Material: Cellophane

Cover cockpit enclosure with discarded cellophane used in wrapping various packages. Cut and fit material until proper size and shape are attained. Insert pilot and instrument panel into position before cementing windshield into place. Apply cement to outer edges of pieces and -place into position. Use pins in assembly until cement is thoroughly dry.

STEP 16 • ASSEMBLING

When all individual parts are completed they are ready for final assembly. Cement elevator and rudder into positions shown and allow cemented joints to dry thoroughly. Attach wing panels and block up wing tips until proper dihedral angle is attained. Insert landing gear struts. After these parts are completely dry attach tail wheel. The model is now ready for decorations.

STEP 17 • DECORATIONS

Material: Printed on Sav-A-Plan Strip and Emblem Sheet

Cut various decorations from Sav-A-Plan strip and Emblem Sheet. Apply a thin layer of cement to backs and place in positions. Cut "U.S. Army" from strip and cement to bottom wing.

STEP 18 • RUBBER MOTOR

Material: Rubber 1/32" x 3/16" x 7" (2 Bands)

Two large rubber bands are supplied. Tie them together to form a two strand rubber motor about 14" long. Sketch shows how bands are joined. Attach rubber motor between propeller shaft and rear motor hook. Rubber motor can be easily inserted by threading or pulling into position with a piece of string dropped through body if held in a vertical position. At front of ship nose plug is removable, but at rear of ship a small opening in the covering should be provided for inserting the rubber motor.

STEP 19 • SCALE PROPELLER

Material: Balsa (not furnished)

A view of the scale propeller is shown on front of plan for those who do not wish to use the machine cut propeller supplied.

STEP 20 • FLYING

When model has been completely assembled it must be checked for center of gravity, balance before a trial flight is attempted. Place the forefingers at the midpoint of the wing tips and lift model to see whether it balances. If tail has a tendency to drop it denotes tail heaviness which may be overcome by adding a little weight to nose of ship. If nose has a tendency to point downward add a little weight to tail. Use this procedure until proper balance is attained. Tacks or pins can be inserted into front or rear of model to produce proper balance. When plane remains horizontal, while suspended on finger tips, it can be considered balanced. A few short trial glides should be made AFTER the model has been properly balanced (not before). When gliding, if ship has tendency to climb and if it does not make a gradual glide downward, it indicates that tail is still a little too heavy. This must be offset by additional weight at front of model. To be certain that ship is correctly balanced, hold it unwound, in position for launching and if the glide after leaving the hand is steady and consistent and goes forward 10 or 15 feet, ship can be considered as making a normal glide. Model is now ready for its trial flight. When gliding the ship do not launch it upward. Launch it with the nose pointed slightly downward which permits gravity to take effect. Before trying a powered flight it is advisable to test motor by winding propeller with right forefinger. Permit rubber motor to unwind completely, two or three times. At this time check trueness of propeller rotation. While turning propeller and thus winding rubber motor, hold model firmly by its nose-block. The proper number of turns for rubber motor is attained when its coils or twists are fairly small and tight

For convenience of model builder all ribs, formers, etc., as shown on printed sheets are duplicated on this plan for use in final checking, repairing and for the building of additional models.

Sav-A-Plan can now be filed away for future reference.

TEMPLATE "N" 1 REQUIRED
REAR AIR SCOOP COVER. CEMENT IN POSITION AFTER TEMPLATE "N" HAS BEEN ATTACHED

TEMPLATE "E" 1 REQUIRED
CEMENT TO TOP OF BODY BETWEEN CROSS SECTIONS NO. 2 & NO. 3

FLYING PROPELLER TEMPLATE

TEMPLATE "O" 2 REQUIRED WHEEL COVER

TEMPLATE "D" 1 REQUIRED
CEMENT TO TOP OF BODY BETWEEN CROSS SECTIONS NO. 3 & NO. 4

TEMPLATE "A" COCKPIT COVER 1 REQUIRED
CEMENT THIS TEMPLATE TO BODY BETWEEN CROSS SECTIONS NO. 5 & NO. 6

TEMPLATE "K" TOP FRONT WING FILLET 2 REQUIRED
CEMENT TO MODEL AFTER WINGS HAVE BEEN ATTACHED

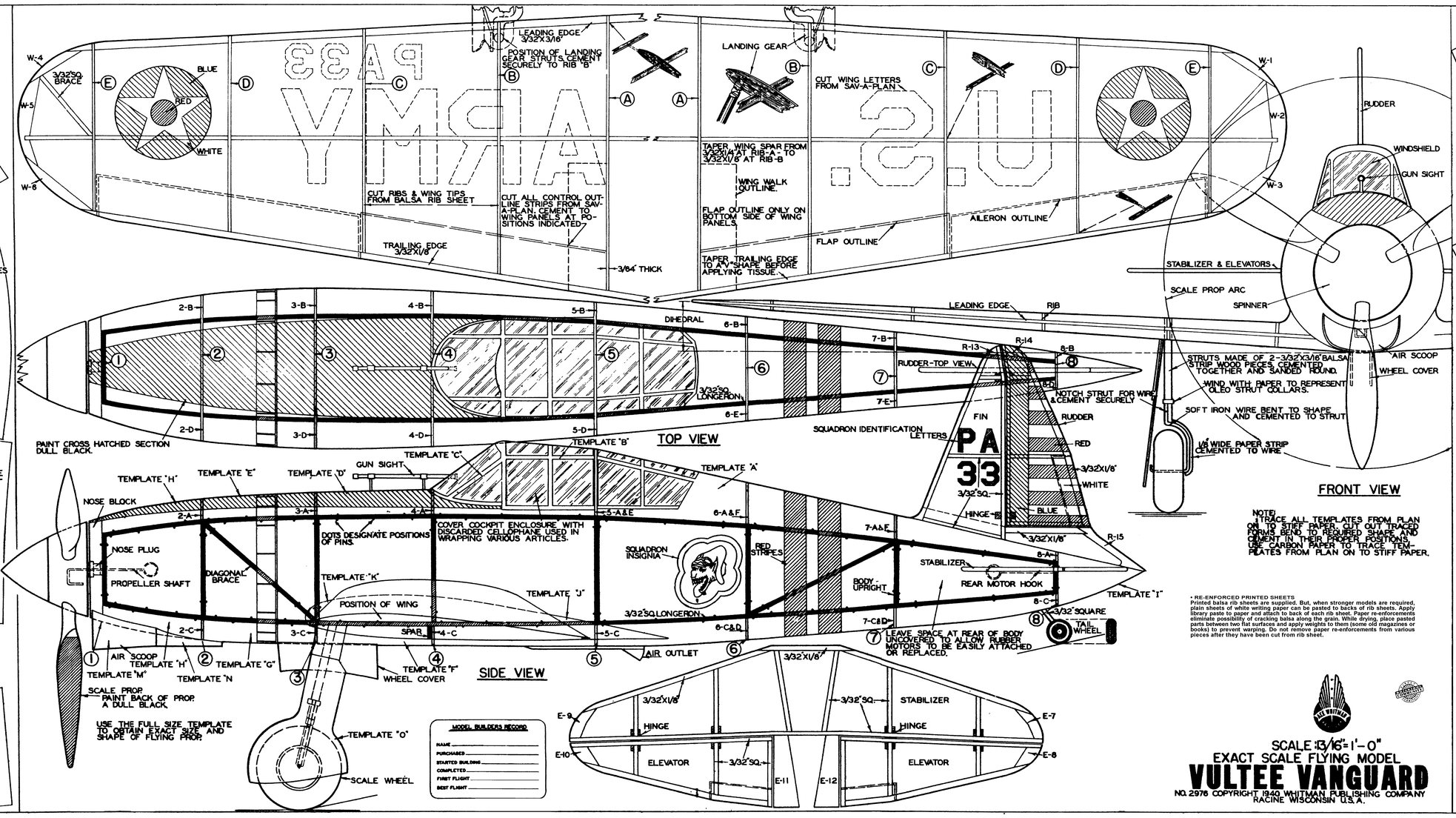
TEMPLATE "H" 2-REQUIRED
CEMENT THESE TEMPLATES TO TOP & BOTTOM OF BODY BETWEEN CROSS SECTIONS NO.1 & NO.2

TEMPLATE "J" TOP REAR WING FILLET 2 REQUIRED
CEMENT TO MODEL AFTER WINGS HAVE BEEN ATTACHED

TEMPLATE "G" 1 REQUIRED
CEMENT THIS TEMPLATE TO BOTTOM OF BODY BETWEEN CROSS SECTIONS NO.2 & NO.3

TEMPLATE "M" 1 REQUIRED AIR SCOOP COVER
CEMENT TO MODEL AFTER AIR SCOOP FRONT HAS BEEN ATTACHED.

TEMPLATE "F" 1 REQUIRED
CEMENT THIS TEMPLATE TO BOTTOM OF BODY BETWEEN CROSS SECTIONS NO.3 & NO.4



MODEL BUILDERS RECORD

NAME
PURCHASED
STARTED BUILDING
COMPLETED
FIRST FLIGHT
BEST FLIGHT

CONDENSED INSTRUCTIONS

- Place drawing board or flat smooth board on bench or table. Lay plan, blue side up, on board and cover it with transparent waxed paper. Smooth out both plan and its waxed paper cover and fasten to board at corners with pins or thumb tacks. During the early building stages, balsa parts are cut from various sheets and bundles of sticks to exact size and are pinned to board through waxed paper and plan with many ordinary thin pins. As the waxed paper is transparent, all drawings and sketches show through plainly. All balsa parts are held in exact positions while cement is drying and thus, when removed, should maintain correct shapes. As cement does not stick to waxed paper, said paper can be used several times.
- Place longerons In proper positions.
- Cut uprights to correct sizes, cement into position and allow to dry thoroughly.
- Put in diagonal braces.
- Build a second body side in same manner.
- While second body side is drying cut out all body formers carefully from rib sheets.
- Remove the second body side from plan and put in all body formers and cross braces. When cement is thoroughly dry check body for alignment
- Be sure all corners ,are square.
- Cut out all pieces required to build the wings.
- Place spars and trailing edges in positions and insert ribs. Complete by attaching leading edges and wing tips.
- Remove wings from plan and sandpaper leading and trailing edges round to conform with airfoil sections.
- Cut out pieces required to build tail and rudder. Work over plan.
- Cut cross members and cross braces to size. Apply cement to ends of pieces and pin down Into position. When dry, remove assembled parts from plan.
- Construct landing gear as shown in various views and sketches.
- As COMPLETE detailed instructions are given on back of drawing, plan can be removed from board so that perspective sketches and other details for finishing model are available.

• RE-ENFORCED PRINTED SHEETS.
Printed balsa rib sheets are supplied. But, when stronger models are required, plain sheets of white writing paper can be pasted to backs of rib sheets. Apply library paste to paper and attach to back of each rib sheet. Paper re-enforcements eliminate possibility of cracking balsa along the grain. While drying, place pasted parts between two flat surfaces and apply weights to them (some old magazines or books) to prevent warping. Do not remove paper re-enforcements from various pieces after they have been cut from rib sheet.

SCALE 13/16"= 1'-0"
EXACT SCALE FLYING MODEL
VULTEE VANGUARD