that marked *hollow mould* (fig. 40.). This is applied in ſuch a manner, that ſome part of the hollow may touch the side of the keel, and the ſtraight part touch the back of the curve before deſcribed by the bend mould ; and, beginning abaft, the ſtraight part will always come lower on every timber, till we come to the midship timber, when it comes to the side of the keel. Having thus formed the timbers, ſo far as the whole mouldings will ſerve, the timbers abaft them are next formed. Their half breadths are determined by the ſheer and floor plans, which are the only fixed points through which the curves of theſe timbers muſt pals. Some form theſe after timbers before the whole is moulded, and then make the hollow mould, which will be ſtraighter than the hollow of either of theſe timbers. It is indifferent which are firſt formed, or what methods are uſed ; for after the timbers are all formed, though every timber may appear very fair when conſidered by itſelf, it is uncertain what the form of the side will be. In order to find which, we muſt form ſeveral ribband and water lines ; and if theſe do not make fair curves, they muſt be rectified, and the timbers formed from theſe ribband and water lines. In uſing the hollow mould, when it is applied to the curve of each tim­ber, if the ſtraight part is produced to the middle line, we ſhall have as many points of interſection as there are timbers ; and if the heights above the bale be transferred to the correſponding timbers in the ſheer plan, a curve paſſing through theſe points is what is called a ri*ſing strait.* This may be formed by fixing a point for the aftermoſt timber that is whole moulded, and transferring that height to the ſheer plan. The curve muſt paſs through this point, and fall in with the riſing line ſomewhere abaft dead flat ; and if the ſeve­ral heights of this line be transferred from the ſheer to the middle line in the body plan, theſe points will regu­late what is called the *hauling down* of the hollow mould.

The timbers in the after body being all formed, thoſe in the fore body are formed in the ſame manner, by transferring the ſeveral heights of the rising and breadth lines from the ſheer to the body plan ; the half breadths correſponding to each height muſt alſo be transferred from the floor to the body plan. The ſame hollow mould will ſerve both for the fore and after body ; and the level lines, by which the water lines to prove the after body were formed, may be produced into the fore body, and by them, the water lines to prove the fore body, may be deſcribed.

Another method of proving the body is by ribband lines, which are formed by ſections of planes inclined to the ſheer plan, and interſecting the body plan diago­nally, as before obſerved, of which there may be as many as may be judged neceſſary. As this has been already explained, we ſhall therefore lay down only one, repre­ſented in the body plan by the lines marked d i a. Theſe are drawn in ſuch a manner as to be perpendi­cular to as many timbers as conveniently may be. After they are drawn in the body plan, the ſeveral portions of the diagonal intercepted between the middle line and each timber muſt be transferrred to the floor plan. Thus, fix one foot of the compaſſes in the point where the diagonal intersects the middle line in the body plan ; extend the other foot to the point where the diagonal interſects the timber ; for example, timber 9 : Set off the same extent upon the perpendicular repreſenting the plane

of timber 9 from the point where it intersects the line KL on the floor plan : in like manner proceed with all the other timbers both in the fore and after body ; and theſe ſhall have the points thro’ which the curve muſt paſs. If this ſhould not prove a fair curve, it muſt be altered, obſerving to conform to the points as nearly as the nature of the curve will admit : ſo it may be car­ried within one point, and without another, according as we find the timbers will allow. For after all the ribband lines are formed, the timbers muſt, if needful, be altered by the ribband lines : this is only the reverſe of forming the ribband lines ; for taking the portions of the ſeveral perpendiculars intercepted between the line KL and the curve of the ribband line in the floor plan, and ſetting them off upon the diagonal from the point where it interſects the middle line, we ſhall have the points in the diagonal through which the curves of the timbers muſt paſs. Thus the diſtance between the line KL and the ribband at timber 3 on the floor plan, when transferred to the body plan, will extend on the diagonal from the middle line to the point where the curve of timber 3 interſects that dia­gonal. The like may be ſaid of all the other timbers ; and if ſeveral ribband lines be formed, they may be ſo contrived that their diagonals in the body plan ſhall be at ſuch diſtances, that a point for every timber be­ing given in each diagonal, will be ſufficient to deter­mine the form of all the timbers.

In ſtationing the timbers upon the keel for a boat, there muſt be room for two futtocks in the ſpace be­fore or abaft ; for which reaſon, the diſtance between theſe two timbers will be as much more than that be­tween the other as the timber is broad. Here it is between ⊕ and (A); which contains the diſtances be­tween ⊕ and (1), and the breadth of the timber beſides.

The timbers being now formed, and proved by rib­band and water lines, proceed then to form the tranſom, faſhion-pieces, &c. by Problem VI.

This method of whole-moulding will not anſwer for the long timbers afore and abaft. They are generally canted in the ſame manner as thoſe for a ſhip. In or­der to render this method more complete, we ſhall here deſcribe the manner of moulding the timbers after they are laid down in the mould loft, by a riſing ſquare, bend, and hollow mould.

It was ſhown before how to form the timbers by the bend and hollow moulds on the draught. The ſame method muſt be uſed in the loſe ; but the moulds muſt be made to their proper ſcantlings in real feet and inches. Now when they are set, as before directed, for moulding each timber, let the middle line in the body plan be drawn acroſs the bend mould, and draw a line acroſs the hollow mould at the point where it touches the upper edge of the keel ; and let them be marked with the proper name of the timber, as in fig. 40. The graduations of the bend mould will therefore be exact­ly the ſame as the narrowing of the breadth. Thus, the diſtance between ⊗ and 7 on the bend mould is equal to the difference between the half breadth of tim­ber 7 and that of ⊕. The height of the head of each timber is likewiſe marked on the bend mould, and alſo the floor and breadth ſirmarks. The floor ſirmark is in that point where a ſtraight edged batten touches the back of the bend mould, the batten being so placed