

Mordecai Murphy's DART

By WALT MOONEY . . . Mordecai Murphy was a villainous cartoon strip character in *Air Trails* magazine back in the late '30s. His aircraft were always sleek and fast. The *Dart*, even though fictional, looked real!

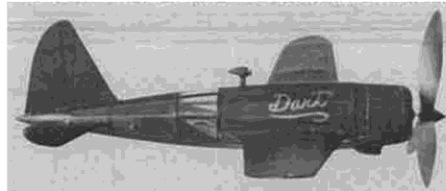
• In 1938 and 1939 almost every month in *Air Trails* magazine there would be a fictional story about one of the aviation heroes of the younger set of the time. Waiting for the latest issue to appear at the local library was almost too much to bear, and once it arrived, the latest Bill Barnes story would be profusely illustrated with pictures of the air battles depicted in the story between Bill or one of his pilots, "Sandy," and Bill's mortal (well almost mortal) enemy MORDECAI MURPHY.

One continual puzzle was how Bill kept managing to come out best in the fights with aircraft that were obviously inferior aerodynamically (if the illustrations could be believed), while Mordecai always limped away from the fight in his beautiful, sleek, black with gold lettering, "Dart". Somehow having the bad guy lose in better looking equipment always seemed a little farfetched. After all, in five or six years, Bill's engineers should have picked up a little stability

and control know-how and put a larger vertical tail on his airplanes.

Well, maybe good aeronautical engineering can't improve black-hearted piloting ability.

The *Dart* always looked good, and inspired in me a desire to build a model of it someday, but where could a three-view be obtained? Thirty-three years of aeronautical engineering experience later, it became obvious that a good review of the available data would allow



a comprehensive air force intelligence effort to be made, and a good, accurate three-view to be drawn.

Curtiss Mooney says that the *Dart* looks like the Grumman *Bearcat* which it

predates by at least a decade. Besides the *Dart* is prettier. The model is a delightful flyer. It has flown 25 seconds indoors, and more than 48 seconds outdoors.

Why not try a model of Mordecai Murphy's *Dart* and wear a "black flying helmet" for a while?

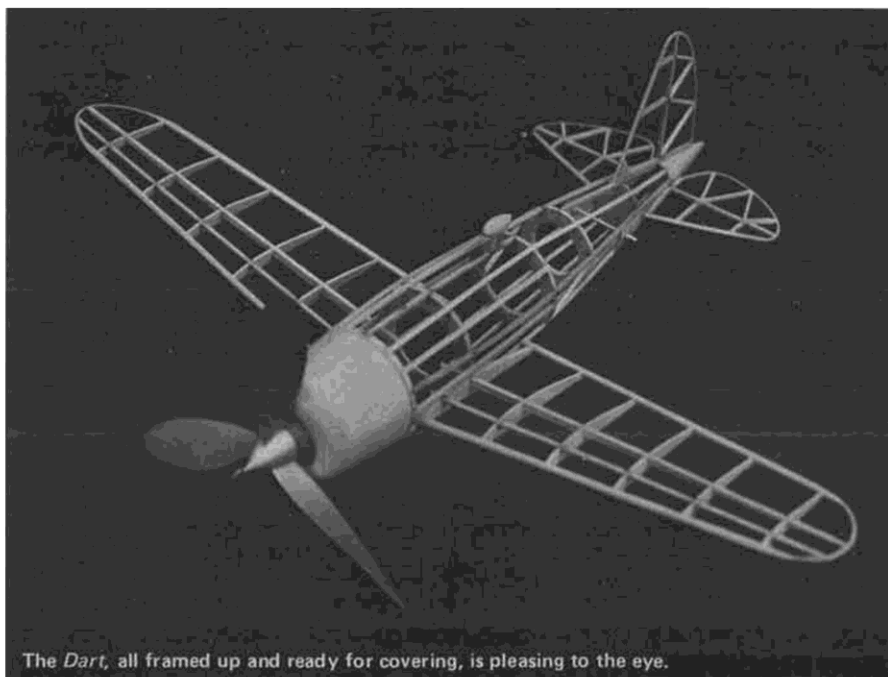
The model in the photos was built without landing gear and "looks right" in the air. It obviously will fly better without a landing gear but one has been indicated for those who prefer to have a bird with legs.

Construction of the *Dart* generally follows standard practices with the exception of the fuselage which will be taken up in detail. The wing tips and curved tail outlines are laminated from thin strips. Basswood strips 1/20 x 1/16 were used for the laminating material for the model shown, but four layers of 1/64 x 1/16 balsa can also be used if care is taken to shape the outlines around a smooth, waxed form using thin white glue as a laminating adhesive.

Wing structure is a standard rib, spar, leading and trailing edge assembly. This is done directly over the plan, blocking up the leading edge so that it can be cemented to the nose of the ribs at the proper location. The leading edge and the wing tips are rounded and the trailing edge tapered using fine sandpaper to obtain the correct airfoil contour.

Build the tail surfaces as 1/16th thick surfaces rather than to the thicker airfoil sections shown to keep them light in weight and easier to build.

Now lets tackle the fuselage. It was built a little differently than usual. Select 1/16th square stringer stock so that all pieces have the same stiffness and all pieces bend the same amount under the same loading. This will help you to obtain an unwarped body. Prepare 14 stringers by cutting them all to the length shown in the widest part of the top view. Put a black felt pen dot at the location of each former pen along the stringer. Sharpen the last 1/8-inch of



The *Dart*, all framed up and ready for covering, is pleasing to the eye.

Continued on page 97

each stringer.

Cut out all the formers, notching as indicated. Note that the notches are only half the thickness of Former 5. Mark the top of each former. The top is the leftmost point on the former as it is drawn on the plan.

Select a light weight balsa block to make into the tailcone (TC). Cut it to match the top and side view, but do not carve it to its final contours. Mark out the location of the ten stringers that are to be notched into the front face of the TC. Sharpen a piece of hard balsa or dowel and push a dent into the TC at each location to accept a stringer.

Now, placing all the former locating marks to the inside, and using cyanoacrylate (Hot Stuff, Zap, etc.) adhere the ten stringers in place in the TC. Make sure that they angle outward as they extend forward so that they make the proper tailcone angle. Now place Former 9 inside the stringer cone at its location marks the cement it in place. Do the same thing with each of the other stringers working forward until Former 5 has been installed. Check to see that the fuselage is a symmetrical structure. Add the remaining stringers.

Now, remove the top center stringer between Formers 7 and 8. Prepare the diagonal members that make up the bottom of the windows, and cement them in place after removing part of the two sidemost stringers between 7 and 8. Carve the tailcone to its final contours.

Cement the four pieces that make up the front of the nose cowl into a single piece. Cross the grain of the adjacent layers for increased strength. Now, using some fairly stiff bond paper, make up a pattern by the cut-and-try method for the balsa sheet wrapper that goes between the back piece of Former 3 and Former 4. When you are satisfied with the pattern, select a piece of A grain, flexible 1/16 balsa sheet, and make it to match the pattern with its grain aligned with the length of the model. Wrap it around Formers 3 and 4 and cement it in place. Carve and sand this engine cowl assembly to the contours shown in the top and side views, and then cement it in place on the front of the fuselage.

Cover the various assemblies with black tissue using your standard covering procedures. Water shrink the tissue and then give the model several coats of clear dope. Add the details such as the periscope, the engine air scoop, the exhaust stacks, the windows, the window frame outlines, and the *Dart* logo. Bond paper fillets are fitted using the cut-and-try method and painted flat black. Cowl flaps are scribed in.

Carve the propeller spinner out of a piece of fine-grained hard balsa. Insert a prop shaft wire, use your favorite free-wheeler if desired.

Get two *Sleek Streak* propellers (or equivalent) and take three blades and notch them into the spinner. Make the thrust bearing out of hard balsa with a hardwood front face. Drill a 1/16th diameter hole in it and insert a short

length of aluminum tubing. Add a couple of washers to your prop shaft and insert it into the thrust bearing, then bend the motor hook. Add a filler piece to each side of the fuselage just forward of the tail to support the rear motor peg. Use 1/16th aluminum tubing for the peg.

The model should balance at the wing tips halfway between the two wing spars. If it does not, ballast it with modeling clay or something similar until it does. Washout each wing tip about an eighth of an inch. Wind up your *Dart* and see how it flies starting with a few turns in the rubber motor and working up to maximum winds over a period of eight or ten test flights. The model in the photo flew in lefthand circles with a fairly steep bank angle. Interestingly, the turns were wider under high power than later on in the flight when the prop had run down. Undoubtedly, this is the result of some slight right thrust, although none was intentionally installed.

Viva Mordecai Murphy, and down with Bill Barnes . . . although it would sure be nice to live through those interesting days again! ●