ſhould be introduced to make good the deficiency. Every beam, and alſo the beam arms, ſhould be kneed ’at each end with one lodging and one hanging knee ; and in thoſe parts of the ſhip which require the knees to be very acute, ſuch as the after beams of the gun- deck, and in ſome ſhips, whoſe bodies are very ſharp, the foremoſt beams of the gun-deck, there ſhould be knees of iron. Care ſhould be taken always to let the upper side of the knees be below the ſurface of the beams in large ſhips one inch and a half, and in ſmall ſhips an inch, by which means the air will have a free paſſage between the knees and under part of the deck.

In the conversion of the beams the ſide next the lodging knee ſhould be left as broad at the end of the beam as can poſſibly be allowed by the timber, the beam retaining its proper ſcantling at the end *of* the lodging knee : by ſo doing the lodging knees will be more without a ſquare, which conſequently makes them the more eaſy to be provided.

In ſhips where the beams can be got in one piece, they ſhould be ſo dispoſed as to have every other one with the butt end the ſame way ; for this reaſon, that the butts will decay before the tops. In large ſhips the beams are made in two or three pieces, and are there­fore allowed to be ſtronger than thoſe that are in one piece. The beams in two pieces may have the ſcarf one-third of the length, and thoſe in three pieces ſhould have the middle piece half the length of the whole beam. The cuſtomary way of putting them together is to table them; and the length of the tablings ſhould be one-half more than the depth of the beam. It is very common to divide the tablings in the middle of the beam, and that part which is taken out at the up­per ſide to be left at the lower ſide, and then kerſey or flannel is put into the ſcarf : but in this caſe the wa­ter is liable to lie in the ſcarf, and muſt be the means of rotting the beams. If, however, the beams were ta­bled together in dovetails, and taken through from ſide to ſide, putting tar only between them, which hardens the wood ; then the water occaſioned by the leaking of the decks would have a free passage, and the beam would dry again ; and this method would not be found inferior in point of ſtrength to the other. The length of the fore and aft arm of the lodging knee ſhould ex­tend to the ſide of the hanging knee next to it ; but there is no neceſſity for that arm to be longer than the other. In faſtening the knees, care ſhould be taken to let one bolt paſs exactly through the middle of the throat, one foot six inches from each end, and the reft divided equally between ; obſerving always to have the holes bored ſquare from the knee. The bolts for the thwartſhip arms of both hanging and lodging knees may go through the arms of each knee, and drive every one the other way.

In order to draw the beams in the draught, take the moulding of the lower deck beams, and ſet it off below the line repreſenting the deck at the ſide, and draw a line in pencil parallel thereto, which will repreſent the under ſide of the beams. In like manner repreſent the under side of the beams for the upper deck, quarter deck, forecaſtle, and roundhouſe. Then take the ſiding of the lower deck beams, and place one under and one between each port, all fore and aft, drawing them in pencil. Determine the dimenſions of the well fore

and aft, which is ten feet, and let it off abaft the beam under the eighth port, placing the beam under the ninth port at that diſtance : thoſe two beams may then be drawn in ink, and will terminate the extent of the well the fore and aft way ; and as a beam cannot go acroſs the ſhip at that place upon account of its being the well and maſt room, there muſt therefore be a beam arm between theſe two beams.

The main hatchway ſhould then be determined, let­ting the beam that forms the fore part of the well form the aft part of it, and the beam under the next part may form the fore ſide of it, which beam may alſo be now drawn in ink : there ſhould alſo be another beam arm introduced in the wake of the main hatch­way.

The fore hatchway may be next determined ; the fore ſide of which ſhould range well up and down with the after end of the forecaſtle, and it may be fore and aft about four-ſevenths of the main hatchway. At the foreſide of the fore hatchway there muſt be a ladder­way down to the orlop, which may be as much fore and aft as the beams will allow. The rest of the beams afore the fore hatchway may remain as ſirſt placed, there being nothing in the way to alter the ſhip. Then determine on the after hatchway, the foreſide of which comes to the aft ſide of the main maſt room.

There ſhould alſo be a hatchway, the foreſide of which may be formed by the aft ſide of the beam un­der the twelfth port ; which is for the convenieney of the ſpirit and fiſh rooms : and there ſhould be a ladder­way abaft it to lead down to the cockpit. There may be alſo another hatchway, the foreſide of it to be form­ed by the aft ſide of the beam under the eleventh port. The ſize of the ladder and hatchways muſt be governed by the-beams, as when there is a good shift of beams they ſhould not be altered for ladder and hatchways, unleſs it is the three principal hatchways, which muſt always be of a proper ſize, according to the ſize of the ſhip.

The after capſtan muſt be placed between the two hatchways laſt deſcribed, and the beams abaft may ſtand as they are already ſhifted, obſerving only the mizenmaſt. There ſhould be a ſmall ſcuttle placed afore the ſecond beam ſrom aft, for the convenience of the bread room : it muſt be on one of the middle lines, as there is a calling at the middle under the four or five after beams to receive the pillars for the ſupport thereof.

The bits may be placed, letting the foreſide of the after ones come againſt the aft ſide of the beam abaft the third port, and the foreſide of the foremoſt ones againſt the next beam but one forward ; then at the foreſide of each bit there ſhould be drawn a ſmall ſcut­tle for the conveniency of handing up the powder from the magazine. The breaſt hook ſhould alſo be drawn, which may be three feet the moulding away, and ſided nine-tenths of the beams of the lower deck.

The gun-deck, beams, knees, &c*.* being deſcribed ; in which, as well as all the decks having ports, the ſame precautions are to be uſed as in the gun-deck ; and ob­ſerving to keep the beams upon one deck as nearly as poſſible over the beams of the other, for the conveniency of pillaring, as they will then ſupport each other.

The hatchways are to be placed exactly over those