⊕and height of the midſhip and other frames; the place of the maſts and channels ; the projection of the head and quarter gallery, and their appendages ; and in a ſhip of war the poſition and dimensions of the gun-ports. Several imaginary lines, namely, the upper and lower height of breadth lines, water lines, &c. are alſo drawn in this plan.

The *half breadth* or *floor plan,* or, as it is frequently called, the *horizontal* plane, contains the ſeveral half­breadths of every frame of timbers at different heights ; ribbands, water lines, &c. are alſo deſcribed on this plane.

The *body* plan, or *plane of projection,* is a ſection of the ſhip at the midſhip frame or broadeſt place, perpen­dicular to the two former. The ſeveral breadths, and the particular form of every frame of timbers, are deſcribed on this plane. As the two ſides of a ſhip are ſimilar to each other, it is therefore unneceſſary to lay down both; hence the frames contained between the main frame and the ſtem are deſcribed on one fide of the middle line, commonly on the right hand side, and the after frames are deſcibed on the other side of that line.

Several lines are deſcribed on theſe planes, in order the more readily to aſſiſt in the formation of the tim­bers ; the principal of which are the following :

The *top-timber line,* is a curve limiting the height of the ſhip at each timber.

The *top-timber halſ breadth line,* is a ſection of the ſhip at the height of the top-timber line, perpendicular to the plane of elevation.

The *height oſ breadth lines,* are two lines named the upper and *lower* heights of breadth. Theſe lines are deſcribed on the plane of elevation to determine the height of the broadeſt part of the ſhip at each timber ; and being deſcribed in the body plan, limits the height and breadth of each frame at its broadeſt part.

*Main half breadth,* is a ſection of the ſhip at the broadeſt part, perpendicular to the ſheer plan, and repreſents the greateſt breadth at the outſide of every timber.

*Water lines,* are lines ſuppoſed to be deſcribed on the bottom of a ſhip when afloat by the ſurface of water ; and the uppermoſt of theſe lines, or that deſcribed by the water on the ſhip’s bottom when ſufficiently load­ed, is called the *loud water line.* According as the ſhip is lightened, ſhe will riſe higher out of the water ; and hence new water lines will be formed. If ſhe be lightened in ſuch a manner that the keel may preſerve the same inclination to the ſurface of the water, theſe lines will be parallel to each other ; and if they are pa­rallel to the keel, they will be repreſented by ſtraight lines parallel to each other in the body plan ; otherwiſe by curves. In the half breadth plan, theſe lines are curves limiting the half breadth of the ſhip at the height of the correſponding lines in the ſheer plan. In or­der to diſtinguish theſe lines, they are uſually drawn in green.

*Ribband lines,* are curves on a ſhip’s bottom by the interſection of a plane inclined to the plane of elevation ; and are denominated *diagonal* or horizontal, according as they are meaſured upon the diagonal, or in a direc­tion perpendicular to the plane of elevation. Both theſe answer to the same curve on the ſhip’s bottom, but give very different curves when deſcribed on the half breadth plan.

*Frames,* are circular pieces of timber bolted toge­ther, and raised upon the keel at certain diſtances, and to which the planks are faſtened. A frame is compoſed of one floor-timber, two or three futtocks, and a top- timber on each side : which being united together, form a circular incloſure, and that which incloſes the greateſt ſpace is called the *midſhip* or *main* frame. The arms of the floor-timber of this frame form a very obtuſe angle ; but in the other frames this angle decreaſes with the diſtance oſ the frame from midſhips. Thoſe floor timbers which form very acute angles are called *crutches.* The length of the midſhip floor timber is in general about half the length of the main frame.

A frame of timbers is commonly formed by arches of circles called *ſweeps.* There are generally five ſweeps :1st, The *floor ſweep ;* which is limited by a line in the body plan perpendicular to the plane of eleva­tion, a little above the keel ; and the height of this line above the keel at the midſhip frame is called the *dead rising.* The upper part of this arch forms the head of the floor timber. *2d,* The *lower breadth ſweep ;* the centre of which is in the line repreſenting the lower height of breadth, 3*d,* The *reconciling ſweep.* This ſweep joins the two former, without intersecting ei­ther ; and makes a fair curve from the lower height of breadth to the riſing line. If a ſtraight line is drawn from the upper edge of the keel to touch the back of the floor ſweep, the form of the midſhip frame below the lower height of breadth will be obtained. The *upper breadth ſweep ;* the centre of which is in the line repreſenting the upper height of breadth oſ the timber. This ſweep deſcribed upwards forms the lower part of the top timber. *5th,* The *top timber ſweep* is that which forms the hollow of the top timber. This hollow is, however, very often formed by a mould, ſo placed as to touch the upper breadth ſweep, and paſs through the point limiting the half breadth oſ the top timber.

The main frame, or as it is uſually called *dead-flat,* is denoted by the character ⊕. The timbers before dead- flat are marked A, B, C, &c. in order ; and thoſe abaft dead-flat by the figures 1, 2, 3, &c. The timbers ad­jacent to dead-flat, and of the same dimenſions nearly, are diſtinguiſhed by the characters (A), (B), &c. and (1), (2), &c. That part of the ſhip abaft the main frame is called the *after body ;* and that before it the *fore body.*

AU. timbers are perpendicular to the half breadth plan. Thoſe timbers whoſe planes are perpendicular to the ſheer plan, are called *ſquare timbers ;* and thoſe whoſe planes are inclined to it are called *canted timbers.*

The *rising line,* is a curve drawn in the ſheer plan, at the heights of the centres of the floor ſweeps in the body plan. As, however, this line, if drawn in this manner, would extend beyond the upper line of the fi­gure, it is, therefore uſually so drawn that its lower part may touch the upper edge of the keel. This is per­formed by taking the heights of each of the centres in the, body plan, from the height of the centre of the ſweep of dead-flat, and fitting them off on the correſponding timbers in the, sheer plan from the upper edge of the keel.

*Half breadth of the rising,* is a curve in the floor plan, which limits the diſtances of the centres of the floor ſweeps from the middle line of the body plan.