

MAKE SIMPLE BOOMERANGS

You may not bag a kangaroo, or even a solitary bushranger, but you can always be sure of getting your own back with one of our easy-to-build boomerangs. Many happy returns!

These two basic models are capable of giving excellent results—the small one for indoor use and the larger model for outdoor launching where there is more space and less chance of hitting someone! Construction is simplicity itself, so start with an indoor model right away . . . The two parts for the indoor boomerang should be cut from quite light $\frac{1}{16}$ in. sheet balsa. Mark off a 9 in. length on the sheet and then two 1 in. wide strips. Cut out with a modelling knife and check that the two pieces are exactly the same width. Round off the tips with fine sandpaper and then simply assemble the two blades, as shown, with a rubber band.

Your boomerang is now ready for trying out. For a start, position the blades so that they form a 'cross' with four equal legs—and be sure to get the two blades at right angles. The boomerang will be easier to launch in this form, and will also describe the smallest circle in flight.

Holding the tip of one blade A (small diagram on the right), throw the boomerang forward with a spinning motion in the direction shown. If you are left handed, hold the boomerang by the opposite tip and spin in the opposite direction.

With a little practice you will find it easy to make the boomerang describe a complete circular flight back to your hand—all within the space of a reasonable size room.

To make the boomerang fly in a larger circle, move the position of the blades to that shown in the middle diagram. Launch by tip A, as before.

For the largest circle of all, adjust the blade positions as shown in the left hand diagram. This time it will be easier to launch by holding the tip of one of the longer blades. Also you may find that the boomerang will not describe a proper circle because it is too light. The main thing is that by altering the blade position you alter the flight circle—but bear in mind that the smaller the flight circle (i.e., the nearer the boomerang is to an equal 'cross', the easier it will be to make it complete a circle back to your hand.

Layout of one blade for the larger boomerang is shown above. Cut *two* from hard $\frac{3}{16}$ in. sheet balsa or $\frac{3}{16}$ in. sheet obeche and make sure that they are identical. You can make the blades any length between 18 in. and 24 in., but the shorter length will be best to start with. You can make a larger one later! The blades need shaping to an aerofoil section with equal camber (actually an ogival section). The easiest way to do this is to plane or carve down one surface into a series of five 'flats', as shown (1) and then finish off with sandpaper (2). Try to get both blades exactly the same. If you have a letter balance, weigh them as a check. If one blade is heavier than the other, sand more off it until the two blades weigh the same.

Assemble the boomerang like the indoor model, but this time using a really stout rubber band (3). This is only a temporary assembly to enable you to find the best position for the blades to suit your launching technique and the space available. When you have found a suitable set-up, mark the blade position with a pencil (4). Remove the band and shape a couple of wedges to act as packing pieces so that the top blade rests snugly on the cambered surface of the lower blade (5). Then cement the two blades permanently together (6). Use pins to hold until set, and bind the joint with thread for further strength.

If you find that your boomerang falls off to one side and loses height instead of describing a flat circle, try steaming some dihedral into the tip of each blade. Simply hold the blade in the steam from a boiling kettle and gently bend to a curve. Try to get exactly the same curve and tip rise (dihedral) on each blade.

Finally, remember that this model is an *outdoor* boomerang—so only launch it where there is plenty of space.

