of the poſt, and CF equal to half that of the ſtem, and from the points A, E, F, B, draw lines parallel to CD. Make AG, BG each equal to 14 feet, the height at the main frame, and draw the line GG parallel to AB. Make GH, GH each equal to half a foot, the difference between the main and top timber half breadths. From A and B ſet up the heights of the lower and upper breadth lines to I and K, and draw the ſtraight lines IK, IK. Let CL be the rising at the main frame, and ⊕, ⊕ the extremities of the floor timber. Henca, as there are now five points determined in each half of the main frame, it may be very eaſily deſcribed.

Make CM equal to L⊕, join M⊕, and draw the other ribbands NO, PQ. In order, however, to sim­plify this operation, the rectilineal diſtance ⊕I was triſected, and through the points of diviſion the lines NO, PQ were drawn parallel to the floor ribband M⊕.

Take the diſtance *bc* (fig. 30.), and lay it off from F to (fig. 32.); alſo make Fb (fig. 32.) equal to Fu (fig. 30.) ; through *b* draw *b c* parallel to AB, and equal to FR (fig. 31). In like manner take the heights of each top-timber from fig. 30. and lay them off from C towards D (fig. 32) ; through theſe points draw lines parallel to AB, and make them equal each to each, to the correſponding half breadth lines taken from the floor plan: Then through the ſeveral points *a, c,*&c thus found, draw a line a *c* H, which will be the projection of the top-timber line of the fore body in the body plan. Proceed in the ſame manner to find the top-timber line in the after body.

Transfer the height of the main breadth line on the ſtem bl (fig. 30.) from F to d (fig. 32). Transfer alſo the heights of the lower and upper breadth lines at timber F (fig. 30. ), namely, FW, FX, from F to *e and f* (fig. 32.) ; through which draw the parallels *eg, fh* ; make them equal to FS (fig. 31.), and draw the ſtraight line *g h.* In this manner proceed to lay down the portions of the extreme breadth at each frame, both in the fore and in the after body in the body plan, and draw the upper and lower breadth lines *dh* K, *dg* I in the fore body and K i, I *i* in the after body. Hence the portions of the ſeveral top-timbers contained be­tween the top-timber and main breadth lines may be eaſily deſcribed. It was before remarked that their forms were partly arbitrary. The midſhip top-timber has generally a hollow, the form of which is left entire­ly to the artiſt, though in ſome ſhips, eſpecially ſmall ones, it has none. It is the common practice to make a mould for this hollow, either by a ſweep or ſome other contrivance, which is produced considerably above the top-timber line, in a ſtraight line or very near one; The midſhip top-timber is formed by this mould, which is ſo placed that it breaks in four with the back of the upper breadth ſweep. The other top-timbers are form­ed by the ſame mould, obſerving to place it ſo that the ſtraight part of it may be parallel to the ſtraight part of the midſhip timber, and moved up or down, ſtill keeping it in that direction till it juſt touches the back of the upper breadth ſweep. Some conſtructors begin at the after timber, after the mould is made for the mid- ſhip top-timber, becauſe they think it easier to keep the ſtraight part of the mould parallel to this than to the midſhip timber ; and by this means the top side is kept from winding. Others, again, make a mark upon

the mould where the breadth line of the midſhip tim­ber croſſes it, and with the ſame mould they form the after timber ; this will occasion the mark that was made on the mould when at the main frame to fall below the breadth line of the after timber, and therefore another mark is made at the height of the breadth line at the after timber ; the ſtraight part of the mould is then laid obliquely acroſs the breadth lines of the top-timbers, in ſuch a manner that it may interſect the breadth line of the midſhip timber at one of theſe marks and the breadth line of the after timber at the other mark ; then the ſeveral interſections of the breadth lines of the timbers are marked upon the mould ; which muſt now be ſo placed in forming each timber, that the proper mark may be applied to its proper breadth, and it muſt be turned about ſo as juſt to touch the upper breadth ſweep. Any of theſe methods may make a fair side, and they may be eaſily proved by forming another in­termediate half breadth line.

The remaining parts of the frames may be deſcribed by either of the methods laid down in Problems IX. and X. In order, however, to illuſtrate this ſtill far­ther, it is thought proper to ſubjoin another method of forming the intermediate frames, the facility of which will recommend it.

Take FZ (fig. 30.), and lay it from F to *k* (fig. 32.) ; then deſeribe the lower part of the foremost frame, making it more or lets full according as pro­poſed ; and interſecting the ribbands in the points l, m, n. Deſcribe alſo the aftermoſt frame o, p, q, Make αβ (fig. 30.) equal to F *r* (fig. 32.), and pro­duce it to *a* (fig. 31.) ; alſo draw γδ and ες (fig. 30.) equal to E *r* and E J (fig. 32.) reſpectively ; and pro­duce them to *b* and *c :* Make F e, Ff, FR (fig. 31.) equal to Ml, Nm*,* Pn (fig. 32.) each to each. Let alſo ⊕h, ⊕i, ⊕k, and 9l, 9 m, 9n (fig. 31,) be made equal to M⊕, NO, and Mo, N *q, Pp* (fig. 32 ) ; then through theſe points trace the curves aenhlb*, rfimc,* and *r* R *k n p,* and they will be the projections of the ribbands in the floor plane. Now transfer the ſeveral intervals of the frames contained be­tween the middle line and the ribbands (fig. 31.) to the correſponding ribbands in the body plan (fig. 32). Hence there will be five points given in each frame, namely, one at the lower breadth line, one at each rib­band, and one at the keel ; and conſequently theſe frames may be eaſily deſcribed. In order to exemplify this, let it be required to lay down the frame E in the plane of projection. Take the interval En (fig. 31.), and lay it from M to *u* (fig. 32). Lay off alſo E *v,* Ee (fig. 31.) from N to *v* and ſrom P to n (fig. 32 ); then through the points F, *u, v, n* and the lower breadth line deſcribe a curve, and it will be the repreſentation of the frame E in the body plan. In like manner the other frames may be deſcribed.

The ribbands may now be transferred from the body plan to the plane of elevation, by taking the ſeveral heights of the interſection of each ribband with the frames, and laying them off on the correſponding frames in the floor plan ; and if the line drawn through theſe points make a fair curve, it is preſumed that the curves of the frames are rightly laid down in the body plan. Only one of theſe ribbands, namely, the firſt, is laid down in fig. 30. Theſe curves may alſo be far­ther proved, by drawing water lines in the plane of ele-