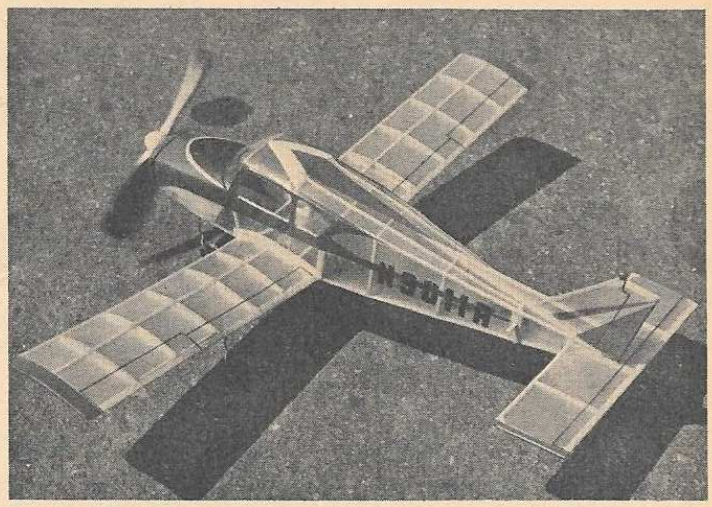
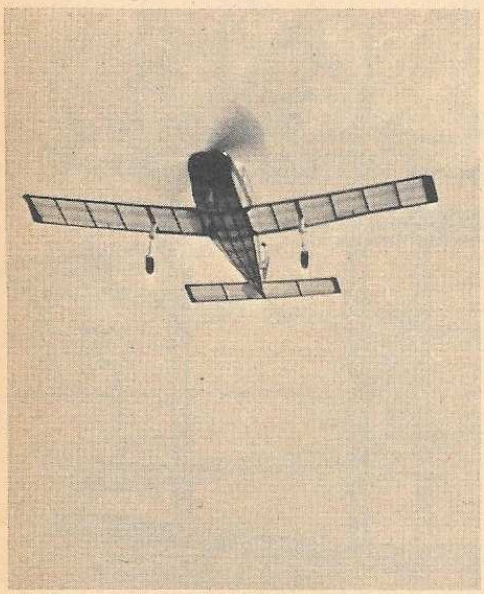
. . . BEECH MUSKETEER

Photos by Fudo Takagi

Chrislea Bee Mooney is the lovely name of Walt's full scale, girl-type, model shown holding latest of his very many fine flying models.

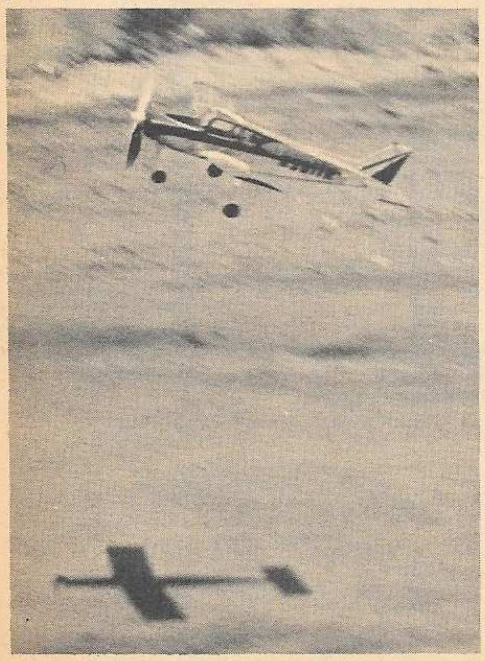


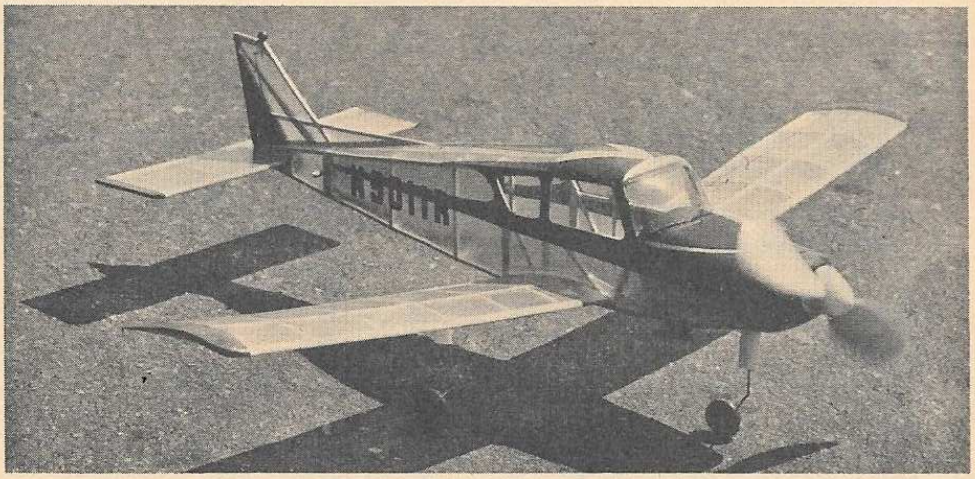
Businesslike and clean describe Lilliputian Musketeer as it stands ready for flight. Trim details add much to scale appearance of little bird.



Have you ever seen anything prettier? Steady as a rock and certainly does look like real thing.

Scale takeoff with shadow below is example of good photography to show model at its best.





Another good bit of photography. Only a few winds of rubber and a simulated engine run-up.

By WALT MOONEY . . . THE OLD PROFESSOR HAS ADDED ANOTHER WINNER TO HIS OUTSTANDING COLLECTION OF GOOD RUBBER-POWERED FREE FLIGHT SCALE MODELS.

► The Musketeer is Beech's attempt to provide a simple, relatively low cost four-place aircraft. The Beech people have simplified the lines and structure of the aircraft as compared to the Bonanza and utilized a fixed landing gear and an all-moving horizontal tail. The leading and trailing edges of the wings and horizontal tail are parallel; and the sides of the body are very nearly flat. Nonetheless, the Musketeer is a very attractive aircraft and is a suitable subject for a small rubber-powered scale model with a minimum number of scale deviations. These deviations are due to two things, full size airplane aerodynamics and modern full size airplane engine propeller combinations. Model aerodynamics require, generally speaking, more dihedral in the wings and a larger horizontal tail area. Model duration requires a large propeller. To fulfill the model requirements, our Musketeer has lengthened landing gear to provide clearance for a larger than scale diameter propeller, a larger than scale horizontal tail and has increased dihedral. For those who would prefer a model closer to scale, the scale gear and tail is indicated on the plans.

One difficulty in portraying modern aircraft in small rubber scale models is in simulation of the metal surfaces. The Musketeer is no exception, as you can see by the photographs it still makes up into a very attractive model.

The model is constructed in the standard manner for small scale rubber jobs. The fuselage is made up of two side frames separated by cross pieces surmounted by formers top and bottom, into which are notched stringers. The wings are composed of leading and trailing edges, ribs, top spars notched into the ribs and carved tips. All the wood in the model is balsa. All sticks are either 1/16th square (*Continued on page* 49)

FULL SIZE PLANS FOR BEECH MUSKETEER ON NEXT TWO PAGES

Beech Musketeer

(*Continued from page* 17)

or 1/16th by ⅛th. If you are willing to do a little sanding and a little laminating, a single sheet of 1/16th by 3 by 36 inch balsa will be more than sufficient. All ribs and formers being cut directly from it, all blocks being laminated from pieces of it, and the top cowl being formed from a piece sanded down to 1/32nd inch thick. The landing gear wire, and propeller hook should be made from piano wire about 1/64th in diameter. The exact size is not critical but the model is quite small so strive for lightness. The wheels can be wood or plastic or rubber at your discretion. Japanese tissue is satisfactory covering, although the model is covered with condenser paper. Trim on the model is pigmented dope with decal numbers but contrasting colored tissue are ok. The propeller on the model shown is carved from a balsa block, however, a machine cut hardwood, or plastic propeller will be perfectly satisfactory provided it is suitably sized and the model's center of gravity (cg) is as indicated on the plans.

Construct the two side frames, (shown cross-hatched on the plans) by pinning the longerons down in place over the planes, then cut and fit uprights and diagonals and cement them in place. When these are perfectly dry, carefully remove from plans and using a piece of double-edged razor blade, separate the two sides. Cement these together at the point of the tail and add the cross braces working from tail to nose. Note that the top longerons in the area of the cabin are closer together than the bottom longerons. Now add formers to cross braces, locate stringers and cement them in place. Note that in some cases, the former is notched for the stringer and in other cases, stringer is cemented on top of the former. Add the cowl sheeting at the nose and carve the side cowling to contour. Select a solid block or laminate one from which to carve the nose block. Two laminations should be made to just fit inside the nose of the fuselage framing so as to locate nose block and hold it in place with a snug fit. Carve nose block to the general shape shown on the plans, and sand it to fair smoothly into the fuselage cowling. Cut out the fourteen wing ribs required and laminate two tip blocks. Pin the leading and trailing edges of the wing in place over the plans and cement the ribs and the tip blocks in place. Note that the top of the root rib, (the one that attaches to the fuselage) is slanted towards the tip so as to provide the correct dihedral angle. Check this by using the dihedral guide shown on the plans. Now add the spar being careful not to change the slant of the root rib while you are doing it. At this point add the triangular gussets at the four corners of the wings. These gussets are essential if you are to avoid corner wrinkles in the covering later on. When the wings are dry remove them from the plans and carefully shape the leading and trailing edges to the contour indicated where the rib shape is shown. Carve the tip blocks to shape.

Make the vertical and horizontal tail surfaces directly over the plans. When they are dry remove from the plans and round the leading edges, and the tips, and taper the trailing edges. Don't foregt to add the gussets in the corners.

Now let's cover the model. The first step

is a careful sanding of the complete structure to remove all burrs, glue bumps and other flaws that might affect the covering in a detrimental way. Make the grain of the tissue go lengthwise on each separate surface covered. Attach it to the surface only around the edges. For instance, tissue should be glued only to the leading and trailing edges, the root rib, and the tip of the wing. Do not attach it to the other ribs or the spars. Use tissue to cover the wood of the cowling and the noseblock. When all items have been covered, lightly spray them with water to shrink the tissue.

Now bend the landing gear wires. The top length is forced into the structure at the location shown on the plans. This is indicated by an x on the wings and is on the centerline of the airplane for the nose gear. Use a pin to make the starting hole. Cement the wires in place and add a second coat of cement. Wheels are then slipped over the axles and can be retained by a small drop of cement.

Carve a propeller from the block shown on the plans or select a ready-made one that will work. Drill a 1/16th diameter hole in nose block to accommodate the length of aluminum tubing that will be used for a propeller shaft bearing. A free wheeling device is not essential to these small scale models, however if desired, your favorite type may be used. Otherwise, use a pin to make a hole in the propeller for the shaft. Bend up the propeller shaft with a winding loop at the front and a hook for the rubber motor behind the nose block. I've found it easier to make a neat winding loop if I bend it first and install the shaft in the propeller. Then thread a few washers on the shaft, thread the shaft through the noseblock bearing and then bend the hook behind the nose block. If you have trouble bending the wire, the method described has the advantage of getting the last bends inside the fuselage and out of sight.

Cement windows in place on side of fuselage. These should be made from thin clear plastic. Be quite sparing with cement and make an effort not to smear on windows. The windshield shown has a compound curve, that is, it bends in two directions at once, so for the best appearance it must be formed. The easiest way to do this is to buy a Vacuform and carve a balsa block to fit the fuselage and to use as a mold. Otherwise carve the form anyway and heat the plastic over stove until it is pliable enough to be pulled down over the form. Carefully install windshield on fuselage.

Assemble the model by sliding the horizontal tail in place in the slot at the rear of the fuselage and lightly cement it in place. Cement rudder in place on the center top stringer and make sure that it is vertical. Cement wings in place on the sides of fuselage in the exact location shown on the side view. Be sure that they are both at the same incidence. Block up both wings and fuselage so that wings will have correct dihedral and let them dry thoroughly.

Now, give entire model two coats of thin clear dope. Add about four drops of oil of winter green, or castor oil, or an equivalent amount of camphor to an ounce of dope and then thin the dope with an equal amount of thinner. The above additives will lessen the shrinking ability of dope and reduce the chances of bad warps on the surfaces. Don't overdo the additives however, or the dope will not dry at all. Now, add color trim and numerals. On the model shown, the striping is red-pigmented dope and the numerals are black decals.

If more details are desired get some photos of the real Musketeer (Write Beech Aircraft Corporation, Wichita, Kansas.) and add items such as navigation lights, anti-collision lights, spinner, landing gear fairings, wing walk, pilot head, flap hinges, cowl air inlets, etc. None of these last details are essential or detrimental to the flying ability of the model but will add quite a bit to its appearance.

One loop of 1/8th rubber is ideal power for the model Musketeer. It should be 2 or 3 inches longer than the distance from the front hook to the rear motor peg. Lubricate it lightly with a good rubber lube or castor oil before you install it.

Now check to see where the model balances. It should balance in a horizontal position if held by two fingertips, one under each wing tip, in line with the center of gravity (cg) as indicated on the plans. If it does not balance add modeling clay to the nose or tail until it does. If some real nice tall grass is available try some test glides. The model should glide smoothly a distance of twelve to fifteen feet from a launch height of three or four feet. If it does not, warp trailing edge of horizontal tail up or down. Now, you are ready for power attempts.

If no tall grass is available or if you are going to just fly indoors, you can dispense with the glides and start at this point with ROG takeoffs using about fifty hand-wound turns to start and gradually working up to the full capacity of the motor. Any deviation from the flight pattern should be corrected by putting thin shims of balsa between fuselage and nose block to point thrust line of propeller in the correct direction. The original model took some down thrust and some right thrust.

The Musketeer should fly well in the area of an indoor basketball court. Most of these have ceilings of about 20 feet height. A short motor will get you up in the rafters so experiment with the length of your motors, extending them until the model just clears the ceiling and comes in to land on the last few turns of the motor.