to measure wnιle their cargoes are on board, the following rule shall be observed and is hereby established : that is to say, measure, first, the length on the upper deck, between the after part of the stem and the fore part of the stern-post ; secondly, the inside breadth on the under side of the upper deck, at the middle point of the length ; and, thirdly, the depth from the under side of the upper deck, down the pump-well, to the skin ; multiply these three dimensions together, and divide the product by 130, and the quotient will be the amount of the register tonnage of such ships.

*To form a Scale of Tonnage, or a Seale of Displacements.*

In order to form what is sometimes called a scale of ton­nage, and sometimes a scale of displacement, on the plan of a ship’s body draw a horizontal line to represent her load water-section, and beneath this line draw other horizontal lines equidistant from each other, representing equidistant horizontal sections ; then calculate the solid contents of the part of the body intercepted between each two successive sections. The sum of the contents of all the solids will be the load displacement of the ship, and the sum of the con­tents of all the solids below any one of the horizontal sections will be the displacement of the ship up to that horizontal section. Find in this manner the load displacement, and also the displacement up to every horizontal section ; then draw a vertical line AB, and on A B, graduated to some scale of feet, set off the distance AB equal to the mean load draught of water of the ship, and on the same line AB let the points C, D, E, be taken respec­tively at the heights of the other equidistant horizontal sections ; then from A, C, D, E, draw A*a*, *Cc, Dd, Ee,* so that E*e*, D*d*, *Cc,* and A*a*, shall respectively be in the same ratio to each other in length as are the solid contents, or the dis­placements of the parts of the body below the respective horizontal sections, to each other, in cubical contents. Thus, if the solid content of the whole displacement be double the solid content of the displacement up to the height C, then draw A*a* double the length of C*c* ; or if it be only one third more, then let A*a* be one third longer than C*c* ; and on the same principle with the other lines. Then trace a curve through all the points *a*, c, *d, e,* which curve will be the curve of displacements. Then, if A*a* be graduated by pro­jecting all the points c, *d, e, &c.* on to it, the line A*a* will become a scale of displacement, or of tonnage.

The use of the scale is obvious, as, when the ship from which it was formed is at any draught of water within the limits of the height BA, her displacement at that draught may be immediately known by squaring a line out from its height, set off from B on the scale BA, to intersect the curve B*edca,* and then squaring up this point of intersection to the scale of tonnage An, which will be intersected at the number of tons in the displacement required. The effect to be pro­duced in the draught of water by lightening or loading the ship to any extent embraced within the scale may also be easily ascertained ; and, in the same manner, the quantity of lading which a ship will require to be put into or taken out of her to bring her to any certain draught of water, may be immediately known. In fact, so useful are these scales of ton­nage that they ought to be calculated for every merchant- ship, and a scale drawn and placed in the hands of the commander. It would enable him to answer at once innu­merable questions which are completely beyond his know­ledge without it. Mr Parsons, a member of the late School of Naval Architecture, proposed to the committee from which the law for tonnage that is at present in force has ema­

nated, that, for all new vessels built or launched after a certain date, such scales of tonnage should be formed, which, when properly authenticated, should be attached to the register of the vessel, in order that from these scales the true ton­nage or actual weight of the cargo might be ascertained, and either the whole or any portion of it which the commit­tee might have determined, be taken as the register tonnage. There would have been many difficulties opposed to the practical application of this plan, although we can by no means consider them as insurmountable. Among these difficulties would have been the question as to what is or what ought to be considered as the light draught of water ; and also the circumstance that many vessels are built from eye alone, of which, therefore, there would have been no drawings to form the scales of tonnage. Mr Parsons has traced the curves of tonnage for many classes of merchant-vessels, and for the several rates of men-of-war, and has published them in a work called Scales of Displacement. A somewhat similar work, as respects the men-of-war, and under the same title, has also been published by Mr Edye, the assistant surveyor of her majesty’s navy.

A very useful body of information on merchant-vessels re­sulted from the labours of the committee on tonnage, that has been already so frequently mentioned in this article. It is a valuable and extensive collection of particulars as to the form, proportions, dimensions, and tonnage of the mercantile navy of England. The measurements were all made, and the information was collected and arranged, by Mr Cradock, a member of the late School of Naval Architecture, who was, by the permission of the Lords Commissioners of the Ad­miralty, employed under the directions of the committee. In order that such a body of information may be more generally useful than it can possibly be while confined to the pages of a parliamentary Report, we shall enrich this article with it. The following accounts of the various methods of comput­ing the tonnage, which are in use among the maritime na­tions of Europe, were obtained by her majesty’s government officially from the several powers, and are included in the report of the committee.

*Methods at present in and* *among Foreign Nations for com­puting the Tonnage of Ships.*

France.—The three measures of length, breadth, and

depth, arc multiplied together, and the product is divided by 94 for the tonnage.

*In single-decked vessels* the length is taken from the after part of the stem on deck to the stern-post ; the extreme breadth is taken, being measured inside from ceiling to ceil­ing, and the depth from the ceiling to the under surface of the deck.

*In vessels of tιco decks,* at Bordeaux, the length of the up­per deck and that of the keelson is measured, and the mean taken for the length. But at Brest, Marseille, and Bou­logne, the mean of the length on the two decks from the stem to the stern-post is taken as the length. The depth of the hold from the ceiling to the under surface of the lower deck is added to that of the height between decks, and considered as the depth. The extreme inside breadth is taken in the same way as in single-decked vessels.

At Bordeaux an allowance is sometimes made for the rake of the stem and stern of the vessel.

At Boulogne, in measuring steam-boats, the length of the coal and engine chambers is deducted from the length of the vessel, and her breadth is taken at the fore and aft extre­mities of the same, the mean of which is considered as the breadth. The depth is taken inside the pumps, from the lower surface of the deck, between the timbers.

At Brest, measures are frequently taken with a string, although contrary to law, and an error of seven tons in the tonnage of a cutter has been the result.