of each of these points from the middle line, and transfer it on the corresponding timber in the half-breadth plan. Through the points thus obtained draw a curve which will terminate both forward and abaft on the same lines as the corresponding diagonal, only observing that the distances of the terminations must be taken in the body plan hori­zontally instead of diagonally.

To run off level lines and water lines in the half-breadth plan. Take the horizontal distances, from the middle line of the ship, of the intersection of each timber with the level or water line in the body plan, and set off these dis­tances from the middle line of the half-breadth plan on the corresponding timbers. Through the points thus obtained puss a curve.

The terminations of these lines below the wing-transom have been already explained.

To terminate the after end of a level line above the wing­transom. From the sheer plan square down the intersec­tions of the level line with the aft part of the midship and side counter-timbers, to the middle line of the half-breadth plan. From the foremost of the two points thus obtained, erect a perpendicular to the middle line, and the point where the round-aft of the stern drawn from tire aftermost point intersects the perpendicular, will be the termination of the level line.

Without further explanation, this method will serve for the terminations of the top-breadth, top-side, port-sill, and other similar lines. The fore ends of these lines may ter­minate in the half-breadth of the stem from the middle line.

To run off buttock and bow lines in the sheer plan. In the body and half-breadth plans, buttock and bow lines are straight lines parallel to the middle line. To transfer them from the body to the sheer plan, proceed thus: in the body plan, from the upper edge of the keel, take the heights of their intersections with each timber, and set off these heights on the corresponding timbers in the sheer plan. Through the spots thus obtained pass a curve. Those lines which do not cross the wing-transom may terminate in the sheer plan, at the main-breadth line. Those which cross the wing-transom terminate at the margin as follows. Square up the intersection of the buttock-line with the mar­gin of the wing-transom in the half-breadth plan, to the margin in the sheer plan. The spot thus obtained deter­mines the ending of the buttock-line.

To run off the main-breadth line in the sheer and half­breadth plans. In the body plan this line is a curve pass­ing through each timber, at its widest part. It is transfer­red to the sheer plan by levelling in its intersection with each timbcr, to the corresponding timbers ; and it is drawn in the half-breadth plan in a manner similar to that before de­scribed with respect to water-lines.

We now suppose the draught is complete, and that due precautions have been taken to make the various curves in the three plans perfectly fair. We proceed to explain the method of laying off the more important parts of a ship.

It will be unnecessary to allude to the manner of transfer­ring the sheer and body plans from the paper on which they are first drawn to a small scale, to the mould-loft, on which they are to be delineated the full size of the ship. The pro­cess will be sufficiently obvious to any intelligent person. We will therefore suppose the sheer and body plans transferred to the floor of the mould-loft. This being done, the next operation is to fair the body, by horizontal, vertical, and ob­lique sections, which is effected by running off in the half­breadth plan, according to our previous description, level lines, buttock-lines, and diagonal lines.

It should be understood, that, forward and aft, it is neces­sary to run off a few vertical sections nearer together than the other sections. This is done on account of the sudden curvature in the bow and buttock of a ship. These sec­tions, which are called “proof timbers,” may be placed ac­cording to discretion ; observing, however, that it is essen­tial to have one near the end of the wing-transom.

When the body is perfectly fair on the floor, it becomes necessary to get in all the alternate timbers, or rather joints of the frames, which have been omitted. In the half-breadth plan, bisect the spaces between every joint already laid off, and strike in the new joints, which, like the others, will be square to the middle line. Then in the half-breadth plan take the distances from the middle line, of the intersections of these joints with each of the level lines and diagonals, and transfer these distances to the corresponding level lines and diagonals in the body plan. Thus will be obtained a series of spots through which curves must be drawn to re­present the new joints, when all the moulding edges in the bo<ly plan will be complete.

Supposing the body plan complete, the moulds may be made for the timbers in the square body. With respect to the floors, it is customary for one large mould to contain them all, the fore and after bodies being placed on its oppo­site sides. This mould, for lightness and convenience, is made of battens ; it is connected at the middle line by a pair of hinges, so that when not in use it may be shut to­gether, and thus occupy only one half the space. In trim­ming a floor, after the spots are obtained from the mould for its curvature, it is sometimes customary to apply the ad­jacent first futtock-mould through them. With respect to the futtocks, for the sake of illustration, let us imagine one frame of the ship (as starboard, K), instead of consisting of a floor, first futtock, second futtock, third futtock, fourth futtock, and top-timber, to consist simply of two long tim­bers, each extending from the dead-wood to the top of the side, one on either side of the joint. Were we to make a mould to K in the body plan, it is obvious that it would give the form of both these imaginary long timbers. The only difference in the application of the mould would be, that in moulding the foremost of these timbers the after side of the mould would be uppermost, whereas in moulding the after timber, the fore side of the mould would be upper­most. The reverse would obviously be the case in mould- ing the larboard timbers. Now, bearing this principle in mind, the moulds are made for the various futtocks, con­forming in their length to the respective diagonals which denote the stations of their heads and heels. The scantling of the timbers is marked on the moulds, together with the stations of the ribbands and bevelling spots. As each edge of a mould may be used, one mould answers for two timbers, and their opposites. Where rigid economy is of importance, one mould may serve for several futtocks, in which case the various joints are inked on the surface of the mould, and are bored through the mould to the timber in order to ob­tain its curvature. This method, however, is not to be ge­nerally recommended, because a set of moulds will, with care, convert for several ships in succession.

After the moulds are made, it is customary to take the bevellings of the square body. This subject will, however, be explained generally under the head of cant-timbers, to which we now direct the reader’s attention.

We have already explained that the plane of a cant-tim­ber is vertical, and inclined at a certain angle to the longi­tudinal plane of the ship ; its projection, therefore, in the half-breadth plan, will be a straight line inclined to the middle line.

In the disposition of the cant-timbers, strength and eco­nomy should be considered ; hence the propriety of dimi­nishing their curvature and bevelling as much as possible. No particular rule can be laid down for their number and disposition, as these must depend on the form of the bow and buttock of the ship. As a general ride, they should be placed as square as possible to the body, and be equally spaced on the main-breadth and middle lines ; their sidings, together with the openings between them, or, in other