length with scarcely greater intervals than about fifteen inches between the supports. The slip was cut from out of the solid rock.

Fig. 56 (Plate CCCCLIII.) represents a section of a method of launching a ship which has been coppered on the slip», and which therefore need not be afterwards docked for that purpose. This method of fitting the launch avoids the necessity of docking to remove the launch, by not hav­ing any part secured to the ship. The two sides of the cradle are prevented from being forced apart when the weight of the ship is brought on them, by chains passing under the keel; Each portion of frame-work composing the launch has two of these chains attached to it, and brought under the keel to a bolt *a,* which passes slackly through one of the poppets, and is secured by a strong fore-lock *b,* with an iron handle c reaching to the ports, at which, when the ship is afloat, it may be drawn out of the bolt ; the chain then draws the bolt *a,* and in falling

trips the cradle from under the bottom. There should be at least two chains on each side secured to the fore-poppets, two on each side to the after-poppets, and two on each side to the stopping-up (fig. 54) ; and this is only for the launch of a small ship. The number will necessarily increase with the weight of the vessel.

We close this article with some most valuable tables of experiments. The first is compiled from one in Moseley’s Illustrations of Mechanics, the other three we have been kindly favoured with by Mr Parsons, a member of the late School of Naval Architecture, and formerly belonging to Her Majesty’s dock-yard service. These experiments, with a number of others on various securities, were most care­fully made by this gentleman ; and we regret much that he has not yet made them public to the world, as we are not aware of any similar information being accessible to naval architects or to engineers.

*“ Table of the Tenacities of different Substances, and the Resistances which they oppose to direct compression.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Substances Experimented on.** | **Tenacity, in Tons, per Square inch.** | **Name of the Ex­perimenter.** | **Crushing Force, in Tons, per Square Inch.** | **Name of the Experimenter.** |
| Wrought iron,  in bars, Russian (mean) | 27 251/2  30 | Lamé. |  |  |
| English (mean) |  |  |  |
| hammered | Brunel. |  |  |
| rolled in sheets and cut lengthways | 14 | Mitis. |  |  |
| ditto cut cross wise | 18 |  |  |  |
| Cast iron, quality No. 1 | 6 to 73/4  6 to 8 | Hodgkinson. | 38 to 41 | Hodgkinson. |
| No. 2 | 37 to 48 |
| No. 3\* | 6 to 93/4  81/2  15 |  |  |
| Copper, cast | Rennie. | 52 | Rennie. |
| hammered |  | 46 |  |
| .... sheet | 21 | Kingston. |  |
| wire | 271/3  8 |  |  |
| Ash, specific gravity, ∙6. | Barlow. |  |  |
| Teak, .... ∙9 | 7 |  |  |  |
| Oak, ∙92 | 5 |  | 1·7 |  |
| Oak, .... ·77 | 4 |  |  |
| Fir, ∙6 | 5 |  |  |  |
| Mahogany, ∙637 | 31/2  6 |  |  |  |
| Elm |  | ·57  ·73  ·86 |  |
| Pine, American | 6 |  |  |
| Deal, white | 6 |  |  |
|  |  |  |  |

**\*“ The strongest quality of cast iron is a Scotch iron known as the Devon hot-blast, No. 3 ; its tenacity is 93/4 tons per square inch, and its resistance to compression 65 tons."**

*“ Table of the Adhesion of Iron and copper Bolts driven into sound Oak with the usual Drift,*† *nor clenched, and subjected to a* *direct Strain, as in fig.* 57.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Diameter of the** | **Number of the** | **Iron. Copper.** | | | | | | | | **Diameter of the** | **Number of the** | **Iron.** | | | | **Copper.** | | | |
| **Length of the Bolt driven into the Wood.** | | | | | | | | **Length of the Bolt** | | | | **driven into the Wood.** | | | |
|  |  |  |  |  |  |  |  |  |  | **Bolt.** |  |  |  |  |  |  |  |  |  |
|  | **ment.** | **Four** | | **Six** | | **Four** | | **Six** | |  |  | **Four** | | **Six** | | **Four** | | **Six** | |
|  |  | **Inches.** | | **Inches.** | | **Inches.** | | **Inches.** | |  |  | **Inches.** | | **Inches.** | | **Inches.** | | **Inches.** | |
|  |  | **Tons. Cwt.** | | **Tons. Cwt.** | | **Tons. Cwt. Tons. Cwt.** | | | | **Inches.** |  | **Tons.** | **Cwt.** | **Tons.** | **Cwt.** | **Tons.** | **Cwt.** | **Tons.** | **Cwt.** |
|  | 1 | 1 | 13 |  |  | 0 | 181/2 |  |  |  | 1 | 3 | 3 | 6 | 0 | 3 | 10 | 5 | 5 |
| 1/4 | 2 | 2 | 0 |  |  | 0 | 18 |  |  | 3/4 | 2 | 3 | 2 | 6 | 0 | 3 | 10 | 5 | 5 |
|  | 3 | 2 | 2 |  |  | 0 | 19 |  |  |  | 3 | 3 | 10 | 5 | 0 | 3 | 10 | 5 | 8 |
|  | 4 | 1 | 13 |  |  | 0 | 18 |  |  |  | 4 | 3 | 10 | 6 | 0 | 3 | 18 | 4 | 18 |
|  | 1 | 2 | 6 | 2 | 12 | 1 | 7 | 2 | 2 |  | 1 | 4 | 10 | 6 | 2 | 4 | 0 | 4 | 13 |
| 3/8 | 2 | 2 | 4 | 2 | 11 | 1 | 8 | 2 | 2 | 7/8 | 2 | 5 | 12 | 5 | 10 | 4 | 0 | 4 | 13 |
|  | 3 | 2 | 4 | 2 | 16 | 1 | 10 | 2 | 2 |  | 3 | 3 | 10 | 6 | 11 | 4 | 5 | 4 | 19 |
|  | 4 | 2 | 0 | 2 | 10 | 1 | 13 | 2 | 0 |  | 4 | 4 | 10 | 6 | 4 | 4 | 2 | **4** | 19 |
|  | 1 | 3 | 2 | 3 | 12 | 2 | 10 | 2 | 15 |  | 1 | 5 | 0 | 7 | 2 | 4 | 2 | 5 | 19 |
| 1/2 | 2 | 3 | 4 | 4 | 0 | 1 | 17 | 3 | 10 | **1...** | 2 | 4 | 7 | 8 | 1 | 4 | 8 | 5 | 0 |
|  | 3 | 3 | 0 | 4 | 0 | 2 | 2 | 3 | 1 |  | 3 | 4 | 11 | 6 | 5 | 3 | 15 | 6 | 5 |
|  | 4 | 2 | 10 | 4 | 0 | 2 | 6 | 2 | 15 |  | 4 | 4 | 0 | 7 | 0 | 4 | 10 | 5 | 0 |
|  | 1 | 3 | 2 | **5** | 6 | 3 | 0 | 4 | 5 |  |  |  |  |  |  |  |  |  |  |
| 5/8 | 2 | 3 | 0 | 4 | 8 | 3 | 6 | 3 | 18 |  |  |  |  |  |  |  |  |  |  |
|  | 3 | 3 | 1 | 4 | 8 | 3 | 6 | 3 | 15 |  |  |  |  |  |  |  |  |  |  |
|  | 4 | 3 | 1 | **5** | 0 | 2 | 9 | 3 | 5 |  |  |  |  |  |  |  |  |  |  |

**† Drift is an allowance made to Insure sufficient tightness in a fastening ; it is therefore the quantity by which the diameter of a fastening exceed· the diameter of the hole bored for its reception.**