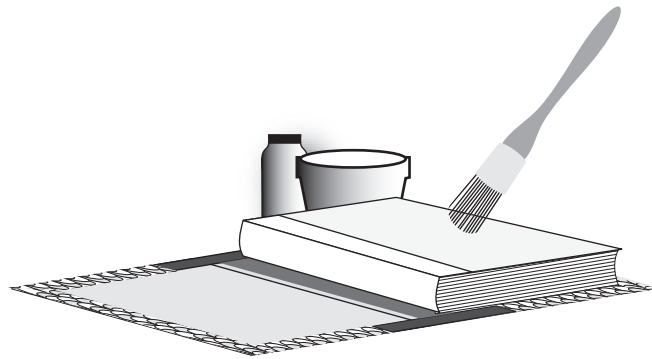


# COURSE NOTES

## Modules 1

(revised October 2011)



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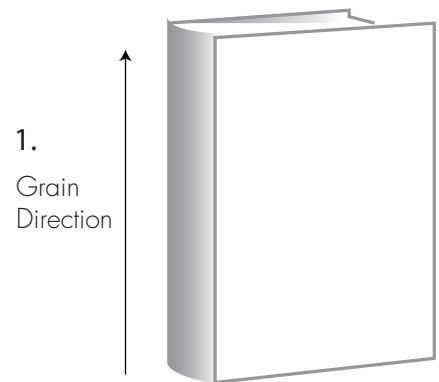
[www.bookbinding.co.uk](http://www.bookbinding.co.uk)

# FIRST PRINCIPLES - GRAIN DIRECTION

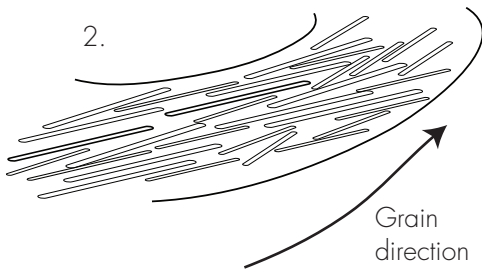
Most materials have a 'grain direction' and it is important to spend a little time understanding this principle and why it is so important in bookbinding.

The general rule is that all materials that make a book, for example paper, cloth, and board, should have their grain running from head to tail in the finished book (1). Failure to observe this rule can cause the book covers to warp when materials with opposing grains are glued together.

Books with sewn sections always lie flatter, and open better, if the grain of the paper in the bookblock is running correctly.



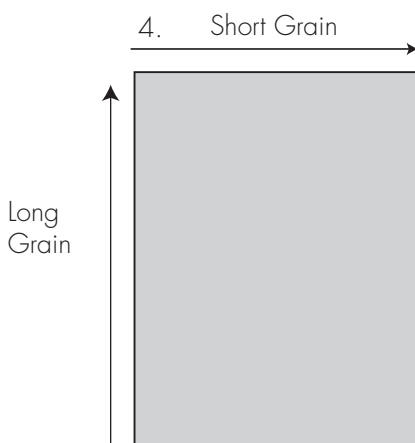
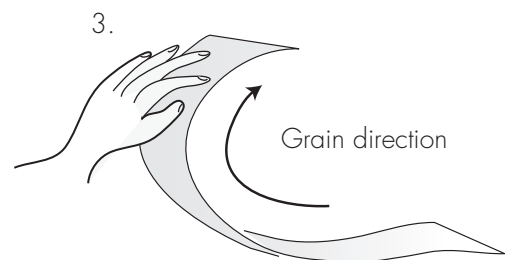
## How to determine the grain direction



Looked at under a microscope, the fibres of a material such as paper would be seen to lie in parallel lines, rather like logs floating down a river (2). These lines, or direction of flow, indicate the grain direction.

The fibres which make up a piece of paper or board behave in exactly the same way as the diagram above.

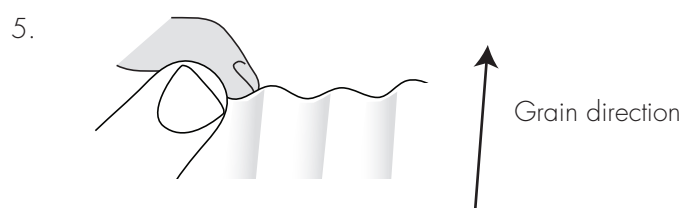
Importantly, materials bend more easily across the grain than against it so you can tell the grain direction of a sheet of paper by testing on which side there is greater resistance to bending (3).



Paper with the grain running along the longer edge is described as 'long grain'. Paper with the grain running along the shorter edge is called 'short grain' (4).

Another way to test the grain direction of paper is to drag your finger and thumb along the long edge and the short edge of a piece of paper. One edge will cockle more than the other (5).

Again, this is rather like the logs floating down the river (2). Pull the fibres along the grain and they slide along each other. Pull the fibres across the grain and they bunch up, causing the paper to cockle.



Think of the grain as running along 'the valleys' in the paper

## MODULE 1 - SINGLE-SECTION BINDINGS

### A Quarter-cloth Notebook

There are three stages in making this binding.

1. The first stage is to make the 'bookblock'. In this exercise the bookblock is made from six sheets of A4 paper, folded together to form a single set of folded leaves.
2. The second stage is to make the outside cover, usually known as 'the case'.
3. The final stage is to glue the bookblock to the case. This process is known as 'casing-in'.

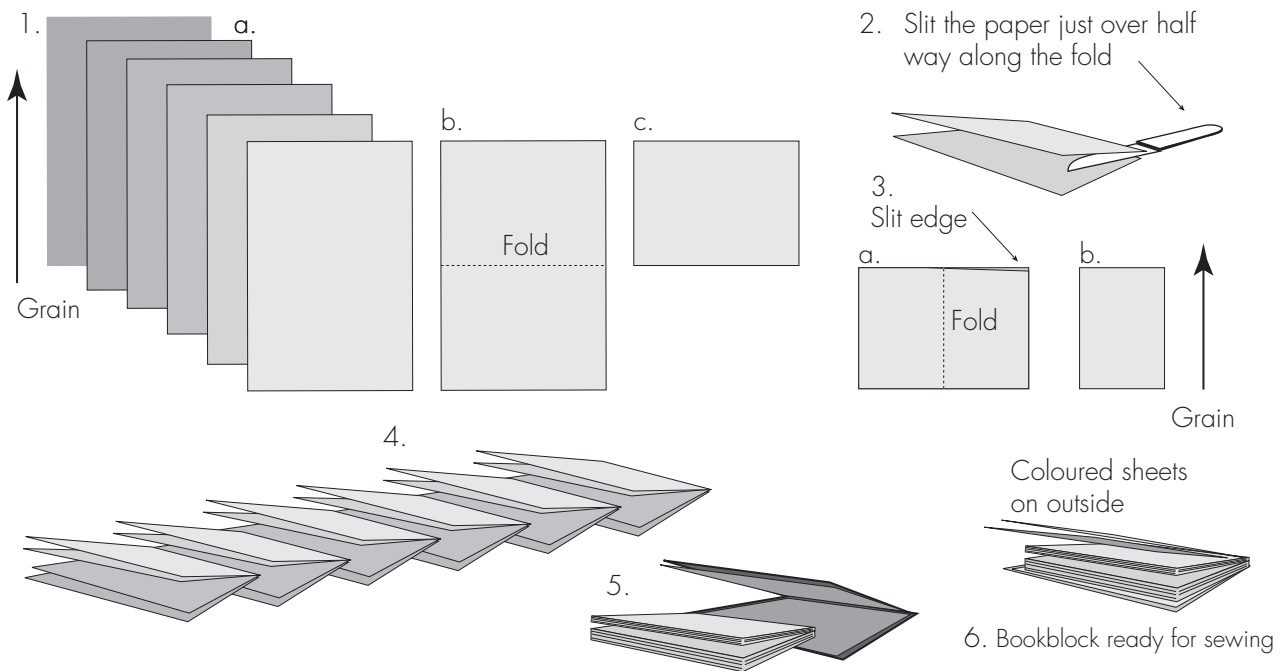


### Stage 1 - Making the bookblock

Take six sheets of A4 paper (**must be long grain**) and one at a time carefully fold each sheet in half as shown below (1a,b,c). The edges of the paper should meet as closely as possible. With a knife slit each fold just beyond the halfway mark (2); slitting the paper in this way helps to prevent the paper creasing when the paper is folded again. Now fold the sheets in half a second time at 90deg to the first, to form six four-leaf sections (3 a,b).

#### IMPORTANT

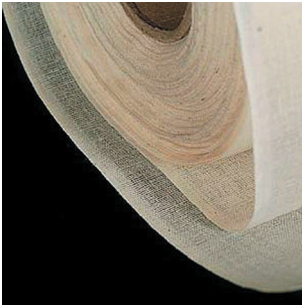
When selecting materials care must be given to ensure that the grain of each material runs from head to tail. Note how when the paper is folded as in the diagram below the grain remains in the correct direction.



When all six sheets have been folded **twice**, open each four-leaf section at the middle and insert one into another. The result is a single twenty-four-leaf bookblock with the grain running from head to tail (4).

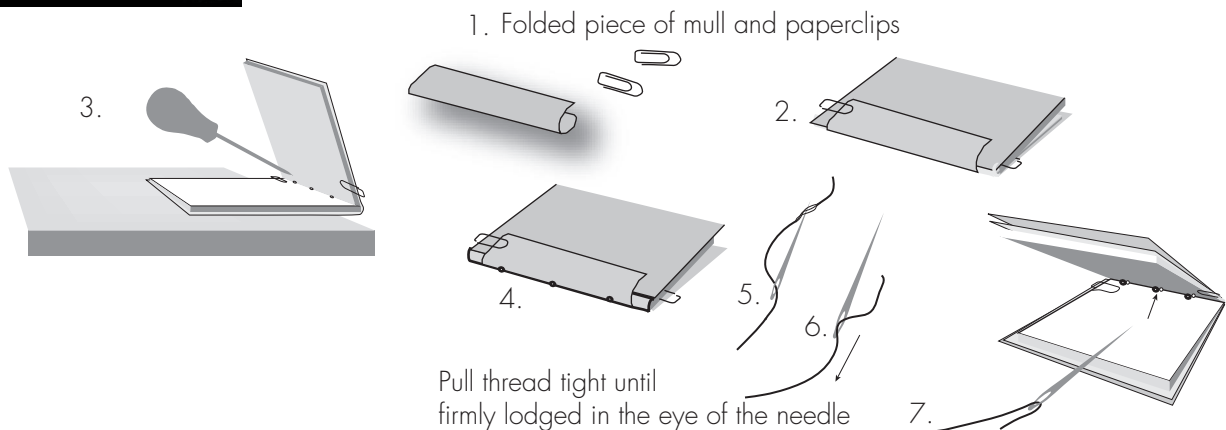
Take two sheets of coloured paper (5) and fold in half, again making sure the grain of the paper is running head to tail. These coloured sheets will form the endpapers and should not be less than 90gsm in weight. The endpapers must be big enough to cover the bookblock and preferably slightly larger. They will be trimmed after sewing. If time allows put the bookblock under a heavy weight to let the paper settle.

The bookblock is now ready for sewing (6).



### Stage 1 - Sewing the bookblock

To strengthen the sewing structure, cut a piece of mull or calico wide enough to overlap the bookblock by approximately 15mm (5/8in) on each side and slightly shorter than the length of the bookblock (1&2). Fold it around the spine. Keeping the edges of the paper as level as possible, open the bookblock at the middle and insert paper clips at the head and tail of the pages to hold the materials in place (2). This will assist in keeping the materials in place during the sewing process.



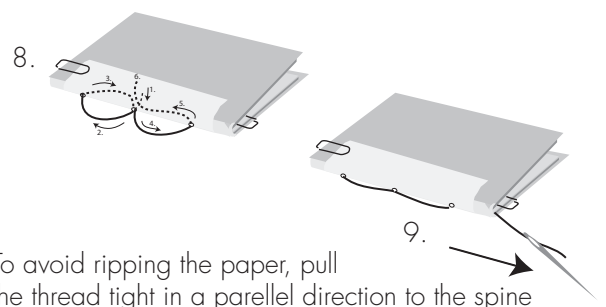
Hold the book half open and, using a sharp needle (or bodkin), make one hole at the centre of the fold and two others approximately 50mm (2in) on either side (3). The holes should be clearly visible from the outside (4). Thread the needle, twist and slightly unravel the thread, pass the point of the needle through the opened thread (5) and draw the 'knot' tight (6). This will secure the thread without making a large knot that could tear the paper. Working from the inside of the bookblock, push the needle through the centre hole (7).

From the outside of the bookblock, continue by pushing the needle through one of the other holes, leaving about 50mm (2in) of loose thread inside the bookblock. Bring the needle out through the centre hole again and finally push it through the last hole to form the 'figure of eight' path in the diagram (8).

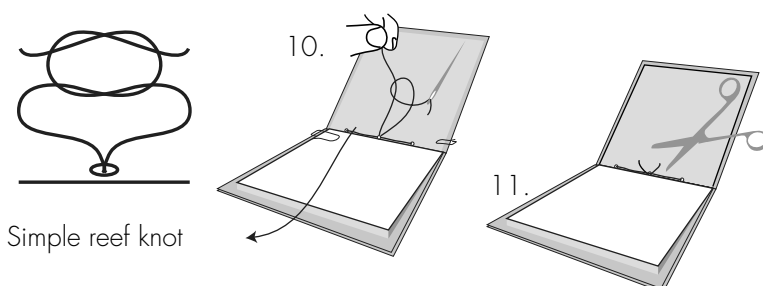
**TIP**

If the bookblock is held over the edge of a wooden block or table, it will make it easier to guide the bodkin and the needle through the centre of the fold (3).

Tighten any loops by pulling the thread parallel to the spine of the bookblock (9). Once the needle has passed through the third hole, the needle end of the thread can be joined to the loose end on the inside centre hole with a simple knot as shown in the diagram below (10).



Tie a reef knot on the inside.



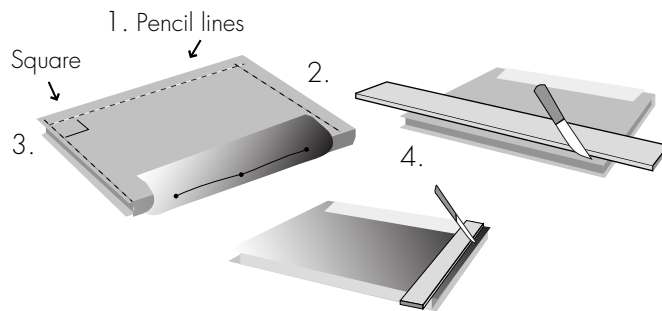
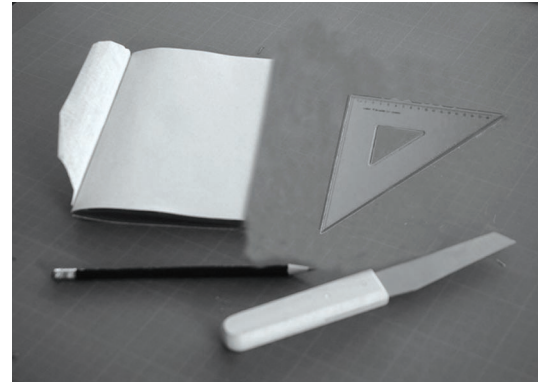
The ends should be trimmed off with 10mm (3/8in) to spare (11).

The paper clips can be removed and the bookblock is now ready for trimming. If time allows, place sewn bookblock under a weight to reduce swelling.

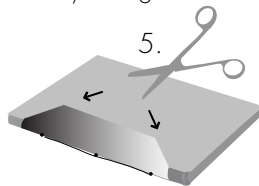
## Stage 1 - Making the bookblock continued

With the sewing completed the bookblock and endpapers can be trimmed. Start with the long edge (fore-edge). Flip through the pages to determine the unevenness of the edges. If the paper was folded neatly, only a small amount of trimming will be necessary.

Determine the trimming point by eye and using a ruler, draw a pencil line on the endpaper parallel with the spine, see below (1).



Trim up the mull by cutting the ends off at a 45° angle



Align one side of a set square against the fore-edge and draw trimming lines at the head and tail of the bookblock (2&3).

Trimming must be carried out with a sharp knife and steel-edged safety rule (4). It is only possible to cut thin books in this way and, even then, it will take several cuts with a knife to penetrate the layers of paper.

After trimming the edges, tidy-up the mull by cutting off the ends at an angle (5). The bookblock is now completed and can be put to one side while you make the case.

To keep the bookblock as flat as possible place it under a heavy weight.

### TIP

Let the knife do the work - don't try to cut the book in one go; repeated light strokes will cut the bookblock more efficiently.

## Stage 2 - Making the Case

As stated at the beginning of this project, there are three stages to this exercise. The first stage, making the bookblock, has been completed and it's now time to make the case.

Remember that the first function of the case is to protect the bookblock and make the book strong and durable.

The second function of the case is to make the book an attractive object; and that is where the choice of covering materials and careful workmanship play an important role.

The spine will be made from a piece of bookcloth and the boards will be covered in a patterned paper. Bookcloth is stronger than paper and that is why it is used to cover the spine where the book gets the most wear.

But the first task is to cut the boards to size and make sure they overlap the edges of the bookblock to sufficiently protect the edges of the paper.

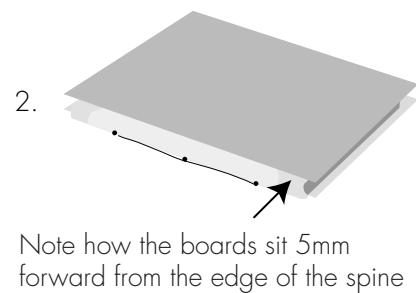
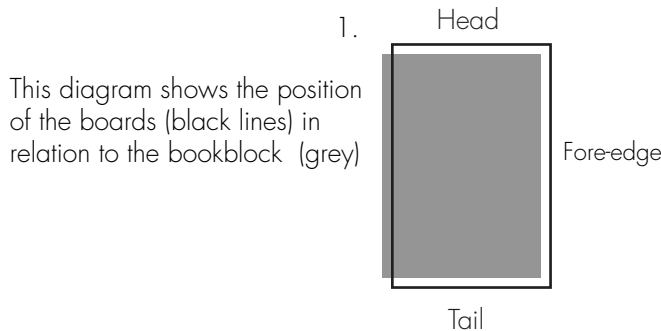


Stage 2 - Making the Case continued

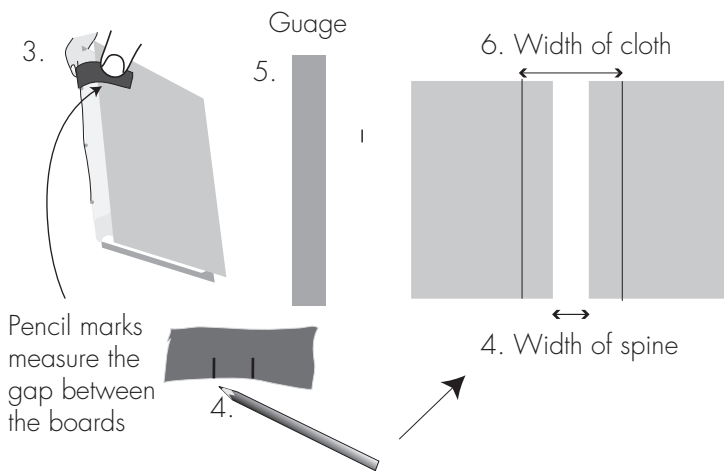
Cut the cover boards to size as shown in the diagram below (1). The cover boards must allow a 5mm (3/16in) overhang at head, tail and fore-edge, and an inset of 5mm at the spine to allow room for the hinge(2).

**Don't forget to check the grain direction of the boards - the grain must run from head to tail.**

Boards can be cut by first measuring with a ruler or, alternatively, the cutting marks can be calculated by holding the bookblock against the board and marking off by eye. Use a set square to achieve good right-angles.



Holding the bookblock and boards in position, take a piece of waste paper and wrap it around the spine (3). Using a pencil, mark off where the paper touches the edge of the boards. This will give a measurement for the spine width (4).



Cut a piece of waste board to this width; this will serve as a gauge for positioning the cover boards (5). A gauge is particularly useful if you are making a number of books to the same size.

Now make a pencil line on each board to determine how far the cloth spine will overlap the boards (6).

Cut the spine cloth to this width (6) ensuring it includes the width of the spine gap (4).

The length of the cloth should allow a 15mm (5/8in) turn-in at head and tail (8).

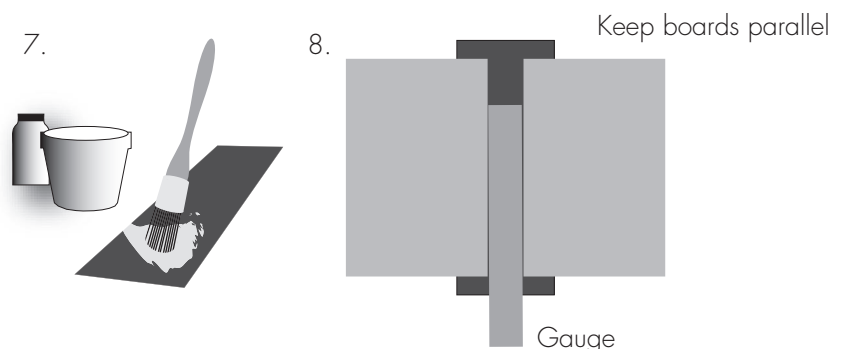
**NOTE**

The distance by which the cloth overlaps the boards (6) determines the final appearance of the book. The proportion of bookcloth to pattern paper is an entirely visual judgement.

Using PVA mixed with some paste, glue-out the cloth (7).

Position the spine gauge in the centre. Lay the boards against the gauge, taking care to keep them level at the head and tail (8).

At this stage, the glue should have enough 'slip' to make any necessary adjustments. Remove the gauge.

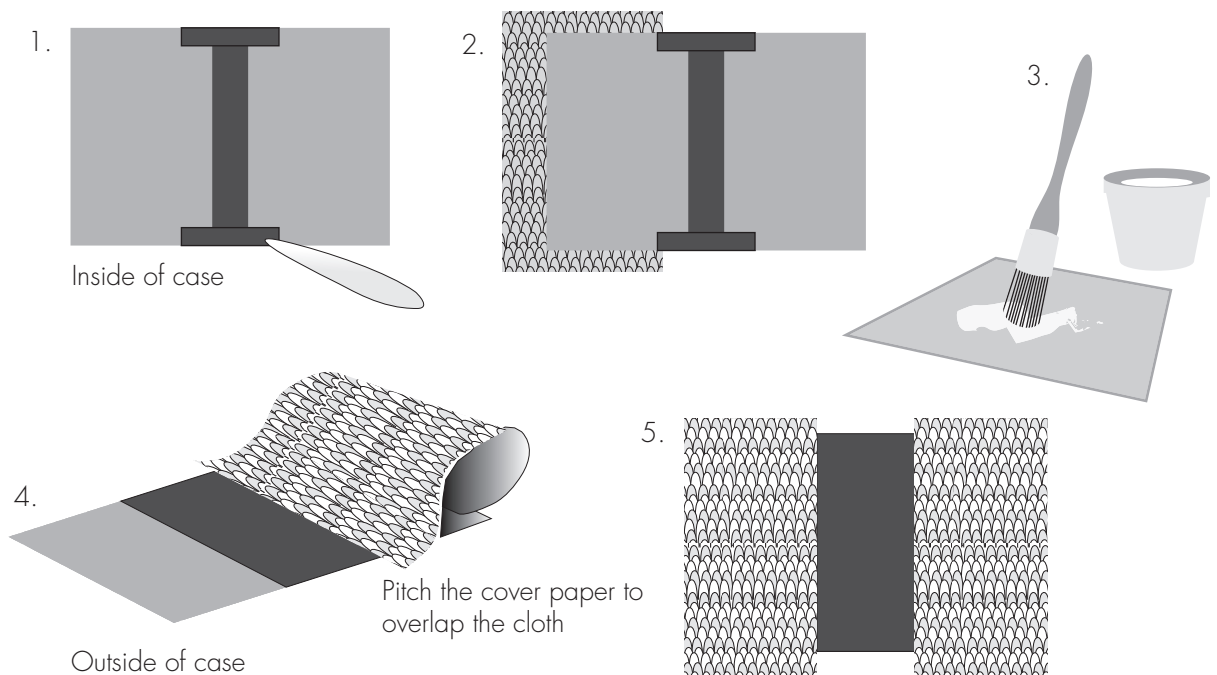


Stage 2 - Making the Case continued

Without disturbing the covers, carefully turn in the spine cloth where it overlaps at the head and tail and rub down with a bone folder (1). Take a little time to achieve good tight creases where it folds over at the boards and spine. Turn the assembly over so that the spine cloth is uppermost, rub down the spine cloth to remove any creases.

Cut out two sheets of pattern paper for the sides, large enough to cover the rest of the boards and overlap the edges by approximate 15mm (5/8in) (2). Glue out these paper covers, one sheet at a time, using a fresh sheet of waste paper underneath (3).

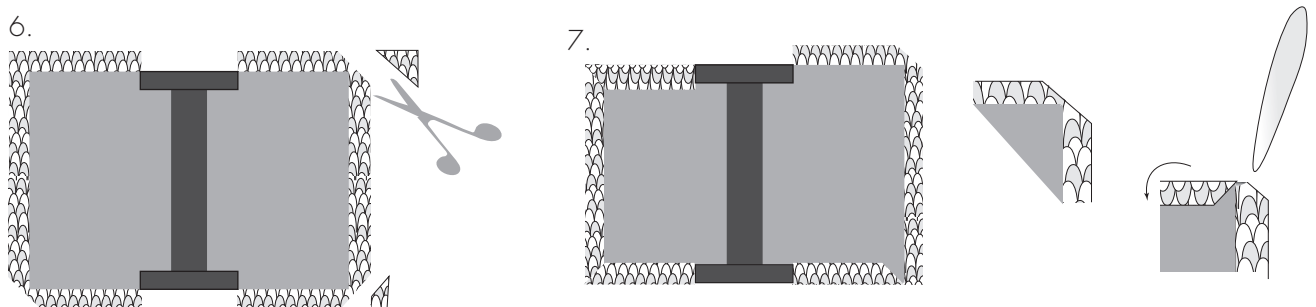
'Pitch' each glued cover paper on to the cover boards (4). Paper when glued has a habit of curling and this can make positioning difficult. With the paper lying glued-side uppermost (to counteract any curl) turn the edge furthest from the spine over to meet the cloth edge. The paper should overlap the cloth by about 2mm (1/16in). When positioning the cover paper, take care to ensure that the edge runs parallel with the spine (5).



Before turning in the sides, cut the paper diagonally at about 2mm (1/16in) from the corners (6). Turn in the head and tail and pinch the corners in with the fingernails or bone folder, before turning in the fore-edge (7). When turning cloth or paper over the boards, carefully stretch the material tightly over the edges. If necessary, apply more glue to the edges of the cover paper before turning in.

NOTE

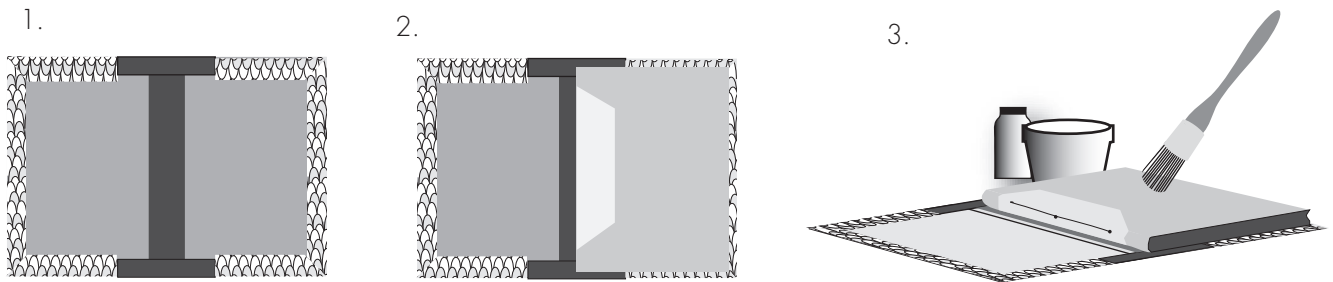
Turn the cover paper over and gently bone down the cover paper to eliminate any air pockets. Leave the case to dry under a weight before the next stage of 'casing-in' the bookblock. This will help to keep the case flat.



### Stage 3 - Casing-in

The process of casing-in attaches the case to the bookblock and completes the binding.

Lay the dried-out case flat on the table with the outside facing down (1). Position the bookblock on one of the cover boards, ensuring that the squares are correct (2). Glue the endpaper underneath the mull. Then, working outwards to the edges, glue-out the whole endpaper (3). Great care must be taken not to get glue on the edges of the paper of the bookblock.

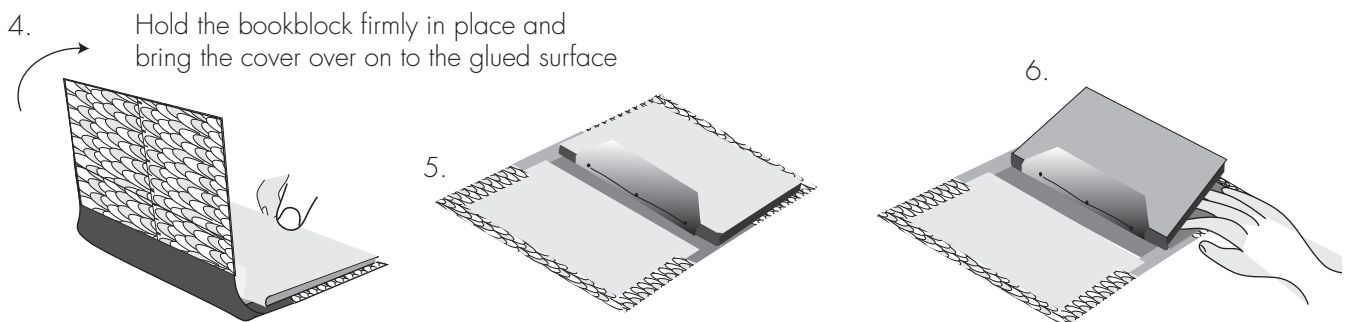


**TIP**

To prevent glue getting on the edges of the bookblock, place a sheet of clean waste paper underneath the endpaper before gluing - but take care to remove it carefully before casing-in.

Hold the bookblock in position and pull the cover board over to meet the glued paper (4). Immediately turn the book over and open up the other board (5). Keeping the glued board and endpaper flat against the surface, carefully lift the bookblock far enough to slip your hand in over the glued endpaper (6). **If necessary**, adjust the position of the endpaper by gently sliding it into position. The endpaper should lie reasonably square to the boards and once you are satisfied with its position, rub the paper down with the tips of your fingers. Take care to rub the paper down well into the spine.

**Do not be tempted to lift the board too far back as this may stretch the paper and cause it to cockle and crease.**



Turn the book over and repeat the operation for the other endpaper (3&4). Cut some silicone-release paper (or greaseproof), and insert between the inside boards and the free endpaper. This will stop any surplus glue from sticking where it should not and also help to prevent moisture from the boards penetrating the bookblock as it dries.

With a bone folder, or similar tool, gently find the crease where the board edge becomes the spine and run the tool along the edge to define the line of the hinge (7).



Finally, put the book between pressing boards, and leave it to dry under a heavy weight (8).

