of each area, from the underside of the tonnage deck to ceiling at inner edge of timber strake, deducting therefrom one-third of the round of the beam. The depths so taken are to be divided into four equal parts, if midship depth should not exceed 16 feet; otherwise into six equal parts.

Breadths are taken at each point of division of the depths and also at the upper and lower points of the depths. The upper breadth of each area is to be set down in its respective column in a line with No. 1 (left-hand numerals), and the rest in succession.

The number of columns for areas will vary according to the length, as in the several classes, and will be equal to the number of parts into which the length is divided plus one.

This formula is also applicable for finding displacement tonnage of ships, that is, the external displacement measured by taking transverse areas to the height of the load water-line to find the cubic content, which content divided by 35 gives the displacement in tons weight, the difference between the light and load displace­ment representing the carrying powers of a vessel in tons.

“The rule, ” says Mr Moorsom, "is founded on the purest mathe­matical principles. It was first published in the Philosophical Transactions of the Royal Society of 1798 by Attwood, in his ‘Disquisition on the Stability of Ships,’ who there describes it as one of those formulæ invented by Sterling for measuring spaces bounded by irregular curves, founded on Sir Isaac Newton’s dis­covery of a theorem—a discovery which the immortal author himself considered amongst his happiest inventions—by which the areas of all curvilinear spaces not geometrically quadrible nor discoverable by any known rules of direct investigation are so closely approxi­mated as to amount to geometrical exactness.”

Mr Allan Gilmour at the middle of the present century expressed his opinion, after a careful consideration of the tonnage question, which was receiving much attention at that time owing to the law 8 and 9 Vict. cap. 89, which had been adopted in place of the old tonnage law 13 Geo. III. cap. 74, not giving satisfaction, that the “ system framed by Mr Moorsom will as it were compel every one to build strong, fast-sailing, and good seagoing ships, and that, in fact, it will stand as long as the world remains.” It will be admitted that great progress has been made in every way in British shipping of late years, and for this due praise must be given to the influence of the present tonnage laws. (W. M\*.)

TONNAGE and POUNDAGE were customs duties anciently imposed upon exports and imports, the former being a duty upon all wines imported in addition to prisage and butlerage, the latter a duty imposed *ad valorem* at the rate of twelvepence in the pound on all merchandise imported or exported. The duties were levied at first by agreement with merchants (poundage in 1302, tonnage in 1347), then granted by parliament in 1373, at first for a limited period only. They were con­sidered to be imposed for the defence of the realm. From the reign of Henry VI. until that of James I. they were usually granted for life. They were not granted to Charles I., and in 1628 that king took the unconstitutional course of levying them on his own authority, a course denounced a few years later by 16 Car. I. c. 18, when the Long Parliament granted them for two months. After the Restoration they were granted to Charles II. and his two

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Length 112⋅75 Feet ÷ 6=18⋅791 Feet, the Common Interval between Areas. | | | | | | | | | | | | | | | | | |
| Depths ÷ 4, the Middle Depth being less than 16 Feet. | | | | | | | | | | | | | | | | | |
|  | | Area 1. | Area 2. | | Area 3. | | Area 4. | | Area 5. | | Area 6. | | Area 7. | Cubic Content and Register | | | |
| Depths . Common val between breadths... |  | Feet. | Feet.  12∙G5 | | Feet.  12⋅3 | | Feet.  11⋅85 | | Feet.  11⋅4  2⋅85 | | Feet.  10∙9 | | Feet. |  | Tonnage. | |  |
| ι inter-)  etween > ths ) |  | 3⋅162 | | 3⋅⋅075 | | 2∙962 | | 2⋅725 | |  | No. of Areas. | Multi­pliers. | Areas brought up.  Sq. Ft. 0  18⋅17  230⋅21  226⋅36  208⋅19  145∙24 0 | Pro­ducts. |
| No. of Bdths.  1  2  3  4  5 | Multi­pliers.  4  2  4  1 | Being sharp at the stem no meas­ured area. | Bdths. Feet. 19∙35 18⋅85 16⋅65 11⋅85  1⋅85 | Pro­ducts. 19⋅35 75⋅4 33⋅3 47⋅4  1⋅85 | Bdths. Feet. 20⋅2 20⋅4 20⋅15 19⋅6  3Ό | Pro­ducts.  20⋅2  81⋅6  40⋅3  78⋅4  3⋅0 | Bdths. Feet. 20⋅4 20∙5 20⋅25 19⋅85  6⋅35 | Pro­ducts.  20∙4  82Ό  40⋅5  79⋅4  6⋅35 | Bdths. Feet. 20∙2 20⋅35 20⋅0 17⋅8  6⋅35 | Pro­ducts.  20∙2  81⋅4  40 0  71⋅2  6⋅35 | Bdths.  Feet. 19Ί 18⋅65 14⋅95  8⋅75  10 | Pro­ducts.  19∙1  74⋅6  29∙9  35⋅0  1Ό | Being sharp at the stern no meas­ured area. | 1  2  3  4  5  6  7 | 1  4  2  4  2  4  1 | 0  744⋅68  460⋅42  905∙44  416⋅38  580⋅96  0 |
| ⅓common inter-·) val between ∣∙ breadths ) | |  | ι- | 177⋅3  1⋅05 | 223∙5  1⋅03 | | 228⋅65  ⋅99 | | 219⋅15  ⋅95 | | 159⋅6  ⋅91 | |  | 3107⋅88  6⋅26=⅓ common interval —— between areas.  1864728 621576  1OΛ4TOQ | | | |
|  | 8865 17730 | | 6705  22350 | | 205785  205785 | | 109575  197235 | | 1596  14364 | |  |
|  |  |  | 186Ί65 | | 230∙205 | | 226⋅363 | | 208⋅192 | | 145⋅236 | |  | 19455· 32 | — Tons  » · ΊΟΛ — Ι<M,.⅛K | | ør'rL·nV |
|  |  | Area 1. | Are | a 2. | Are | a 3. | Are: | a 4. | Are | a 5. | Are | a 6. | Area 7. |  |  | | |

The space or spaces between decks above the tonnage deck are dealt with by a similar formula. A mean horizontal area of the space, or each space if more than one, is found and multiplied by the mean height.

The permanent closed-in spaces above the upper deck available for cargo, stores, passengers, or crew are measured in the same manner by finding a mean area and multiplying by a mean height.

The measurement of net engine room is governed by the arrange­ment of the space, and is measured as a whole or in parts as may be required by its particular form.

The following is an example under class 2, depth under 16 feet, of tonnage under tonnage deck :—

successors for life. By Acts of Anne and George I. the duties were made perpetual, and mortgaged for the public debt. In 1787 they were finally abolished, and other modes of obtaining revenue substituted, by 27 Geo. III. c. 13.

Poundage also signifies a fee paid to an officer of a court for his services, e.g., to a sheriff’s officer, who is entitled by 28 Eliz. c. 4 to a poundage of a shilling in the pound on an execution up to £100, and sixpence in the pound above that sum.

TONQUA BEAN. The Tonqua, Tonka, or Tonquin bean, also called the coumara nut, is the seed of *Diρteriχ odorata,* a Leguminous tree growing to a height of 80 feet, native of tropical South America. The drupe-like pod contains a single seed possessed of a fine sweet “new- mown hay ” odour, due to the presence of a crystallizable principle called coumarin, to which also the dried stalks of *Melilotus officinalis* and the vernal grass *Anthoxanthum odoratum* owe their odour. Tonqua beans are used princi­pally for scenting snuff and as an ingredient in perfume sachets and in perfumers’ “ bouquets.”

TONQUIN. See Tong-king.

TONSILLITIS. See Throat Diseases.

TONSURE. The reception of the tonsure, in the Roman Catholic Church, is the initial ceremony which marks admission to orders and to the rights and privileges of clerical standing. It is administered by the bishop with an appropriate ritual. Candidates for the rite must have been confirmed, be adequately instructed in the elements of the Christian faith, and be able to read and write. Those who have received it are bound (unless in excep­tional circumstances) to renew the mark, consisting of a bare circle on the crown of the head, at least once a month, otherwise they forfeit the privileges it carries. A very early origin has sometimes been claimed for the tonsure, but the earliest instance of an ecclesiastical precept on the subject occurs in can. 41 of the council of Toledo (633 a.d.) : “ omnes clerici, detonso superius capite toto, inferius solam circuli coronam relinquant.” Can. 33 of the Quini­sext council (692) requires even singers and readers to be tonsured. Since the 8th century three tonsures have been more or less in use, known respectively as the Roman,