

+ Messerschmitt M23b +

By BILL NOONAN . . . A perfect model for the new 36" minimum wingspan Jumbo scale rules, this ship embodies all the characteristics of our historic rubber scale era that is making such a tremendous comeback.

• The Messerschmitt M23 series was introduced with the model "a" in 1929, to satisfy an appeal issued by The German Aero Club for lightplane designs to compete in the *Ostpreussenflug*, or Circuit of East Prussia touring contest. The early "a" model sported the popular ABC Scorpion two-cylinder (38 hp) engine, or the 45 hp Salmson AD9. The acceptance of the clean, graceful low-wing two-seater encouraged Messerschmitt to make improvements in the form of the M23b, with modified airframe and power plant choices giving

pilots no less than eight different engines to choose from. It is interesting to note variations in fuselage length on production models in the "b" series which varied from 20 feet, 10 inches to 21 feet, 9-3/4 inches. One can assume this had to do with power and weight characteristics.

Our model reproduces the acrobatic mode which served champion Willi Stor so well, registered D-1856. It was powered with an 110 hp inverted Argus engine.

No record seems to have been kept

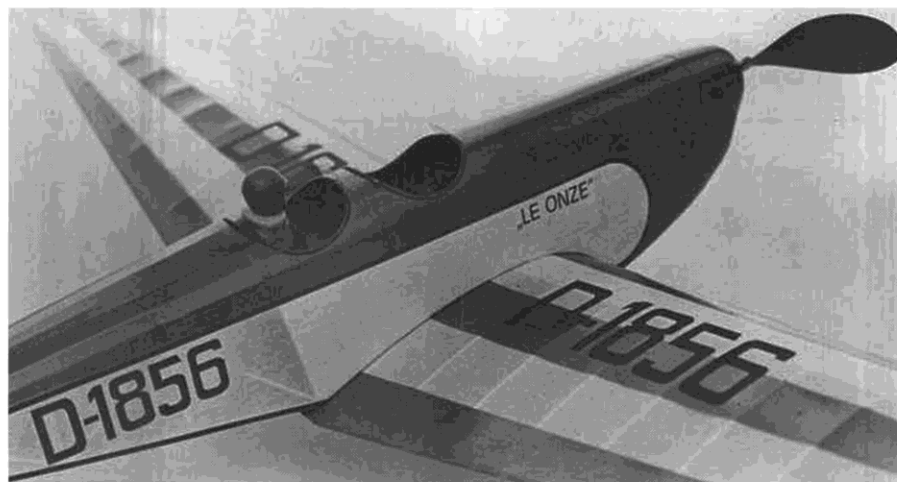
of the exact color of the aircraft, but contemporary black and white photographs, probably taken with orthochromatic film, suggest the plane might have been red and white, which seems appropriate to the somewhat flamboyant scheme chosen by Stor to embellish wings, fuselage and tail surfaces. It must have been popular at air shows.

History records some M23b's with squared-off tail surfaces. Our model follows Stor's configuration, which had rounded tips on both stabilizer and vertical fin, harmonizing nicely with the wing plan. This model seems to depart from others also in the aileron design, which, rather than being contained between rib stations, went to the tip radius.

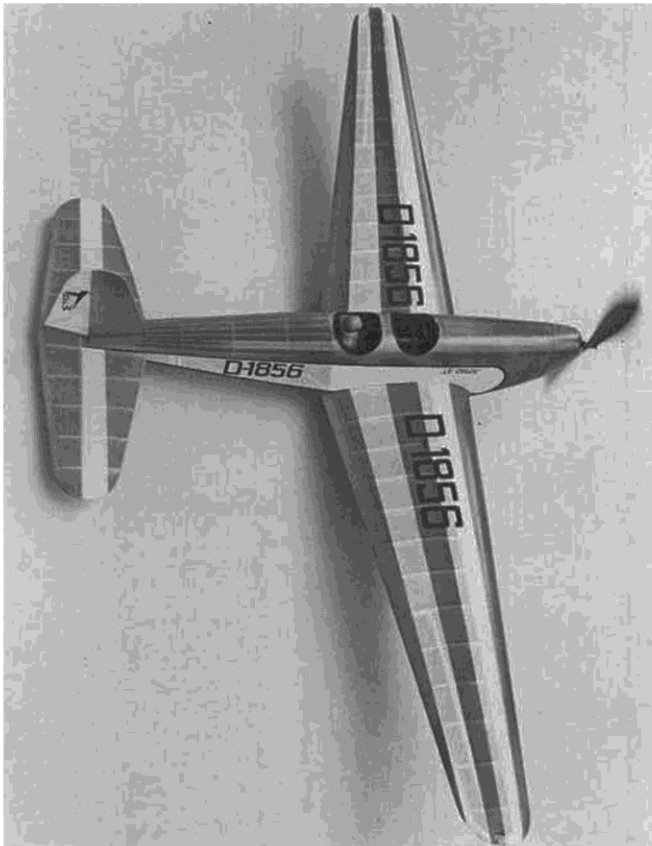
The M23 series, particularly the "c" model, excite a note of familiarity, much as might be elicited by looking through an old family photo album. *Deju vu?* No, its a reflection of the most famous Messerschmitt of all, the Me109. Subtle qualities in the shape of the wing, fuselage contour, etc. tie these two generations together, revealing the lineage, much the way the photo album might have.

WING

As was the prevailing practice of many German designers of the twenties (Fokker, Junkers, et al.), the M23b fea-



Neat workmanship shows in this close-up photo. The original airplane had right and left folding wing panels. On the model, a one-piece wing was used for simplicity.



Left: Generous flying surfaces make the M23b an excellent choice for flying scale. Hmmm, would be interesting R/C Sport Scale ship.

tured a strongly tapered, deep-sectioned, undercambered wing. We have deviated from the original, not in plan, but mechanically, in the interest of strength. The original had right and left folding wing panels. Our model incorporates a full-span wing, which passes under the fuselage.

Spar is cut from straight-grained $1/8 \times 1/2$ medium hard balsa, tapered per drawing. Ribs are cut from light $1/16$ sheet, omitting spar, leading and trailing edge provisions.

Cut tapered leading edge and roughly sectioned trailing edge. Pin both over respective positions on Saran Wrap-protected plans. The leading edge will need scrap balsa "shims" to elevate it above the plan to anticipate coinciding with rib contour. Take each rib and hold it in position at its correct station. Confirm proper chord and make mark with sharp cutting tool on each rib at l.e. and t.e. contact points. Cut off surplus and again confirm fit by wedging dry ribs between l.e. and t.e. At this time lay spar across ribs and repeat marking procedure on the top of each rib, indicating spar notch. Withdraw ribs, cut notches to correct depth. Spar sits $1/32$ below top of ribs. The excess in front of the spar is removed after assembly, with a fine sanding block, maintaining airfoil contour to the leading edge. This step-down from spar forward allows later placement of $1/32$ balsa leading airfoil edge covering. Cut tips from $1/8$ medium balsa, cement in place, trim and sand to proper contour.

Your wings should appear as finished,

except for the center section and addition of $1/32$ sheet. It might be pointed out at this time that the ailerons were incorporated to enhance the scale effect, as well as to provide for wash-out or to correct incorrigible warps. On the original model, they remain in a fixed position.

Remove wings from plan. Cut dihedral spar brace (part SB) from $1/32$ plywood. Cement this part to front of spars, making sure spars accurately parallel brace angle, which automatically gives proper dihedral. Use clothes pins or spring clips available at stationery supply stores, to hold the whole ball of wax together while it dries. The center section immediately under the fuselage is flat as viewed from the front. This allows the wing to "cradle" into the bottom of the fuselage.

Add center section ribs as shown, as well as leading and trailing edges. Sand to proper airfoil. The center section will be covered with $1/32$ sheet full chord, so no step-down is called for on center section ribs (two). Rather, these two ribs are $1/32$ less in depth than adjacent root ribs. False "stringer ribs" are cemented inside root ribs to form shelf to glue $1/32$ sheet to.

The $1/32$ sheet can now be fitted. Start by running bead of cement (we used Titebond) along top of spar, taking care not to slop any aft on top of ribs. Pin the sheet along spar top from root rib to tip. When dry, bend to conform to airfoil, and cement to leading edge. When this is dry, cut and sand, feathering to airfoil shape along leading

edge.

Before covering the center section with $1/32$ sheet, bend right and left wing anchor hooks and epoxy to back of spar. These will protrude about $3/8$ above the $1/32$ sheet center section covering which forms the cockpit floor. Mating hooks will later be epoxied inside fuselage sides approximately at top longeron. Stretched rubber bands or tensions springs between the hook sets form the method of holding the wing in place.

A lot of trouble you say?

I have had too many occurrences where dynamic contact with a foreign object (the ground?) transmitted stress to longerons and transverse members, usually necessitating major repairs. This method of attachment is further justified by the fact that the landing gear is integral with the wing.

TAIL SURFACES

The primary framework of both vertical fin and horizontal stabilizer is $3/32$ square balsa. The stabilizer has a $3/32 \times 1/4$ trailing edge, tips are laminated from two pieces of basswood, $1/32 \times 3/32$, to make a $1/16 \times 3/32$ combination. The entire vertical fin outline is laminated.

To make the laminated parts, cut stabilizer tip and vertical fin forms from $1/8$ balsa, and wax edges with candle or parafin to act as a release in case surplus glue gets between lamination and form.

Prepare the basswood strips for bending by soaking in hot (not boiling) water for about 30 minutes. Wipe excess water from the strips and apply either white

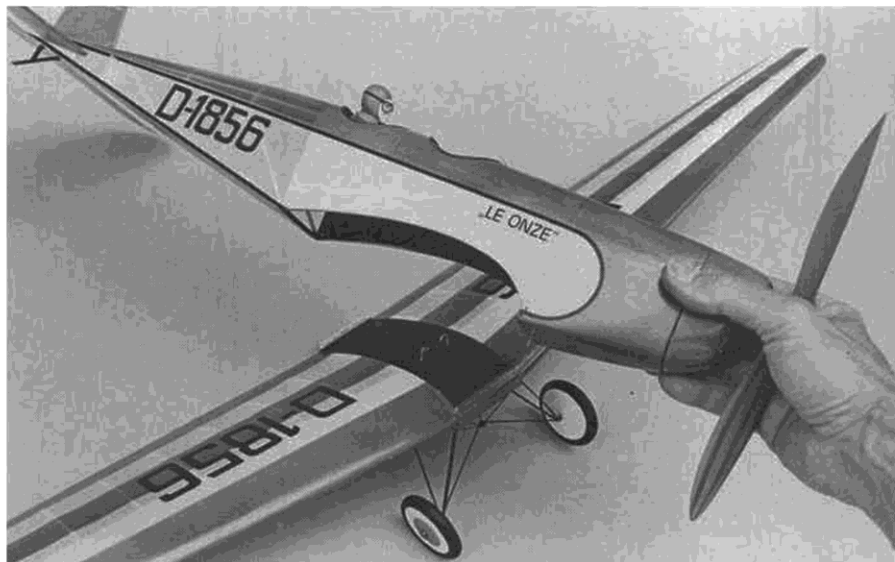
glue or Titebond between strips. Pin down forms and pin lamination strips around the forms, making sure strips conform to the desired shapes. Check to see laminated parts are in contact with one another. Allow to dry overnight.

Trim basswood and cement to primary frame of spar and "ribs." The vertical fin is flat in cross-section, the leading and trailing edges sanded to round shape. The stabilizer airfoil is modified to a symmetrical cross-section by adding 1/16 square "cap strips" on all 3/32 square "ribs," both top and bottom, sanding to streamline section when dry. This enhances the stabilizer contours, and improves the structural integrity aft of the spar. In the construction of the original model, the two center ribs were cemented in place after the fuselage was completed, allowing absolute accurate fit where stabilizer contacted the fuselage sides.

FUSELAGE

The main fuselage longerons are of medium grade 1/8 square balsa. You could substitute 3/32 square in the interest of weight saving, and not appreciably affect structural strength. Lay main longerons over plans, using Saran wrap between to prevent structure from adhering to plans from excess glue. Cement square uprights and 1/16 x 1/8 diagonals in place. Cut 1/8 sheet portion which forms fuselage sides in cockpit area, and is contoured on bottom to receive wing. When dry, repeat procedure for second side, again separating the two with Saran wrap. We used Vintage Aero's plastic "Pins Downs," handy little gizmos that hold balsa parts to plans without having to penetrate balsa with pins, a no-no.

Remove completed sides from plans and position inverted over top view, the top longeron being flat allows this to be easily accomplished. Cement in cross pieces, noting that what would be the top longeron (which is now on the bottom) cross pieces actually bridge the fuselage about a 1/2 inch down, to anticipate the formers being inserted later. This detail allows for eventual



Hooks on top of wing engage rubber bands which wrap around hooks inside fuselage, holding wing in place. Alignment piece on trailing edge should be lightly glued to break away in crash.

passage of rubber motor, approximately paralleling the top longeron. Remove from plans when dry.

Cut formers from 1/16 sheet balsa. Do not notch at time of cutting. Cement each in place in main framework. When dry, establish center stringer position by holding piece of 1/16 x 1/8 balsa along center line (looking from above). Mark each former with sharp instrument or sharp pencil. This becomes reference mark for filing notches with modeler's file. Each notch is calculated to receive a 1/16 x 1/8 stringer. Follow same procedure with all stringers. When cementing stringers in place, note that they all wind up in a nice gang at the horizontal "stabilizer post." All stringers about this post with the exception of the center one, which is 3/32 short, allowing vertical fin spar to penetrate the fuselage and form the tail skid support.

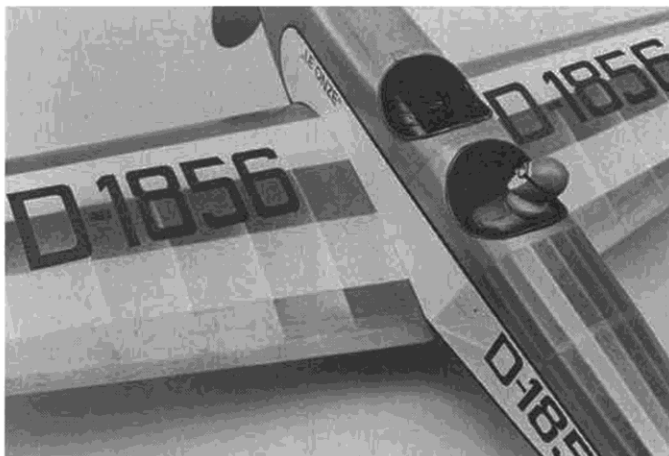
Fill in between stringers with soft 1/16 sheet between Former B and Former F. When cement has set, sand with progressively fine grades of garnet paper, taking care to maintain smooth and accurate contour. Cockpits are cut after covering has been applied, but we

will describe the procedure: Position bond paper pattern in correct position atop the fuselage, determining accurate cockpit locations between formers. Scribe outlines. Cut with sharp, pointed blade. Sand cockpit edges to remove minor imperfections. Cockpit coamings, applied after final color finish, are of either 1/16 diameter black tubing, or insulation stripped from unstranded copper hook-up wire. These hide most minor discrepancies.

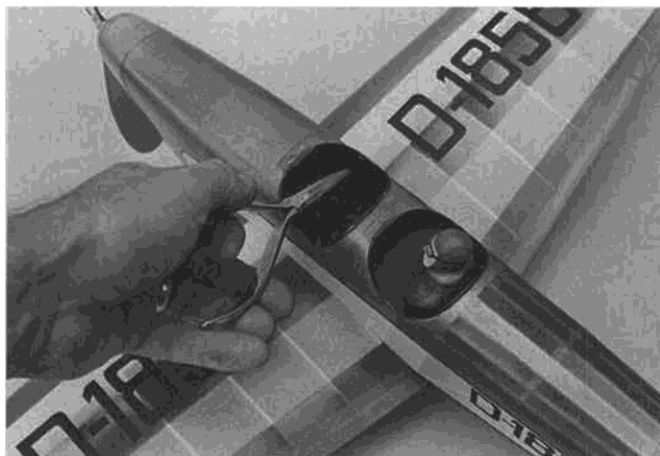
Cement the 1/32 plywood former (A) in place. Fill in cowl sides with 1/4-inch soft balsa and cement cowl bottom block in place. When dry, carve and sand to correct shape. Cowl is flat on bottom where it meets the wing leading edge, changing to the void shape of former A at the front. It is not necessary to hollow out the bottom cowl block, as some weight is needed in the nose, and it might as well contribute to structural strength.

The removable nose "block" is really a series of 1/4-inch balsa sheet laminations, cemented with alternating grain. This nose could be carved from a hard

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Close-up photo reveals neat covering job by author/designer/builder. Rubber motor can be seen in front cockpit.



Needle-nose pliers are used to install rubber bands that hold wing in place . . . Okay, if you insist, needle-nose!

block, but this is the method we used, and it provides a highly resilient and durable part.

When nose contouring is completed, using progressively finer grades of garnet paper to achieve proper shape, drill hole on thrust line to accommodate .045 I.D. brass or aluminum tubing, which acts as bushing for rubber hook. The tubing is cut short to accept insertion of wood or teflon thrust button, this backing up roller ball thrust bearing on which the 9-inch Peck-Polymer prop rides. Epoxy the tubing in place, making sure no glue each rib, otherwise you will wind up with a fat version of a German Clark Y airfoil.

Fuselage is easy. Cover the sides and bottom in conventional manner, making sure tissue grain is running parallel with longerons. Turtleback was covered with individual strips between formers, tissue laid athwartwise, shingle fashion, from longeron to longeron. Cover all sheet surfaces. Nose block and underwing filler are not covered, but receive three coats of Aerogloss sanding sealer or equivalent. Tail surfaces are covered in conventional manner and need no special description.

Spray covered model lightly with water, using atomizer. When dry, apply three coats of nitrate dope, diluted with thinner specified by manufacturer, to a 40-60 ratio, 60% dope. We used plasti-cizer in our mix, to minimize warp.

The red trim on the model is "Spray Mark" cadmium red no. 310, an aerosol product used by commercial artists, and available at better stocked art supply stores. It is transparent and has excellent color intensity. Carefully mask areas which are to remain white with draftsman's tape, which has weaker adhesive than regular masking tape, making removal easier. Wing and fuselage undersides are solid red, stabilizer underside repeats striped motif which appears on top. Both wing and stabilizer topside have distinct red and white strips, the wing stripes narrowing toward the tip, as shown in the photos. White fuselage sides are separated from red top deck and nose by black stripe which follows longerons and forms a 180 degree arc on cowl side. One note of caution: the Spray Mark is water-soluble, and has to be fixed with artist's fixative, commonly used to "set" charcoal or pastel drawings. We used Grumbacher Myston non-glossy artist's fixative. It is a very light-weight spray. Don't try clear dope over the Spray Mark, the two are not compatible.

Cut registration letter and numbers from tissue, white for wing underside, all the rest, black. We used 3M Sprayment as an adhesive, laying cut figures upside down on newspaper and holding can far enough away so as not to blow

the delicate numbers around. Carefully pick up numbers with pointed knife and position accurately in respective places. Give these a shot or two of fixative to help seal the edges and prevent the airstream from lifting them.

The BFW bird on the rudder is cut from black tissue. Both BFW letters and "LE ONZE" that appears on the fuselage forward of the front cockpit, are 30 point pressure applied transfer type. The type face is "Antique Olive" manufactured by Geotype. Practically all manufacturers of transfer type, and there are a lot of them, have "Helvetica" which may be substituted. "Le Onze" translates to "The Eleven." Its significance is unknown.

MISCELLANEOUS

The 1/32 landing gear wire is sheathed with 1 ply plate finish (smooth) Strathmore artist's paper. This is a durable, hard paper with distinctive grain characteristics which should parallel the wire. Cut sheaths to strut length, leaving about twice as much chord as needed. Wrap wire with paper, forming symmetrical airfoil. Cement and pinch trailing edge, using spring clips from stationery store to hold until dry. Trim to proper chord, and paint flat black with Floquil railroad color, which has excellent texture and covering qualities.

Wheels on the original model were turned from laminated balsa. You may want to substitute Williams Brothers 1-7/8 inch diameter vintage wheels, which would work fine. Tires are flat black, wheel white with red center.

Willi Stor, whose likeness you see in the rear cockpit, was cut from light balsa, sanded and coated with four coats of sanding sealer before receiving artist's acrylic cosmetic. Goggle frames were bent from brass wire. "Lenses" were made by dipping into clear dope spread on water as you might cover a microfilm job. Cement them to Willi with epoxy dab.

The Peck prop was sprayed kind of a maple color, and when dry, carefully masked to simulate laminations. It was resprayed with a darker value spray which might approximate mahogany and the masking was removed. *Voila!* Instant lamination.

FLYING

Six strands (3 loops) of 3/16 lubed rubber are used for power. The loops should be 24 inches long, which means that about 8 inches of rubber hangs out the nose when limp. Fellow modeler, John Oldenkamp, gave us one of those neat little cast aluminum "unions" which gather the rubber at the nose hook and make it a cinch to transfer to the hook after packing in the winds. We strongly recommend its use (*it's made by Jim Crocket. See ads. wcn*). The other end of the rubber bundle is secured at the tail by 3/16 O.D. aluminum tube, running transversely through

fuselage, held by friction in hard balsa.

Test model over tall grass, starting with about 1000 winds. Torque may take it to the left, if all surfaces are unwarped and neutral. That's the way ours went, in large circles. Model should balance when supported at wing tip extremities. We had to add a piece of printer's type weighing about 7 grams to the nose, inside the cowl bottom, to achieve this.

The model flies slowly and exhibits no stability peculiarities. We always try to get about two to three degrees uniform wash-out built into the wing tips, and this model is no exception. What is two to three degrees? It should be about an 1/8 inch at the trailing edge at the wing tips. If it can't be built in, you may want to experiment with aileron angle change.

The Messerschmitt M23b is a neat, well proportioned model that seems to satisfy a number of requirements; it's easy to build, it's pretty and it's strong.