|  |  |  |
| --- | --- | --- |
| *An Estimate of the Weight of the Eighty Gun Ship in* Plates CCCCLX. and CCCCLXI. as fitted for *Sea,*  *with six Months Provisiοns.* | | |
| *Weight of the Hull N⁰ of ft.* | N⁰of lbs. | Tons. Lbs. |
| of Oak timber at 66 lb. to  the cubic foot 48497 | 3200802 | 1428 2082 |
| Fir timber at 48 lb. to | 213936 |  |
| the cubic foot 4457 | 95 1136 |
| Elm timber at 32 lb. to |  | 12 160 |
| the cubic foot 520 | 27040 |
| Carve work and lead work | 4651 | 2 171 |
| Iron work, rudder irons, |
| chain-plates, nails, &c. | 88254 | 39 894 |
| Pitch, tar, oakum, and |  | 8 |
| paint | 17920 |
| Cook-room fitted with 7 | 16123 |  |
| fire hearth | 7 443 |
| Sum | 3568726 | 593 406 |
| *Weight of the Furniture.*  N⁰ of lb.  Complete ſet of mails and yards,  with the spare geer 161000 | | Tons. Lbs.  71 1960 |
| Anchors with their stocks, and | 39996 | 17 1916 |
| matter’s flores |
| Rigging | 69128 | 30 1928 |
| Sails, complete ſet, and ſpare | 32008 | 14 648 |
| Cables and hawſers | 73332 | 32 1652 |
| Blocks, pumps, and boats | 62056 27 1576 | |
| Sum | 437520195 720 | |
| *Weight of the Guns and Ammunition.* | | |
| Guns with their carriages | 377034 | 168 714 |
| Powder and shot, powder barrels," |
| &c. | 116320 | 51 2080 |
| Implements for the powder | 6500 | 2 2020 |
| Ditto for guns, crows, handſpikes, |
| &c. | 21573 | 9 1413 |
| Sum - | 521427 | 232 1747 |
| *Weight of the Officers Stores,* &c.  Carpenter’s flores 20187 | | 9 2*7* |
| Boatſwam’s stores  Gunner’s flores | 21112 8964 | 9 952  4 4 |
| Caulker’s flores | 5200 | 2 720 |
| Surgeon and chaplain’s effects | 11096 | 4 2136 |
| Sum | 66559 | 29 1599 |
| *Weight of the Proνisions* |  |  |
| Provisions for six months for 700 7 | 858970 | 383 1050 |
| men, with all their equipage |
| Water, casks, and captain’s table | 933900. | 416 2060 |
| Sum | 1792870 | 800 870 |

|  |  |  |  |
| --- | --- | --- | --- |
| *Weight of the Men, &c.* | | | |
| Seven hundred men with their effects, including the officers and their effects  Ballast | N⁰ of lbs. Tons. | | Lbs.  1121 |
| 316961  1478400 | 141  660 |
| Sum | 1795361 | 801 | II2I |
| *RECAPITULATION.* | |  |  |
| The hull  The furniture | 3568726  437520 | 1593  195 | 406  720 |
| Guns and ammunition | 521427 | 232 | 1747 |
| Officers flores | 66559 | 29 | 1599 |
| Provisions | 1792870 | 800 | 870 |
| Weight of the men and ballast | 1795361 | 801 | 1121 |
| Sum | 8182463 | 3652 | 1983 |

Agreeable to the above eſtimate, we find that the eighty gun ſhip, with every thing on board and fit for ſea, when brought down to the load water line, weighs 8,182,463 pounds, or nearly 3653 tons. It may now be known if the load water line in the draught be properly placed, by reducing the immerſed part of the body into cubic feet. For if the eighty gun ſhip, when brought down to the load water line, weighs 3653 tons, the quantity of water diſplaced muſt alſo be 3653 tons : now a cubic foot of ſalt water being ſuppoſed to weigh 74 pounds, if therefore 8182463 be divided by 74, the quotient is 110573, the number of cubical feet which she muſt diſplace agreeable to her weight.

It is now neceſſary to find the number of cubic feet contained in the ſhip’s bottom below the load water line by calculation. If the bottom was a regular ſolid, this might be very eaſily done ; but as it is otherwiſe, we muſt be ſatisfied with the following method by approximation, firſt given by M. Bouguer.

Take the lengths of every other of the lines that repreſent the frames in the horizontal plane upon the upper water line ; then find the ſum of theſe together, with half the foremoſt and aftermoſt frames. Now multiply that ſum by the diſtance between the frames, and the product is the area of the water line contained between the foremoſt and aftermoſt frames: then find the area of that part abaft the after frame, which forms a trapezium, and alſo the poſt and rudder ; find alſo the area of that part afore the foremaſt frame, and alſo of the ſtem and gripe ; then theſe areas being added to that firſt found, and the ſum doubled, will be the area of the ſurface of the whole water line. The reaſon of this rule will be obvious to thoſe acquainted with the firſt principles of mathematics.

The areas of the other water line may be found in the same manner : then the ſum of all theſe areas, ex­cept that of the uppermoſt and lowermoſt, of which on­ly one half of each muſt be taken, being multiplied by the diſtance between the water lines (theſe lines in the plane of elevation being equidiſtant from each other), and the product will be the ſolid content of the ſpace contained between the lower and load water lines.