LIFE BOATS.

In these days of tremendous catastrophes at sea it is a relief to look for a moment at the work which is being accomplished by the British National Life-boat institution. At the recent annual meeting the report showed that since the last meeting the Institution had placed twelve new life-boats on the coast,—five of them at new stations, and the others replacing old or inferior boats. Seven of them had been provided with transporting carriages, and six new boat-house had been built. During the past year the society's life-boats, which are now 250 in number, had saved 543 persons, nearly all of them under perilous circumstances, when ordinary boats could not have effected their rescue, or could only have done so at extreme risk to those on board them. These invaluable services since the last annual meeting had happily been rendered without any loss of life among the brave men who had performed them. It was satisfactory to know that, as far as the operations of this institution were concerned, the violence of no storm appalled the brave men who manned the life-boats. The number of lives saved from its first establishment to the present time, either by its lifeboats or by special exertions, for which it had granted rewards, was 22,866.

In furnishing a life-boat's equipment, the first duty is to provide her with everything that can contribute to the safety of those employed on this dangerous service, and secondly, to make her as far as possible independent of all assistance from wrecked vessels, the crews of which are often in a helpless state, perhaps lashed to the rigging, and unable to throw a rope, or even to get from the wreck to the boat without help.

A life-boat is therefore provided with life-lines, some festooned round her sides, by the aid of which any one in the water using them as stirrups can get into her; others with corks attached are thrown from within her when along-side a wreck, and float on the water all around her. She is also furnished with a cork life-buoy, which, with a line attached, can be thrown, or floated, to any one in the water, who might be too distant to reach the life-lines of the boat She has likewise strong but light lines with grappling-irons attached, one at the bow and another at the stern, which, by being thrown into the rigging or on board a wreck fasten themselves, so that the boat can be at once held to the wreck without the assistance of any one in her. An anchor and cable, a good lantern for nightwork; a compass; and a drogue or water-bag, which is dragged behind a boat to prevent "broaching-to" when running before a heavy sea, are also necessary to a complete life-boat's equipment.

In choosing sites of ground on which the life-boat houses are to be built, regard is particularly taken to their convenience, so that they may be handy for launching the life-boat, and for her easy transport on her carriage along the coast to the scene of the wreck The house is usually 40 ft. long and 17 ft. wide; its doors are 14ft. wide, and their height about 12 ft. There are folding doors of the above dimensions facing the water and if it should be deemed an advantage to be able to take the boat on her carriage to the rear of the house, doors of the same dimensions are also placed at that end, otherwise a small door at the rear and suffices. The life-boat house is usually a substantial building, built of brick or stone, and having a slated roof. A boarding or flooring, about 6 ft. in length, is placed over the joists at the rear end of the house, to keep the spare stores on, and a batten with wooden pegs for hanging up the life-belts and small lines, is fixed at a convenient height along the side wall In some of the life-boat houses gas has been fitted.

The average expense of a complete life-boat station is 800*l.*, in addition to 70*l* a year needed to keep the establishment in state of efficiency. The cost is made up as follows:—

Life boat and her equipment, including life-belts for the crew, and transporting carriage for the life-boat.	£550
Boat-house (average cost).....	250
Total.....	£800

On page 221 we illustrate, from *The Builder*, a new life-boat station which has just been completed at Walmer. This house is built with Kentish rag and Bath stone Dressings, the verandahs and uprights, and all exposed woodwork, being stained and varnished. There are large doors about 14 ft. wide at the end opposite to that shown in the view. There is a loft at one end of the house for tackle, and the walls are fitted with pegs for life belts. Ventilation is secured by louvred openings in gables and sides of house by fixed louvres in casements, alternate with glazed windows The verandah, or covered ways, on each side are fitted up with seats, and afford comfort and shelter to the sailors.

THE CARPENTER AND JOINER.

It is the business of the carpenter to frame and put together roofs, partitions, floors and other necessary parts of the building. The joiner begins his work where the carpenter leaves off, for it is his business to supply and fit up stairs, cupboards, furniture, and other parts required for convenience We may illustrate some of the most important terms used in carpentry by means of two kinds of roof represented in figs. 234, 235. Pieces of timber laid on the wall in order to distribute the pressure of the roof equally, and to bind the walls together, are called *wall-plates* or *raising-plates*, as at *a a*, while the horizontal piece of timber *b b*, connected to two opposite principal rafters, is called a *tie-beam*. It serves the purpose of preventing the walls from being pushed out by the thrust of the roof, and also of supporting the ceiling of the room below. When placed above the bottom of the rafters it is called a *collar beam*. The two pieces of timber in the sides of the truss which support a grated frame of timber over them for receiving the roof-covering or slating are called the *principal rafters*, as at *c c*. The horizontal pieces of timber *d d*, notched on the principal rafters on which, and on the pole-plates, the common rafters rest, are called *purlines*, while the pieces of timber *e e* placed at equal distances on the purlines, and parallel to the principal rafters, are called *common rafters* their use is to support the boarding to which the slating is fixed The pieces of timber *f f*, which rest on the ends of the tie-beams and support the lower ends of the common rafters, are called *pole-plates*. At *g* (fig. 234,) is an upright piece of timber in the middle of a truss, framed at the upper end into the principal rafters, and at the lower end into the tie-beam; this is called a *king-post*, and its use is to prevent the tie-beam from sinking in the middle. *Queen posts i i*, fig. 235, are two upright pieces of timber framed below into the tie-beam, and above into the principal rafters; they are placed at equal distances from the middle of the truss or its ends *Struts* or *braces*, *h h*, are oblique straining-pieces framed below into the queen-posts or king-posts, and above in the principal rafters, and supported by them *Puncheons* or *studs* are short transverse pieces of timber fixed between two others for supporting them equally. A *straining beam*, *k*, fig. 235, is a piece of timber placed between the queen-posts at their upper end so as to withstand the thrust of the principal rafters; while a similar piece placed upon the tie-beam at the bottom of the two queen posts for resisting the force of the braces which are acted on by the weight of the covering, is called a *strutting-sill*, middle *i*, fig. 235 There are other terms, such as *cam ceiling beams*, or horizontal pieces of timber made sloping on the upper edge from the middle towards each end, for discharging the water. *Jack-rafters*, *principal braces*, or *cushion rafters*, are pieces of timber framed in the same vertical plane with the principal rafters under, and parallel to them, for giving additional support.

An important part of the business of the carpenter is that of *joints*. These may be used for lengthening timbers, or they may be *framing* and *bearing* joints, used in trusses, flooring, &c., or joints for ties and braces. Timbers may be connected lengthwise by bringing the two beams end to end, placing a short piece on each side, and bolting through these short pieces and the main beams, but this is not a neat method, it is therefore more common to apply the operation of *scarfing*, in which case one-half of the substance of each beam is cut away for a short length, and the cut portions being brought together are fastened by means of screws, straps, bolts, or wedges. Thus the common *scarf-joint* (fig. 224) is made by halving each piece of timber for a certain length, and bolting or strapping the two pieces together; but where it is an object to secure strength in resisting longitudinal strains, such a joint as that shown at fig 230 is employed either with or without bolts. The French scarf joint (fig 231) is called, from its fancied resemblance to the form of a flash of lightning, *tenon de Jupiter* this figure also shows the method of applying bolts and straps. Fig. 237 shows a *longitudinal joint* which may be used where a vertical