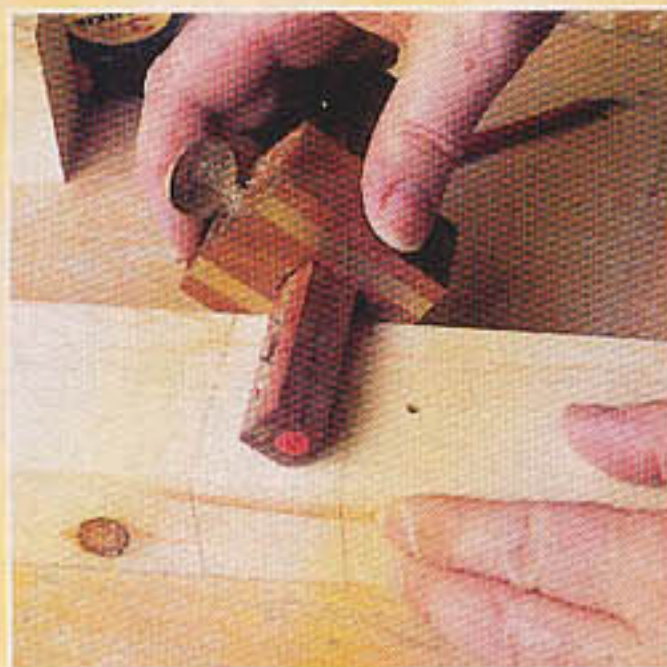


How to make a cross halving joint for the seat structure



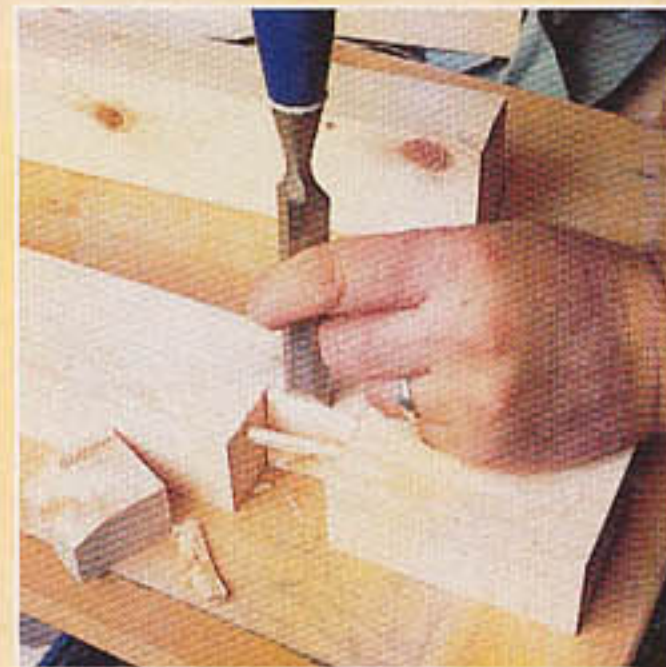
1 Mark out identical rails in sets. Cramp them together and square the joint markings across the top faces, then separate the timbers and square the lines around each piece



2 Mark the shoulder line of each halving joint with a marking gauge. Work off the face edge on each piece to ensure the joints are flush and match up after cutting



3 Hold the rail firmly in a vice or on a bench hook while you cut the joint cheeks. Use a tenon saw and saw just to the waste side of the line down to the gauged shoulder



4 Chop out the waste between the cheeks with a wide chisel, with the rail held on the bench. Take care not to let the grain split below the shoulder line

Good Woodworking
ARBOUR SEAT

particular attention to all exposed end grain, especially the ends that will contact the ground. It may be better to treat the wood before construction begins rather than afterwards, but remember to treat the bare joints after they have been cut. Top cappings have been added to each column, not just for decoration but also to provide extra protection to the vulnerable end grain.

I chose pine because I wanted this project to be as accessible to the beginner to woodworking as possible, but those with more experience and equipment may wish to use hardwoods like teak, iroko or oak, all of which are

classified as very durable. The timber can be left in a sawn state or planed to the above dimensions if required. If you can afford the extra cost, this will produce a much longer lasting job.

Remember that once this seat is in place, with plants growing over it, it may be difficult to reach much of the timber for subsequent protective treatments.

Trellis for the sides can be bought from a garden centre or made in the workshop from lots of thin strips, possibly offcuts, sawn on the bandsaw. I found it easier to buy mine as prepackaged 6x2ft expanding hardwood trellis, which gives a diamond effect when fitted. You could use square trellis or even adjust the side dimensions to incorporate narrow trellis panels with a frame around the outside.

Now Make the Seat

If you are using hardwood, plane (or simply saw) all the timber to the correct dimensions, or get it done for you. Select pine carefully before you buy it for as few knots, splits or shakes as possible in the wood. Sight along each piece to ensure it is straight and there are no twists.

1 Cut all the components to the lengths given in the cutting list. Set aside the 16 uprights (leaving their bottom ends standing in a tub of preservative if possible) while you cut the joints in the main frame rails.

2 Mark a face side and edge on each of the rails, short and long, from which all marking will be made. In my case, the face edge of each piece usually represents the

uppermost face, and the face side the innermost face. Cramp the five long rails together, face edges uppermost and ends flush and square with each other. Mark the corner halvings, 100mm in from each end and 45mm wide. The latter may vary slightly depending on the thickness of your timber – suppliers' preferences often differ, so check the thickness on your timber before you start. Square these marks right across the five boards. Also mark out the positions of the three extra top cross rails joints (one central and the other two equidistant between this and the outer corner joints) but only square these across the first two rails. Separate all the rails and square the lines around all four faces of each timber. Use a hard sharp pencil and make clean fine lines.

Repeat this procedure to mark out the 11 shorter side and top rails. You may prefer to do this in two batches, but use one piece from the first batch as a pattern for the second, just to ensure the match is maintained. Note that the long backrest rail and two short armrest rails will not have halvings cut in them. Mark them, all the same, to help locate them in position later.

3 Set a marking gauge to half the width of the rail timber and gauge the shoulder line for all the halvings, working off the face edge each time with the same gauge to ensure that the amount left in one half of the joint will equal that removed from the other. Cross hatch the waste portion of each joint on its three faces to save cutting mistakes. Note that the longer rails have all

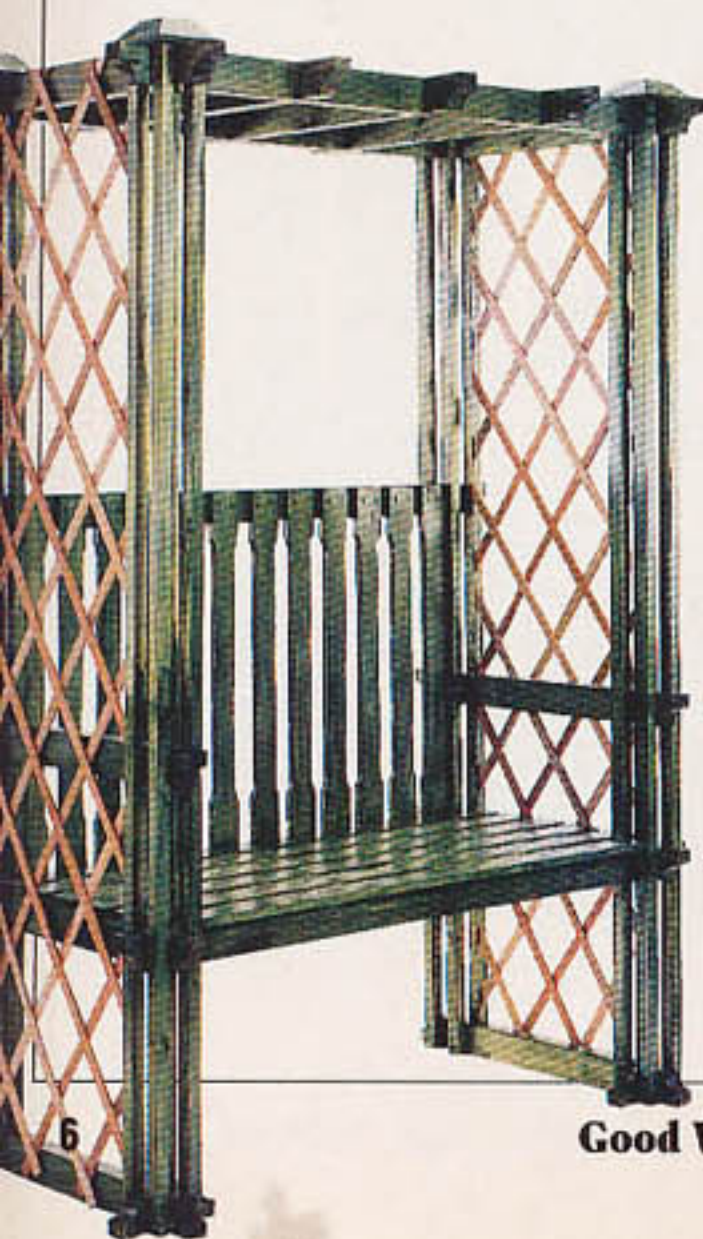
TIP A line squared around the four faces of a piece of timber should meet with its starting point; if it doesn't the timber may be slightly out of square. Minimise any discrepancies by squaring only from the face side and edge in each direction, rather than continuing around the board marking all four faces in turn.

their halvings cut into the top portion of the timber, with the corresponding part of the joint cut in the lower halves of the shorter end rails.

4 Place the first joint to be cut horizontally in the vice, holding the timber firmly but well below the central shoulder line. Failing a vice, use a bench hook or even a Workmate to secure the timber while cutting the cheeks. Saw down to the shoulder line with a tenon saw. Keep the saw to the waste side of the line and check constantly that it does not drift off square in either plane. Repeat this for the second cheek cut.

Chisel away the waste down to the shoulder. I prefer to place the timber on the bench (holding it down with a clamp if necessary) and chop down into each side to remove the bulk of the waste, then return the wood to the vice to pare down to the line. If your chisel is narrower than the joint, make sure that you chop with the grain or it may run away and remove more than you intended. The gauged line leaves a positive location for the chisel for the final paring.

Check the fit of the joint against a piece of offcut rail but don't force it in case you split the



Simple garden Arbour Seat



Brighten up your garden ready for summer. Pete Martin's stylish arbour seat will provide an attractive focal point for any plot as it slowly disappears under a welter of blooms and foliage. And it couldn't be easier to make

PROJECT GUIDE

DIFFICULTY: SIMPLE
TIME: 20 HOURS
TYPE: OUTDOOR FURNITURE

TOOLS YOU WILL NEED

HANDTOOLS

A basic kit consisting of little more than a tenon saw, chisel, marking gauge, try square and screwdriver

POWERTOOLS

Electric drill and jigsaw

MATERIALS YOU WILL NEED

PINE

33m of 32x32mm (28x28 PAR)
18m of 75x50mm (70x45 PAR)
18m of 75x20mm (70x15 PAR)

TRELLIS

Make your own or buy two packs of 6x2ft expanding trellis from a garden DIY store

Arbour seats are strange but wonderful structures in full bloom. They combine the best elements of garden benches, flower covered trellis and pergolas to provide a scented and shady private hideaway. Sited in a favourite sunny spot in the garden, an arbour seat will give constant pleasure for years to come, its open lattice structure forming a framework for fragrant climbing plants and flowers. Watching the late Geoff Hamilton, in his *Paradise Gardens* series, erect a simple construction of branches over his seating area for plants to grow over and contain, I decided I would make my own version.

About this time last year, I showed how to make a garden bench (GW 43:4) which, at the time, I considered to be very simple to build. However, even this depended on mortice and tenon joints for its construction and required some machinery to achieve the finished result. This arbour seat, by contrast, is about as simple as I can make it. I used little more than a saw, a chisel and a screwdriver and, as a nod towards power tools, an electric drill and a jigsaw, though even these are not essential.

Build it Light and Simple

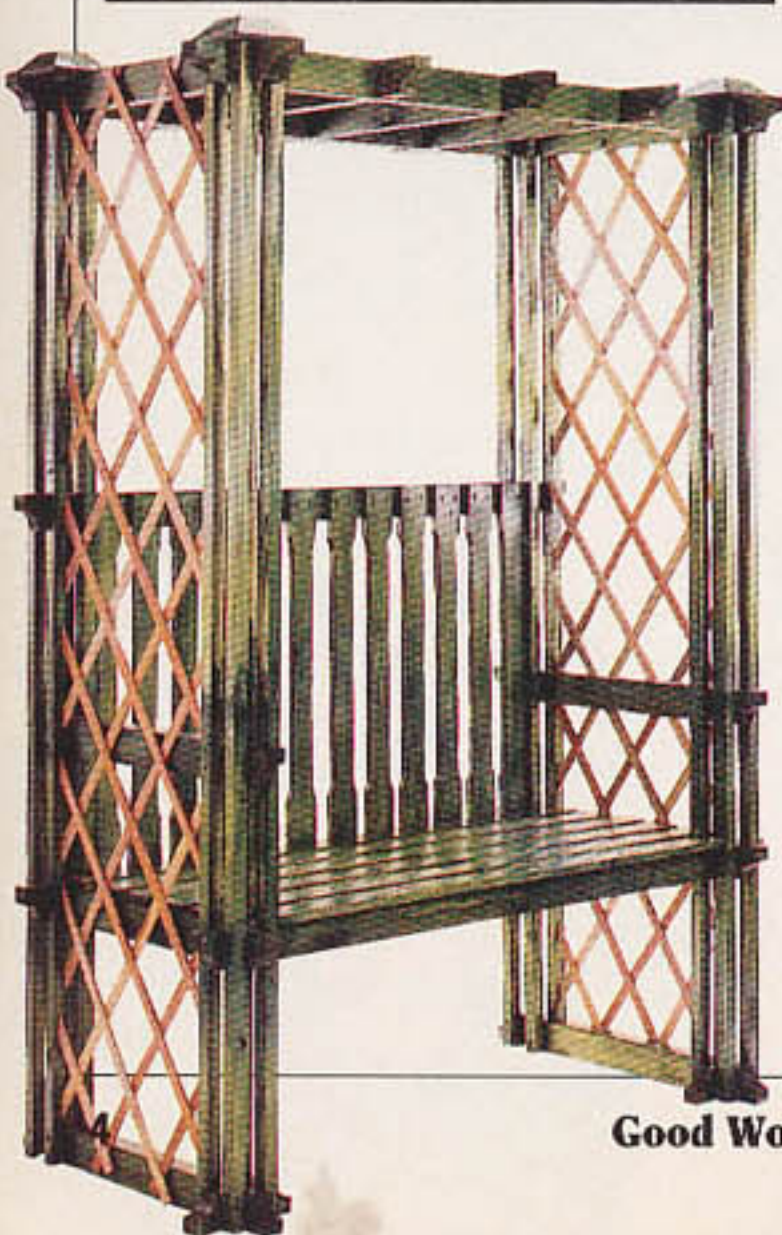
The design and construction revolves around a basic cross halving joint, employed to join the main horizontal frame members together. This is probably the first joint that a newcomer to woodworking will learn and is a simple joint to master, using only a couple of basic tools. Its strength relies on a snug fit between two halves which, in turn, depends on accurate marking with square and

gauge, and sawing to a line – skills quickly within the reach of any novice. One of the advantages of larger scale garden woodworking is that the odd slip goes unnoticed, making the seat a good learning experience. The joints are reinforced with screws so even a slightly slack one should remain solid in use.

The overall design has a light airy feel by the use of four lengths of thin square section timber, rather than a thicker solid column, at every corner, each sitting in one of the four quarters around the cross halving. These are screwed into place and, like the horizontal frames, are derived from standard sections to be found in most builder's merchants or DIY stores. The uprights are 28x28mm PAR, all the frame members 45x70mm PAR, and the seat and backrest slats 70x15mm PAR. Don't worry if you can't get exactly these dimensions, just adapt the joints accordingly.

Preserve the Timber

Furniture destined to stay outdoors all year round needs to be made from well-treated timber if pine is to be used. Tanalised timber is the most satisfactory but is often only available in sawn sections and may be soaking wet when you buy it. It is also often of poor quality, being used predominantly as building construction material or for large garden structures. If you don't fancy using this, aim to treat the timber with several good soakings of a plant-friendly preservative such as those produced by Ronseal or Cuprinol, before applying a decorative and protective surface finish. Pay

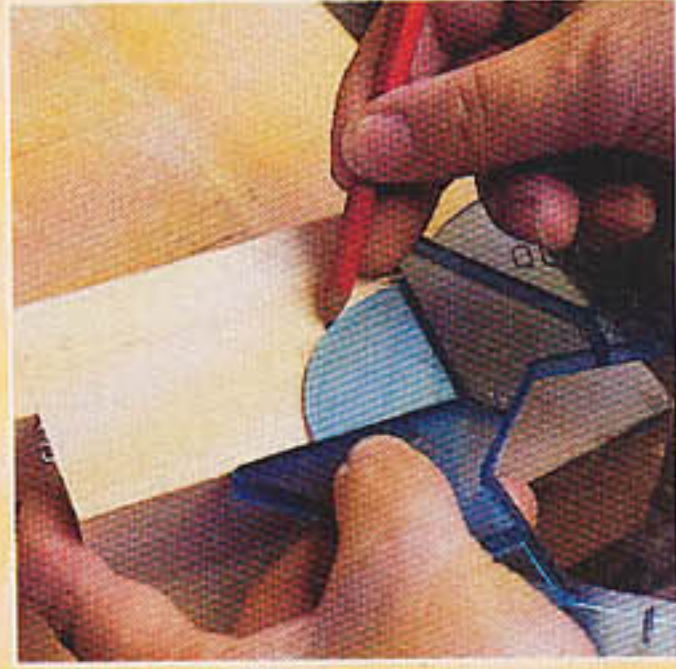


Good Woodworking

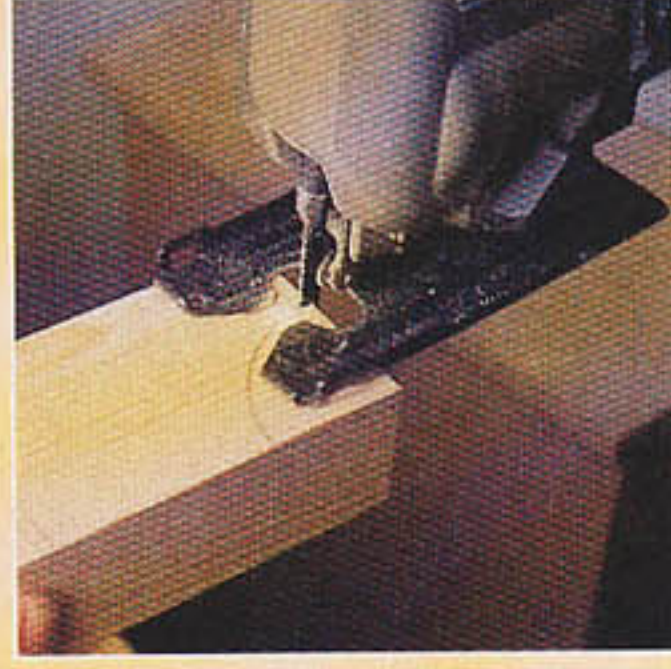




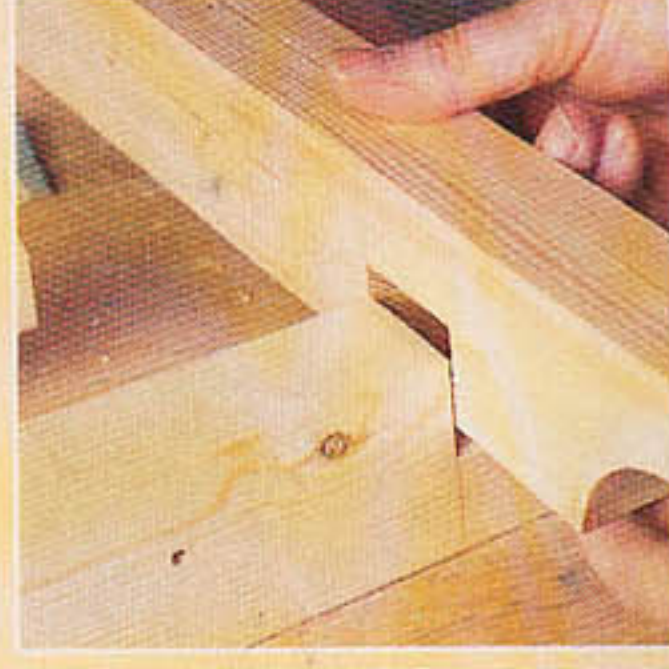
5 Pare down to the shoulder line with the rail back in the vice. Come in from each side, locating the chisel edge in the scribe line. Ensure the bottom of the cut is flat and level



6 Make a template for the decorative cutaways at each end of the rails. I used a 1/4in radius from a set of new Veritas plastic templates (see the On Test pages this issue)

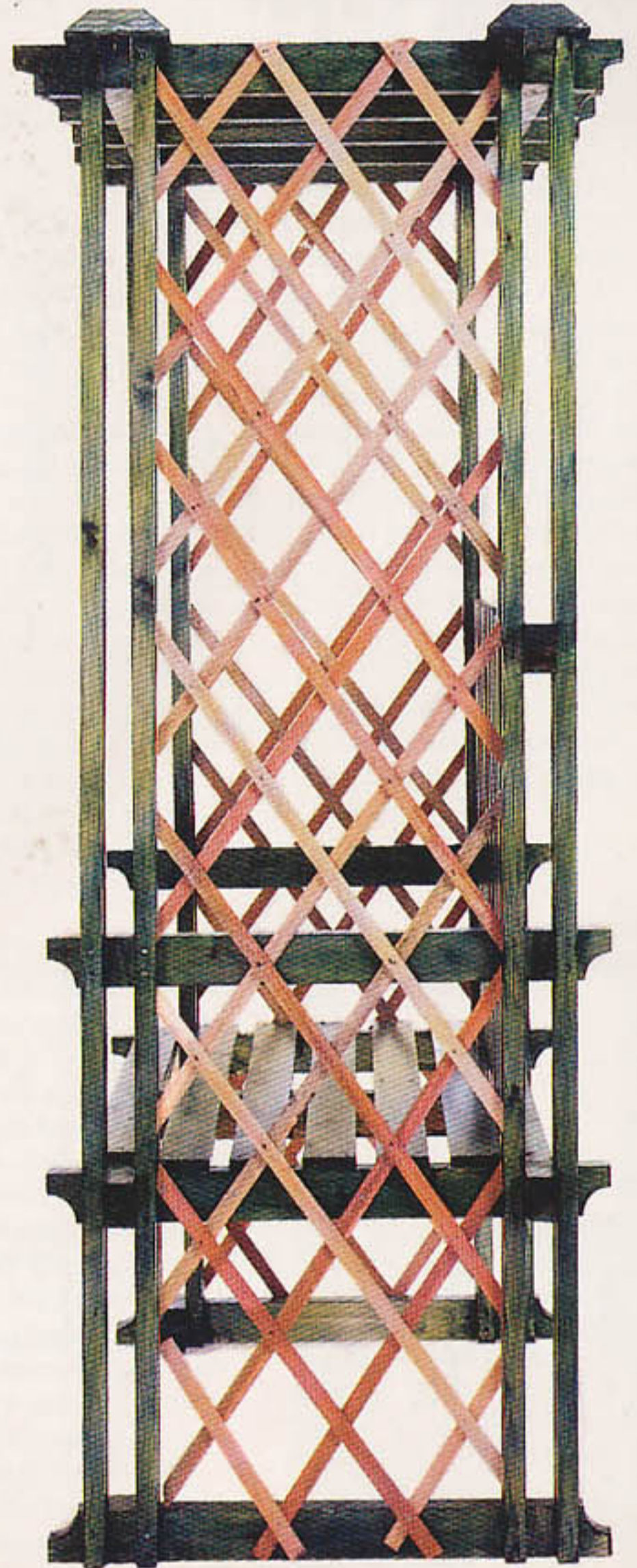


7 Cut the shape away with a jigsaw. Turn any pendulum action on the saw to zero and use a fairly fine blade so you can cut this tight curve without scorching the timber



8 The cross halving should fit snugly but not so tight that the fragile short grain beyond the joint snaps off as the two halves are tapped together. Hold the joint together with a screw

Elevation Views of the Arbour Seat



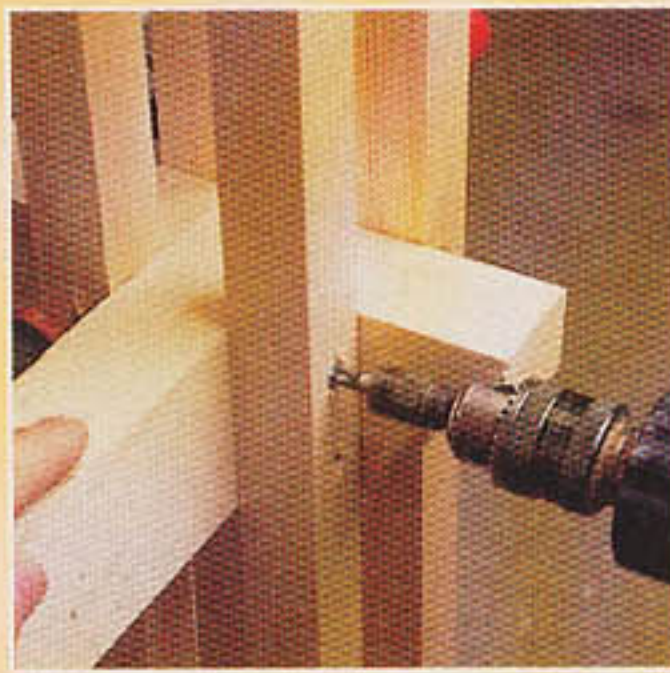
Build up the structure around the basic frames



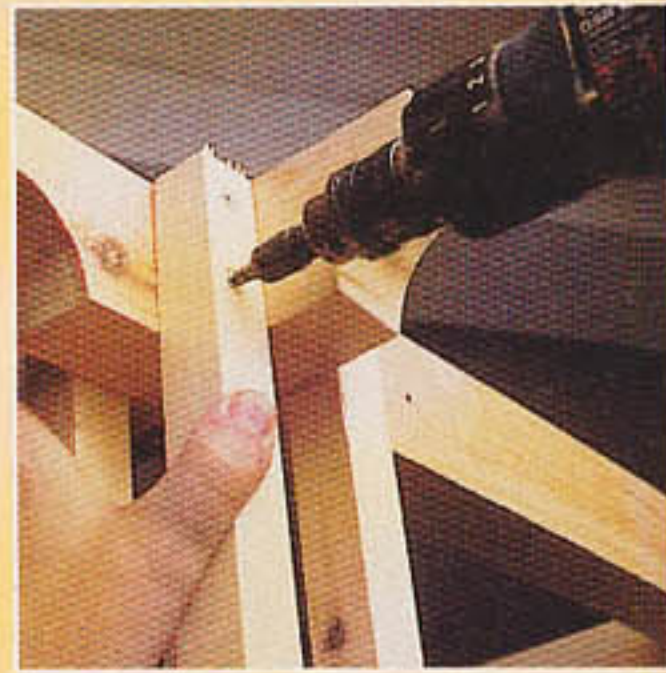
9 Mark out one upright as a pattern piece and transfer the measurements from this to a batch cramped together



10 Drill a clearance hole and countersink for each fixing screw to ensure that it will not split the timber especially at the ends



11 Screw four uprights around each corner joint on the seat frame. Check that the rails line up with the marks on the uprights



12 You may need help to position the top frame assembly in the columns. Hold it with cramps until you can fix the screws

Good Woodworking ARBOUR SEAT

short grain to the end of the rail. Ease the cheeks with a chisel if they are too tight, but take a note of the fit and try and adjust your sawing to ensure a snugger fit on the next joint. It is better to remove too little than too much but use the repetition as practice to improve your work.

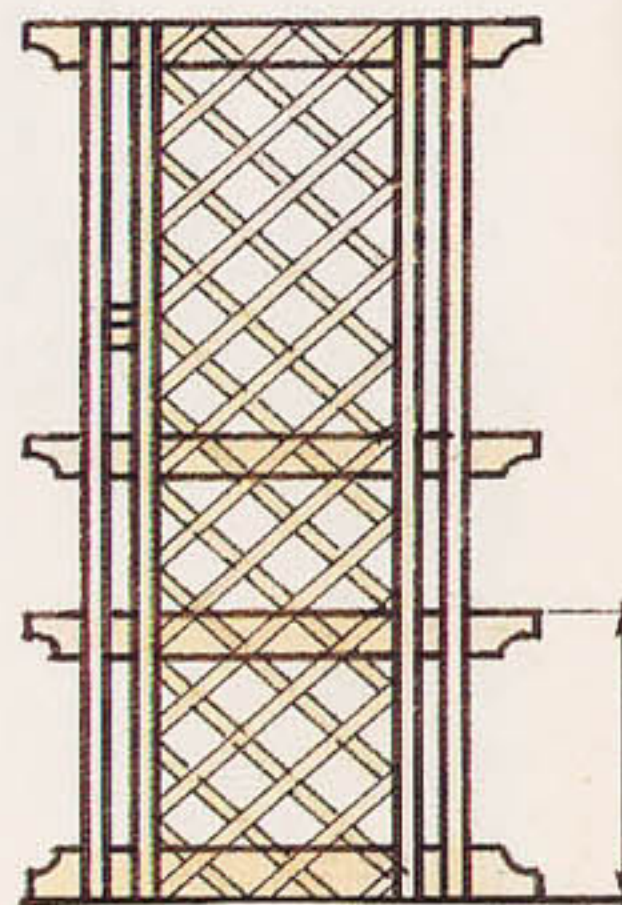
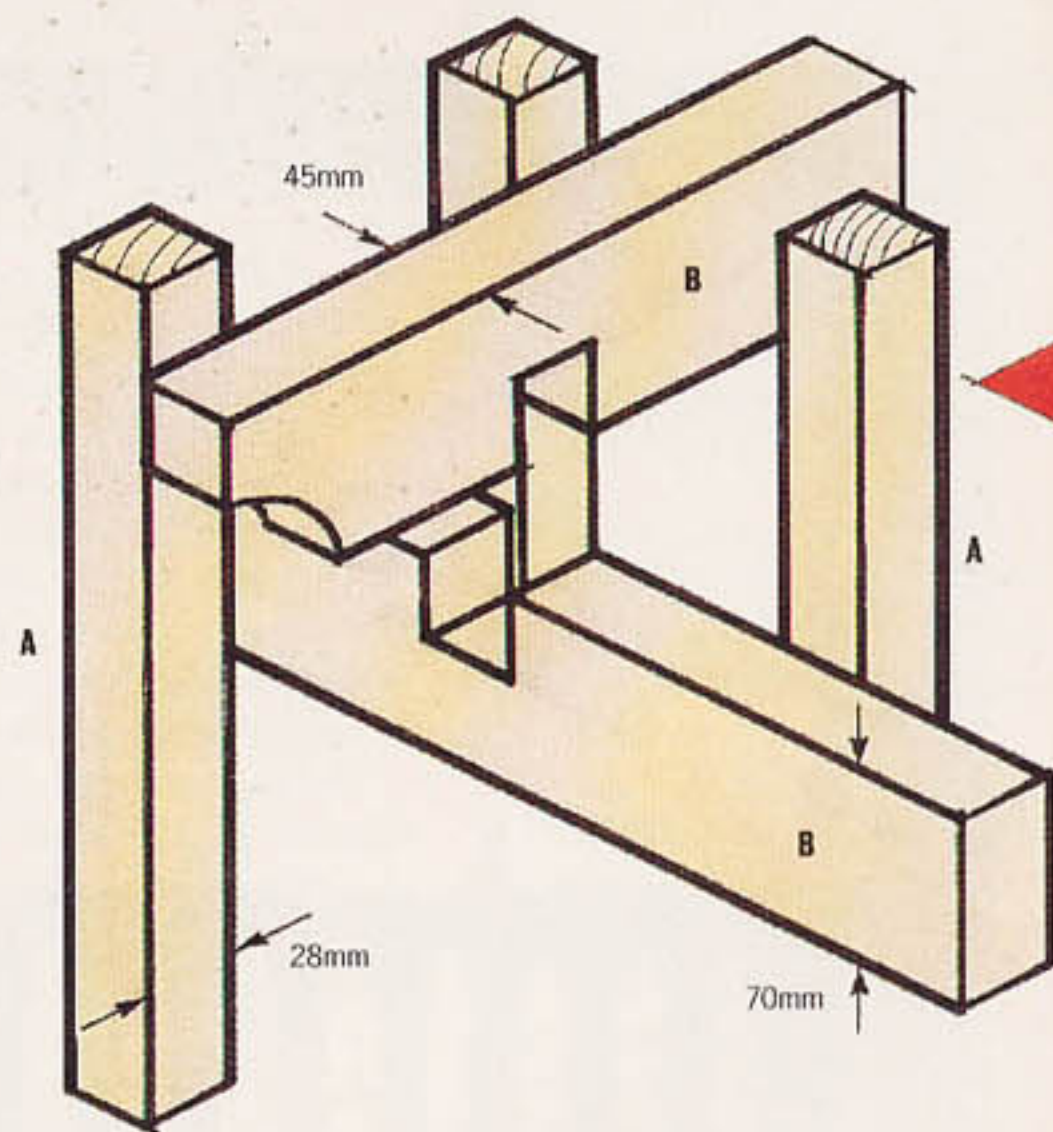
Repeat this procedure to cut the joints on all the rails. Match up the two halves of each joint as you progress and ease their shoulder lines if necessary to ensure that the joint finishes with the top and bottom faces flush with each other. Number or letter the halves as you prefer to mark the match.

5 Mark out the curved decorative cutaway on the end of each rail. Draw this out each time with a suitable curve or a pair of compasses, or make a simple template with an offcut to aid the marking. Double check before you cut each piece that you have marked the correct edge of the timber, and note that the cutaways on the foot rails are the opposite way to all the rest. Use a jigsaw to produce a fine smooth cut, and sand any rough edges and splinters as you progress.

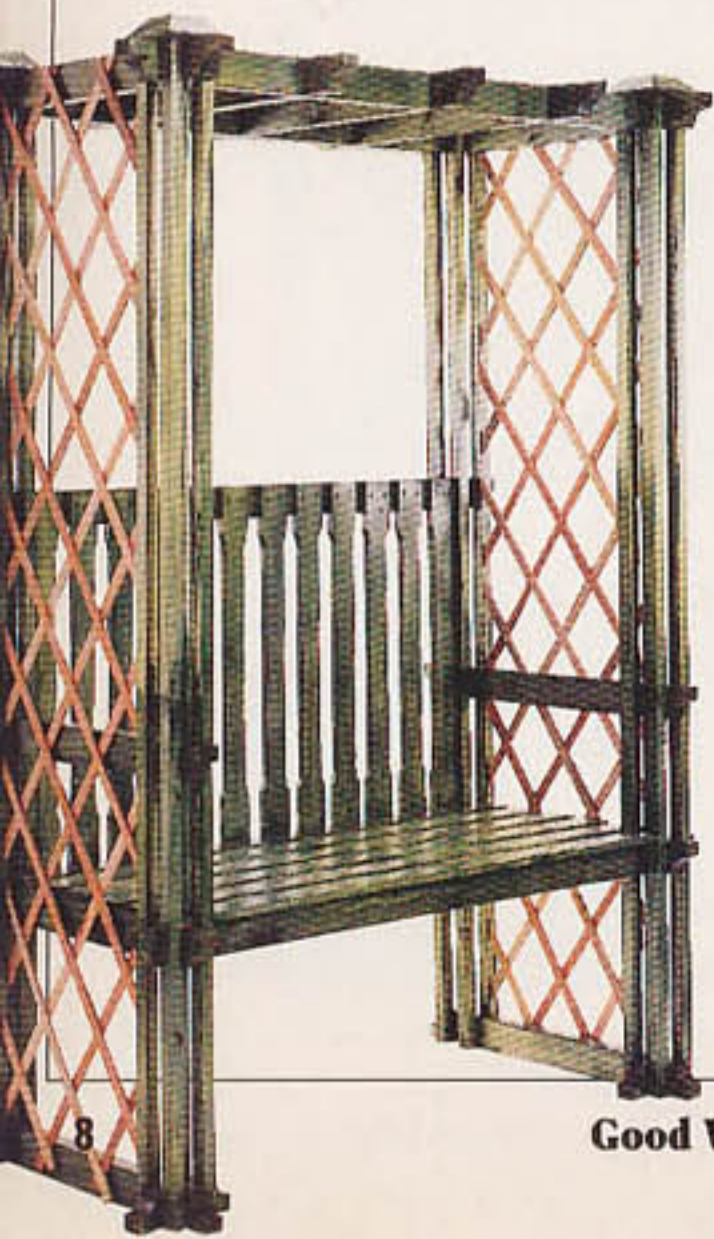
6 Assemble the four pieces that make up the seat frame and the seven pieces for the top frame. Liberally treat all the newly exposed timber around the joints with preservative, before taping the frames together. Reinforce each joint with a single 4.5x50mm countersunk screw, placed centrally through the joint from beneath. If possible, use sheradised or zinc plated screws that will not rust so quickly in external conditions.

7 Measure and mark off the position of the seat rails on each of the uprights and drill and countersink for two 4.5x50mm fixing screws. (I set a height of 520mm to suit myself, but you may prefer to shorten the distance a little if you consider this too high.) Drill two further holes in the same orientation at both the top and the bottom of each section for the top and foot rails. Ensure they are the correct size for the screws or these may split the wood as the seat is assembled.

Screw a single upright into place in one of the four quarters around each cross halving joint on the seat frame. The first two may



The dimensions of the arbour timbers were chosen so that standard PAR pine from a DIY store or builder's merchant could be used. Naturally, for an outdoor project, a hardwood such as oak or teak would be a more durable choice, but this will prove quite expensive and will need cutting and planing to size. Pine will be adequate provided that it is well treated with a suitable preservative and given a final surface protection

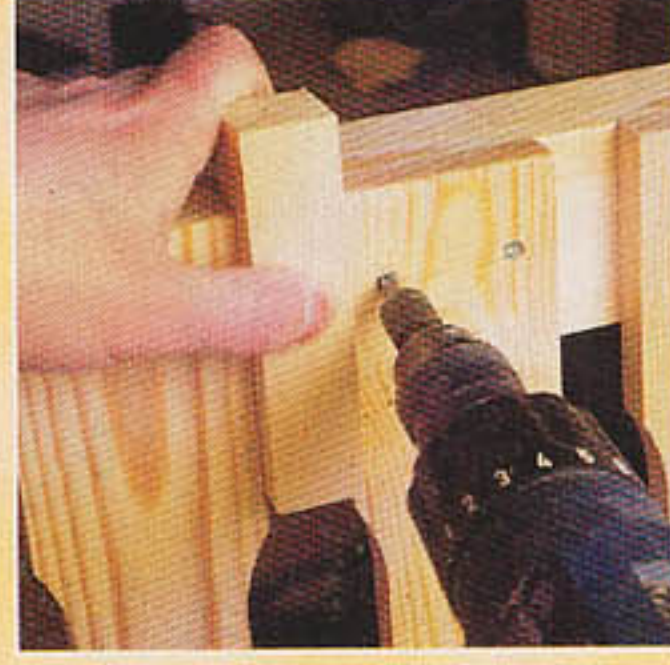




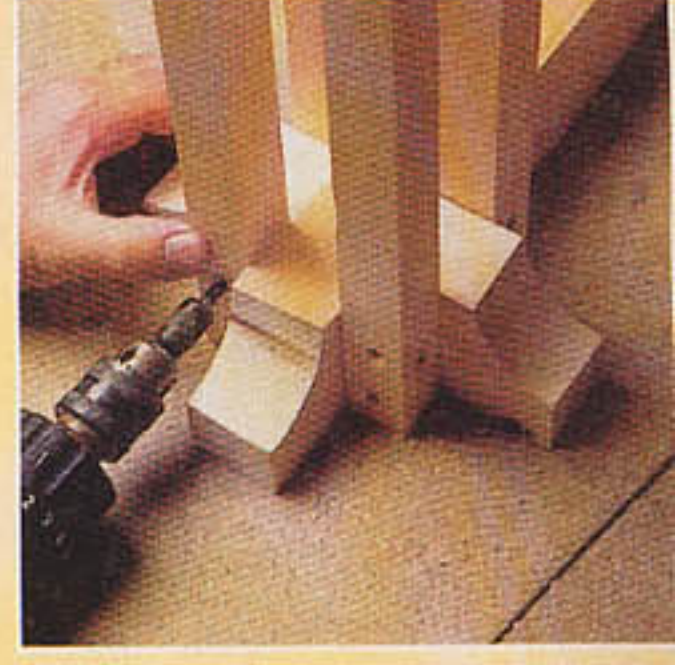
13 Use a piece of timber as a spacer between the seat slats. Take care not to split the ends as you screw them



14 Draw out and cut a decorative cutaway on either side of a seat back slat and use this as a pattern to mark the rest

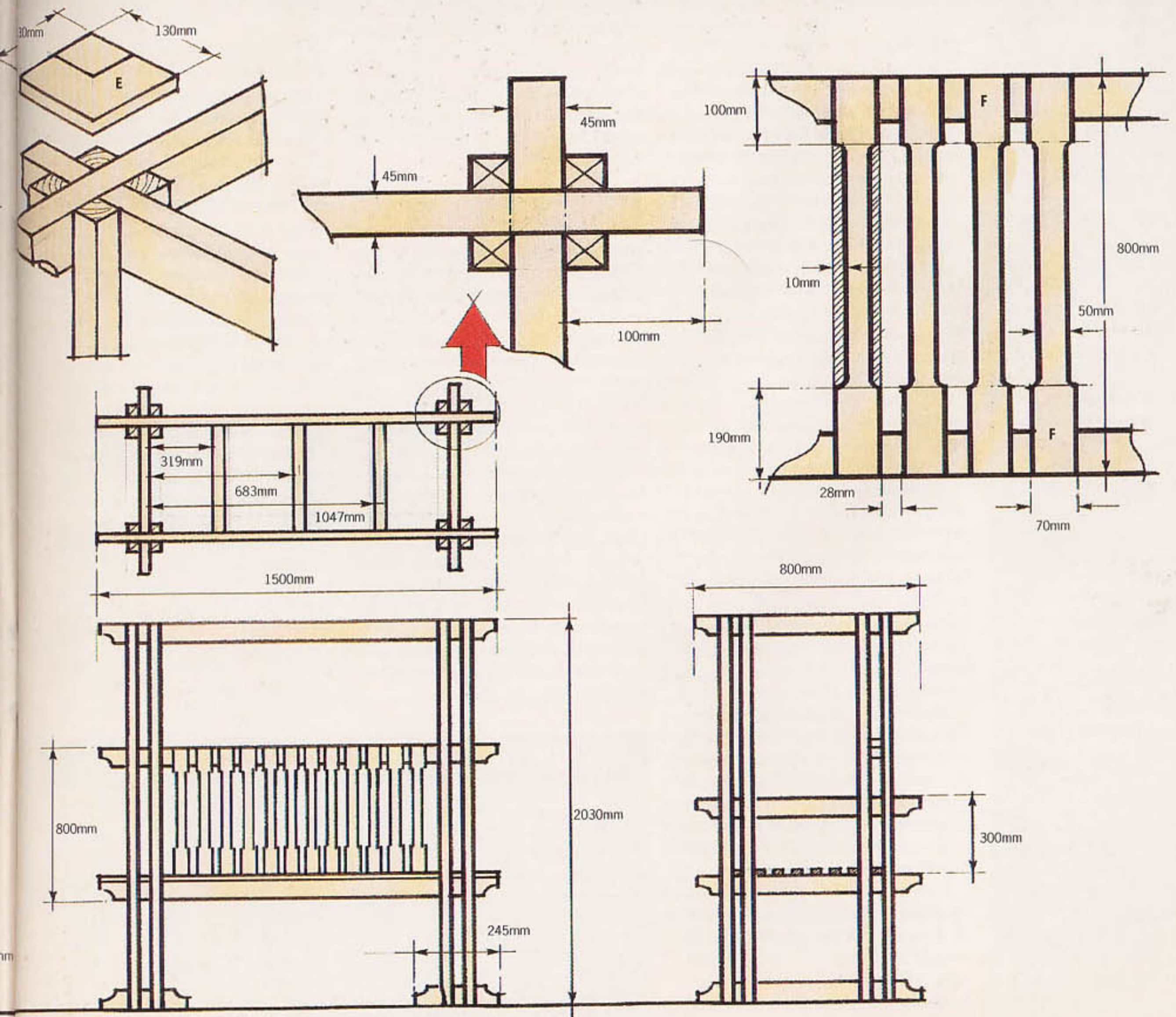


15 Use a timber gauge again to space the back slats. Work to the centre from each end and keep the tops flush with the back rail

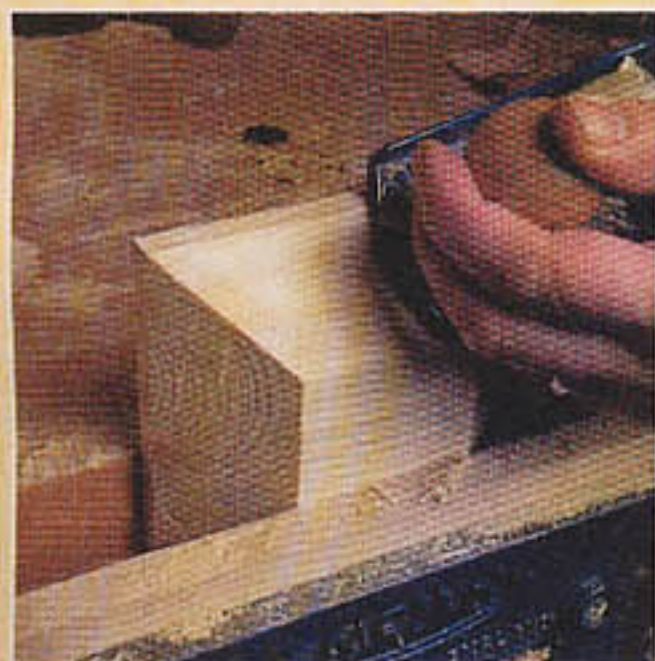


16 Being much shorter, the foot blocks have a lot of short grain so take care when screwing them into place between the columns

Construction Details of the Arbour Seat



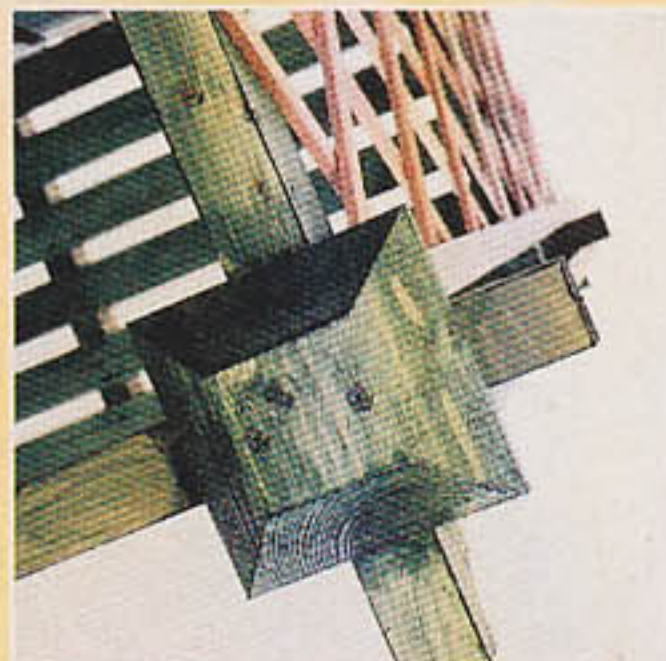
Cappings, trellis and preservative



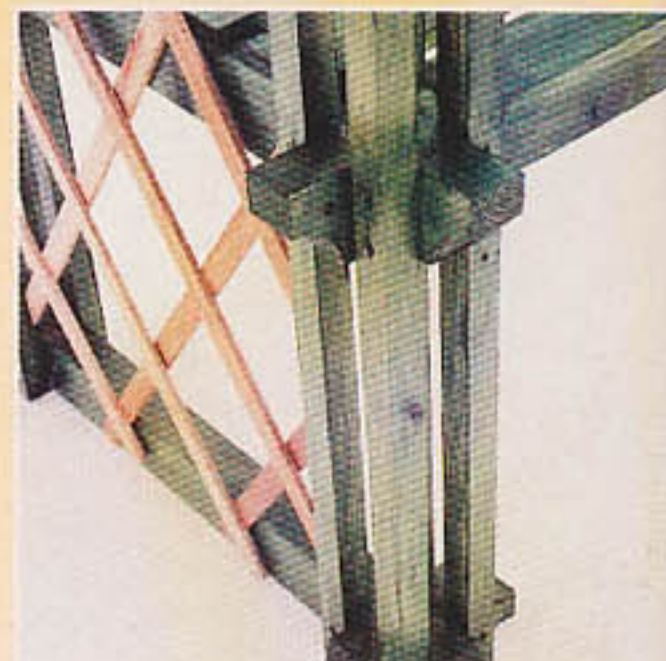
17 The top cappings protect the column end grain from rainwater. They are chamfered to help this run off quickly



18 Hold the trellis against the outer face of the columns, then mark and trim it so that it slips into place between the timbers



19 Hardwoods like oak are naturally durable but pine will need a good soaking in preservative to have a reasonable lifespan



20 Pay particular attention to end grain, which is very prone to moisture ingress unless well protected

need the frame to be held on end while the uprights are attached, but then the structure can be moved to the vertical position and the last two sections first lightly cramped into place before securing each with screws. At this point the seat should stand upright. Manoeuvre the top frame into place, with the aid of several G-cramps acting as stop battens, and screw the uprights into the relevant corners of the frame.

Introduce the remaining 12 uprights to their respective places and fix each one to the seat frame and the top frame. Try to position the uprights so that each set of screws is fixed into a new timber face around the joint. This will prevent the screws touching or weakening the timber. Check that the top of each upright is flush with the top frame edge, and that the seat frame locates within its pencil markings.

8 Cut the four short foot blocks to length. Mark and cut a halving in the centre of each to match those on the two main foot rails and make a decorative cutaway at each end, remembering that these will face upwards. Slide each foot rail into position between the inner and outer pairs of uprights at each side of the arbour assembly. Locate and screw the foot blocks into their halvings, and

TIP If you are building this arbour in the workshop, ensure that it will leave through the workshop door without having to dismantle it. If it is too big, make the final assembly outdoors once all the components have been cut and jointed indoors.

screw the uprights into place around the joint. Take care not to split the fragile short grain on each of the blocks.

9 Measure up 730mm from the top of the seat frame along each of the two rear column sets and slide the backrest rail into place with its top flush with the marks. Hold the rail with cramps while you secure it with screws. Similarly, measure up 300mm for the armrests and fix these in place. Adjust this last measurement to suit yourself if you prefer. Mark the centre of the front and back seat rails and screw the seat support rail between them. This is a simple butt joint between the two timbers.

10 Cut the seat back slats to length and mark out the decorative cutouts down each side with the aid of a straightedge and a curve. Cut the first one to shape with a jigsaw, check it against its rails for fit, then use it as a pattern to mark out the rest. Cut these out and drill and countersink two fixing holes at each end. Work out the spacing between each slat (this should be constant) and cut a small gauging piece to help maintain this space as you screw each slat into place. Ensure the top ends are flush with the top edge of the rail, and that the slats remain parallel with each other and the corner uprights. Start at either end and work towards the middle to lessen the effects of any drift.

11 The seat slats can now be fitted. Cut the front one to fit snugly between the front column sets, its back edge flush with the back edge of the front rail. Screw this into place, then space the

remainder as before with a gauge timber. Cut these to finish flush at either end with the outer face of the side rails, and drill and countersink the screwholes to prevent the ends splitting as you fix them. Try to ensure that the screwheads end up flush with the timber surface or water may collect in any depression and seep into the wood.

12 Cut four blocks to size for the top caps on the columns. These are heavily chamfered on the top edges to form flat topped pyramids. Set a marking gauge to about 30 to 35mm, and mark around the top face and the side edges. Plane down to these scribe marks with a block plane to produce a 45° bevel, planing across the grain first to reduce any breakout at the end of the cut.

Ensure the tops of the columns are flat and flush before screwing each cap into place centrally over them. Again, take care not to split delicate short grain on the decorative rail ends.

If you wish, and can find timber wide enough, you could also add four basic square blocks under the four column bases. This will keep the end grain from

sitting directly on the ground where it may attempt to soak up surface moisture. Don't forget to adjust the seat height accordingly.

13 Paint the timber (or otherwise finish it) with two coats of a microporous external paint at this stage, before you add the trellis. Expand a trellis pack over one end of the complete seat, overlapping slightly the inner upright of each end column set and the top rail. Secure it in several places, with G-cramps or spring cramps, while you trace the vertical edges of the columns on to the trellis with a pencil. When all the trellis slats have been marked to length and the correct angle, remove the trellis and trim the ends with a tenon saw or even a jigsaw. Expand the trellis back into place between the columns and screw it to the outer faces of the top, seat, armrest and bottom rails. Pre-drill the holes, and countersink, to ensure that the screws do not split the delicate trellis timber.

GRAHAM LAIRD
NEXT MONTH
VENEERED COFFEE TABLE

Cutting List for the Arbour Seat

PART	QTY	MATERIAL	LENGTH	WIDTH	THKNS
A Uprights	16	Pine	2030mm	28mm	28mm
B Front and back rails	5	Pine	1500mm	70mm	45mm
C Side rails	11	Pine	800mm	70mm	45mm
D Foot blocks	4	Pine	245mm	70mm	45mm
E Top caps	4	Pine	130mm	130mm	45mm
F Back slats	12	Pine	800mm	70mm	15mm
G Seat slats	6	Pine	1300mm	70mm	45mm

Cutting lists always give the full length of a piece including the joint, but not wastage. Allow at least 25mm (1in) extra for length and 5mm (3/16in) on the width and thickness of sawn stock