angles to this longitudinal plane, whereas that of the cant timber is oblique to this plane. The subject of square and cant timbers has been explained by the following familiar illustration. Imagine the before-named vertical athwart­ship plane to be fixed at its intersection with the vertical longitudinal plane, but still allowed to revolve on the ver­tical line of intersection as an axis. It may be considered as a door on its hinges. When the door is wide open, in other words, when the plane stands athwartships, it repre­sents a square timber ; when the door is partially closed, or allowed to revolve on its hinges, it represents a cant timber· This imaginary revolution, of course, takes place forward in the fore-body and aft in the after-body. Thus, in the half-breadth plan, Plate CCCCL., AB, drawn perpendicular to the middle line of the ship, represents the joint of a square frame ; but if it is made to revolve forward round the point A, till it comes into the position A*b*, it then represents the joint of a cant frame.

We have now to explain the manner of drawing the va­rious lines and sections of a ship, and of transferring them from one plan to another. For this purpose it will be con­venient to imagine the draught complete, and in a general way to retrace the steps by which the completion was ef­fected, by explaining the adaptation and correspondence of the three plans with each other. Below the upper edge of the rabbet of the keel are drawn the depth of the rabbet and the under sides of the main and false keels. At a distance apart, cqual to the length of the ship, are drawn the fore­most and aftermost perpendiculars, at right angles to the keel, and respectively intersecting the aft part of the rabbet of the stem, and the fore part of the rabbet of the stern­post, at the height of the lower deck. The stem and stern­post, together with their respective rabbets, are likewise delineated. From the calculation of the w eight of the ship when fully equipped, as already explained, is determined the position of the upper or load water-line; the other water­lines arc drawn at pleasure parallel to, and generally equi­distant from, the load water-line. They are severally mark­ed No. 1, 2, 3, 4, *&c.* (Plate CCCCL.), observing that they are characterized by the same figures in the body and half­breadth as in the sheer plan.

The load water-line being drawn in the sheer draught, the height of the lower deck may be determined, It is to be observed, that a deck is delineated by three lines, the upper two of which are parallel to each other, and represent the thickness of the deck at the middle ; the third or lower line denotes the under surface of the deck at the side of the ship. Supposing the height of the deck determined amid­ships, forward and aft ; let these heights be set above the load water-line, and through the three spots thus obtained draw a segment of a circle ; this curve defines the deck at the middle. To obtain the deck at the side, proceed as follows. Draw a straight line, cqual in length to the breadth of the ship amidships, to the interior of the timbers. Per­pendicular to and at the middle of this line, set off the round-up of the beam, through which point and the extre­mities of the line draw the segment of a circle, which will represent the round-up of all the beams. Draw a tangent to this curve at its middle point, which will evidently be parallel to the first-named line, or chord of the arc. Now, to obtain the round-down of the deck at any particular sta­tion, take the half-breadth of the ship at that station, and set off this half-breadth on the tangent from the middle of the curve. Next take the perpendicular distance (at right angles to the tangent) of the curve from the point last ob­tained, and set it off on the sheer plan at the corresponding station below the under side of the deck at the middle ; the spot thus obtained is the deck at the side. By proceeding in a similar manner at other stations we obtain several spots through which a fair curve must be drawn, and thus is de­termined the under surface of the deck, or the upper sur­face of the beam at the side of the ship. In like manner are the other decks delineated, their height and round-up being known. At present, however, only the lower deck can be decided. Before the upper deck, quarter-deck and forecastle, and round-house, are drawn, it will be necessary to draw, in the sheer draught, the midship and side coun­ter-timbers. We here remind the reader that we are al­luding to a two-decked ship, whereas the sheer draught (Plate CCCCL.) represents a frigate, which has one fight­ing deck less than a line-of-battle ship.

As the heels of the stern or counter-timbers rest on and are connected to the wing-transom, this transom may be considered as the foundation of the stern. To draw the wing-transom, set up in the sheer plan, from the upper edge of the rabbet of the keel, the height of its intersection at the middle line of the ship with the fore part of the rabbet of the stern-post. At this point draw a horizontal line, be­low which draw a second horizontal line, at a distance from the former equal to the round-down of the transom. Ou the upper horizontal line set off the round-forward of the transom, which square down to the second horizontal line. Next join the last-named point and the point of intersection of the upper surface of the transom, with the fore part of the rabbet, and we thus obtain the after upper edge of the tran­som. It is to be understood that the method just described for drawing the wing-transom is only an approximation to truth : thus we have supposed the after upper edge of the transom a straight line, whereas in reality its projection is a curve ; but as this description is sufficiently accurate for our present purpose, we shall reserve any further remarks on the subject until we explain the method of laying off the transoms.

Having drawn a line to represent the after upper edge of the wing-transom, the fore and after extremities of this line will be respectively the terminations of the after parts of the lower ends of the midship and side counter-timbers ; but before these timbers are described, it will be necessary to make a few observations on the stern of a ship.

If we imagine the stern to be cut by a vertical fore and aft plane, the after boundary of this section, above the wing­transom, will consist of the hollows of the lower and upper counters, and a straight line from the upper knuckle to the top of the side. Moreover, the stem has two curvatures, a round-up and a round-aft. The round-up is variable, where­as the round-aft (above the upper knuckle) is constant. The round-up of the stern gradually increases from the wing-transom to the taffrail ; that is, the right aft rails, which include the tuck-rail, the lower counter, upper coun­ter, foot-space, and breast-rails, have more and more cur­vature as they ascend. the round-aft of the stern, from the upper knuckle to the taffrail, is the same in equal breadths ; in fact, the stern is a portion of a cylinder, and therefore all sections square to its axis, or square to the rake, which is parallel to its axis, are portions of the same circle.

We may now proceed to draw in the midship counter­timber. The stations of the upper and lower knuckles being determined, draw a circular arc to the hollow of the upper counter ; and from the lower knuckle to the intersec­tion of the upper edge of the wing-transom with the fore part of the rabbet of the stem-post draw another curve to the hollow of the lower counter. From the upper knuckle draw a straight line to the rake of the stern, and we thus complete the projection of the midship counter-timber.

To draw in the side counter-timber in the sheer plan. At the height of the upper knuckle of the midship counter­timber draw a horizontal line ; at the distance of the round­down of the upper counter below this line draw another horizontal line, on which set off the round-forward of the upper counter square to the rake. The point thus obtained will be the upper knuckle at the side. In like manner is