of the ſhip for his purpoſe. By this government judge *of* the ſhips requiſite for tranſport ſervice, and by this are all revenue charges on the ſhip computed. It is no leſs difficult to anſwer this queſtion by any general rule which ſhall be very exact, becauſe it depends not on­ly on the cubical dimenſions of the ſhip’s bottom, but alſo on the ſcantling of her whole frame, and in ſhort on the weight of every thing which properly makes part of a ſhip ready to receive on board her cargo. The weight of timber is variable ; the ſcantling of the frame is no leſs ſo. We muſt therefore be contented with an average value which is not very remote from the truth ; and this average is to be obtained, not by any mathematical diſcuſſion, but by obſervation of the burthen or cargo actually received, in a great variety of cases. But ſome fort of rule of calculation muſt be made out. This is and muſt be done by perſons not ma­thematicians. We may therefore expect to find it inca­pable of being reduced to any principle, and that every builder will have a different rule. Accordingly the rules given for this purpoſe are in general very whimſical, measures being uſed and combined in a way that ſeems quite unconnected with ſtercometry or the meaſurement of solids. The rules for calculation are even affected by the intereſts of the two parties oppoſitely concerned in the reſult. The calculation for the tonnage by which the cuſtoms are to be exacted by government are quite different from the rule by which the tonnage of a tran­sport hired by government is computed ; and the ſame ſhip hired as a tranſport will be computed near one half bigger than when paying importation duties.

Yet the whole of this might be made a very simple buſineſs and very exact. When the ſhip is launched, let her light-water line be marked, and this with the cubical contents of the immerſed part be noted down, and be engroſſed in the deed by which the property of the ſhip is conveyed from hand to hand. The weight of her maſts, sails, rigging, and ſea-ſtores, is moſt eaſily obtained ; and every builder can compute the cubical contents of the body when immerſed to the load water line. The difference of theſe is unqueſtionably the bur­then of the ſhip.

It is evident from what has been already ſaid in the laſt chapter, that if the number of cubic feet of water which the ſhip diſplaces when light, or, which is the ſame, the number of cubic feet below the light water line, found by the preceding method of calculation, be ſubtracted from the number of cubic feet contained in the bottom below the load water line, and the remainder reduced to tons by multiplying by 74, the number of pounds in a cubic foot of ſea water, and divided by 2240, the number of pounds in a ton, the quotient will be the tonnage.

But as this method is very troubleſome, the follow­ing rule for this purpoſe is that which is uſed in the king’s and merchant’s ſervice.

Let fall a perpendicular from the foreſide of the ſtem at the height of the hawſe holes @@(h), and another per­pendicular from the back of the main poſt at the height

of the wing tranſom. From the length between theſe two perpendiculars deduct three-fifths of the extreme breadth @@(I), and alſo as many times 2 1/2 inches as there are feet in the height of the wing tranſom above the upper edge of the keel ; the remainder is the length of the keel for tonnage. Now multiply this length by the extreme breadth, and the product by half the extreme breadth, and this laſt product divided by 94 is the tonnage re­quired.

Or, multiply the length of the keel for tonnage by the ſquare of the extreme breadth, and the product di­vided by 188 will give the tonnage.

|  |  |  |  |
| --- | --- | --- | --- |
| *Calculation oſ the Tonnage of an Eighty Gun Ship.*  I. According to the true method. | | | |
| The weight of the ſhip at her launching draught of water  The weight of the furniture | aching | tons  1593  195 | lbs  406  720 |
| The weight of the ſhip at her light wa- | |  |  |
| ter mark |  | 1788 | 1126 |
| The weight of the ſhip at the load watermark 3652 | | | 1983 |
| Real burthen |  | 1864 | 857 |
| II. By the common rule. | |  |  |
| Length from the foreſide of the ſtem at | | Ft | inch. |
| the height of the hawſe holes, | to the |  |  |
| aft ſide of the main poſt, at the height | |  |  |
| of the wing tranſom |  | 185 | 10 |
| Three-fifths of the extreme breadth | |  |  |
| is - - 29 f.  Height of the wing tranſom | 9 1/2 in. |  |  |
| is 2 8 f. 4 in. which mul­tiplied by 24 inches is 6 | 8 1/2 |  |  |
| Sum 36 | 6 | 36 | 6 |
| Length of the keel for tonnage |  | 149 | 4 |
| Extreme breadth |  | 49 | 8 |
| Product |  | 7416 | 10 1/2 |
| Half the extreme breadth | - | 24 | 10 |
|  | 94)184185 | | 8 3/4 |
| Burthen according to the common | |  |  |
| rule | - | 1959 | 929 |
| Real burthen |  | 1864 857 | |
| Difference | - | 95 | 72 |

Hence an eighty gun ſhip will not carry the ton­nage ſhe is rated at by about 95 tons. As the body of this ſhip is fuller than in ſhips of war in general, there is therefore a nearer agreement between the tonnages found by the two different methods. It may be obſerved that ſhips of war carry leſs tonnage than they are rated at by the common rule, and that moſt merchants ſhips carry

@@@( h ) In the merchant ſervice this perpendicular is let fall from the fore ſide of the ſtem at the height of the wing tranſom, by reaſon of the hawſe-holes being generally ſo very high in merchant ſhips, and their ſtems alſo having a great rake forward.

@@@(I) The breadth understood in this place is the breadth from outside to outſide of the plank.