although in this short treatise many things are necessarily omitted which are of importance, as illustrative examples of the art of laying off, it will be found to embrace all those points which are likely to occur in the ship-building of the present day, or at least render them comparatively easy.

*Practical Building.*

We now come to the consideration of the branch of our subject to which the term “ ship-building” may be correct­ly applied ; that is, the mechanical construction of the fa­bric of a ship. We have already, in the preliminary re­marks to the “ Laying Off,” described generally the rela­tive position of the principal timbers which compose the frame-work of the hull, and that are necessary to give the contour of the body. Technically speaking, it is usual only to apply the term timbers to the frame-timbers of a ship. We shall, however, for the sake of perspicuity and brevity of description, adopt the term as one of more general ap­plication, and use it to designate the larger pieces of wood­work which enter into the construction of the hull. Pre­viously to any detail, we shall mention severally the various internal timbers used as supports and ties to the frame, and the combinations of external and internal plank by which it is covered. This is necessary in order to render the subsequent descriptions intelligible to those unacquainted with the technical names used in ship-building. We must also refer our readers to the plates which are intended to illustrate this part of our article, for much information that may be more easily obtained from them than from descrip­tion.

The apron is fayed (or fitted) to the after side of the stem, and is intended to give shift to its scarphs ; the lower end scarphs to the dead-wood. The keelson is an internal longitudinal range of timbers, situated immediately over the keel, and fayed to the inside of the throats of the floors, its use being to give shift to the scarphs of the keel, and to secure the frames down to the dead-wood. The foremost end of the keelson scarphs to the stemson, which is intended to give shift to the “ boxing scarph,” or con­nexion between the stem and keel. The after end of the keelson formerly scarphed to the sternson, a timber which, in a similar manner aft, strengthens the connexion between the keel and stern-post. The keelson is now generally rounded off short of the heel of the sternson, and latterly the boxing scarph of the stem has been discontinued. The additional keelsons, sometimes also called sister-keelsons, are timbers brought on the inside of the frame on each side of the keelson, to receive and to diffuse the weight of the main­mast. Timbers which cross the stemson or keelson for­ward, for the purpose of connecting the two sides of the ship, are called hooks. Those which are placed to receive the ends of the decks are called deck-hooks. Timbers which for a similar purpose cross the sternson or keelson aft, are called crutches. These hooks and crutches are frequently combinations of timber, or of timber and iron They are then formed of two half hooks called ekeings, and the middle or connecting piece. Timbers which are fayed to the inside of the frame, or upon the inside plank, solely for the purpose of supporting the frame, are called ridere. Timbers which in a square stern fay to the fronts of the transoms, and run forward to strengthen the connexion be­tween the stern and the ship’s side, are called sleepers. The two sides of the ship are prevented from collapsing by transverse timbers called beams, which are generally con­nected at their ends to the ship’s side by knees either of wood or iron. The beams are spaced, first with reference to the mast-holes, to the hatchways, ladderways, or pas­sages from deck to deck, and other arrangements connected with the economy of the ship, and then in reference to the ports, that they may afford support to the artillery.

Those beams which do not extend from one side of the ship to the other are called half-beams ; they are placed in intervals between the beams that would otherwise be too devoid of support for the plank of the deck, which is laid on the upper surface of the beams, and called the flat of the deck. Timbers worked round the interior of the ship for the purpose of receiving the beams of the several decks, are called shelves to these decks ; and those timbers which are worked upon the ends of the beams, and also round the interior of the Ship, are called water-ways ; thus, gun-deck shelf, gun-deck water-way, or upper deck shelf, upper deck water-way. Chocks, internally, are timbers brought under the ends of the beams, or under the shelf that is imme­diately beneath the beams, to support them, and to receive the bolts of the knees which connect their ends with the ship’s side. A chock is a name applied very generally to any piece of timber filling an interval, or supplying a defi­ciency in any of the combinations, either of timber, or of timber and iron. Bits are timbers projecting through the decks, either vertically or slightly inclined, and are used for facilitating the management of the ropes for the rigging. The riding-bits are for securing the cable when the ship is riding at anchor. Standards, generally, now, are timbers used for supports, as to the bits. On the old system of building, standards were sometimes placed where they could only act as ties, as the standard to the stern. There were also standard-knees on the decks, both to support and tie the ship’s sides.

The plank, both external and internal, is of various thick­nesses : a thick strake, or a combination of several thick strakes, being worked wherever it has been supposed that the frame required particular support ; as internally, over the heads and heels of the timbers ; both externally and internally between the ranges of ports ; and internally, to support the connexion of the beams with the side.

Of the internal planking, the lowest strake or combina­tion of strakes in the hold is called the limber-strake. A limber is a passage for water, of which there is one through­out the length of the ship on each side of the keelson, in order that any leakage may find its way to the pumps ; and it is from this that the limber-strake takes its name. A strake of planking is a range of planks abutting against each other, and extending, excepting in particular cases to be afterwards mentioned, the whole length of the ship.

The whole of the plank in the hold is called ceiling. Those strakes which come over the heads and heels of the timbers are worked thicker than the general thickness of the ceiling, and are distinguished as the thick strakes over the several heads. The strakes under the ends of the beams of the different decks, and down to the ports of the deck below, if there be any ports, are called the clamps of the decks to the beams of which they are supports; as the gun-deck clamps, middle-deck clamps. The strakes which work up to the cills of the ports of the several decks are called the spirketing of those decks, as gun-deck spirketing, upper-deck spirketing. The upper strakes of planks, or assemblages of external planks, are called the sheer strakes. The strakes between the several ranges of ports, beginning from under the upper-deck ports of a three-decked ship, are called the channel-wale, the middle-wale, and the main- wale. The strake immediately above the main-wale is called the black strake. The strakes below the main-wale diminish from the thickness of the main-wale to the thick­ness of the plank of the bottom, and are therefore called the diminishing strakes. The lowest strake of the plank of the bottom, that of which the edge is in the rabbet of the keel, is called the garboard. In merchant-ships the rabbet is generally worked out of the middle of the side of the keel, and not, as in ships of war, at the upper part of the side. Several methods of working this garboard, and the lower strakes of the bottom, have been lately adopted, both in the