The areas of the sections being thus determined, the construction of the draught was begun. The midship sec­tion, and one or two sections in each body, being drawn in, and their areas ascertained to agree with the tables, one or two diagonals were got in, and the rest of the sections drawn, always keeping their areas precisely equal to those given by the table. The direction of the diagonals at the extre­mities determined the places of the rabbets of the stem and stern-post, and from these the length of the whole load water-line was found to be 0∙44 feet longer than that of the construction water-line ; that is, 0∙33 at the fore-end, and 0∙11 at the after-end ; consequently the length of the load water-line between the rabbets was equal to 88·755 feet.

As, in a ship constructed according to this method, the situation of the centre of gravity with respect to the length, and also the displacement, are known correctly, during the progress of the work much tedious arithmetical calculation is avoided ; and, after a very little practice, it will be found that the forms of the different sections may with great ease be drawn to contain the requisite areas ; consequently, by the general adoption of the method, an amazing saving of time and trouble would be effected.

There can be no doubt that this parabolic system offers great advantages, especially to the student of naval archi­tecture, in the great facility with which it may be applied to institute comparisons between ships by means of the ex­ponents. The mere repetition of the digits which number the displacement of a ship, or the area of either of her sec­tions, will convey no idea of the form either of the body or of the section. Again, the ratio of the displacement, or of the area of the section, to that of the circumscribing pa­rallelopiped or rectangle, will convey a scarcely more de­finite idea of shape ; whereas the exponent of the displace­ment or of the section, presenting itself to us not only as an arithmetical measure of quantity, but referring us at the same time to a geometrical line, the mind becomes imme­diately almost as conscious of the peculiarities of the form of the body or of the section as if a drawing of either were present before the eye. A very slight attention to the com­parisons which have been drawn between the Nelson, Bul­wark, and Endymion, by means of their exponents, will con­vince the reader of the advantage which the system posses­ses in this respect, and of the value in which an extensive digest of ships of various forms and qualities, calculated on this principle, would be held by naval architects. At the same time, it is quite evident that even the inventor, Chap­man, would not have recommended the parabolic system as a total substitute for the more rigorous applications of science, but only as accessory to them. Also, the parabola affords facilities for variations in form, which may be almost said to leave the architect at perfect liberty in his design.

*General Observations on the Physiology of Timber.*

As we cannot, in the space allotted to this article, enter into a particular examination of the nature and qualitics of the different varieties of timber used in building a ship, we must confine ourselves to such observations on the physiology of timber in general, as may be of practical application.

Timber, when forming a component part of the structure of a ship, is subjected to many deteriorating influences that have no analogies in other combinations of wood-work. Al­though particular instances may be quoted of ships which have resisted decay for long periods, the average durability of the royal navy is reported not to exceed fifteen years. This we consider now an unfavourable statement; but, in the wear, tear, and neglect incidental to the constant services of war, even this average must be considerably lowered. The duration of the mercantile navy is stated at a higher aver­age ; but it must be remembered that the merchant-ship is not necessarily maintained in such perfect repair as the ship of war ; and also, that the system of insurance enables both merchant and shipowner to freight and to sail ships, of which Lloyd’s books record a most fearful and a most astounding tale ; a tale which proves, that the longer average durabi­lity of the mercantile navy is in part purchased at a most sinful expenditure of human life ; an expenditure which no amount of insurance can compensate.

The occasional instances of lengthened durability in some ships of the royal navy tend to prove, that it may be pos­sible much to increase the average, by insuring a combi­nation of the same causes which, perhaps accidentally in these cases, produced this effect. That this is a most im­portant consideration is evident ; for if we knew how to in­sure to our ships the durability recorded of the Montague, we should diminish the expense of our navy by one half ; while if we could insure to them that recorded of the Royal William, we should diminish the expense to one sixth!

The deterioration and decay of ships may be advantage­ously considered under several distinct heads. One may in­clude the decay to which timber is subject, in common with all organized matter, and which may be either hastened or retarded, according as destructive or preservative influences prevail ; another may include the variety of decay to which the name of “ dry rot” has been applied ; and another may include that decay which appears to be not only prematurely, but unnaturally induced, dependent on the injudicious com­bination of destructive agents with the inorganical com­pounds of the timber.

That large masses of timber in combination should be more subject to the deteriorating influences which tend to accelerate decay, is what we may be led to expect from analogy. All organization of which we have any knowledge, becomes eventually decomposed by the chemical action which takes place in its constituents. During the life and health of a plant, the various components acting under the influence of their common vitality, perform their several functions in accordance to the end of their original combi­nation ; but with the cessation of life that influence ceases, and the constituents of the organized structure assert their individual existence, and resume their original affinities. Some separate, some form new compounds, and others which the vital principle had retained in harmless combination now act energetically and destructively on each other; while the original mass, under the influence of these several causes, gradually deteriorates, and is eventually decomposed. This result may be accelerated or retarded by the presence or absence of those circumstances which are favourable or unfavourable to it. Temperature, moisture, the vicinity or remoteness of agents either destructive or preservative, all have great influence in promoting or retarding decomposi­tion, principally in as far as they promote or retard the fer­mentative process, which appears to be the preliminary step towards the rapid decomposition of vegetable matter. A certain degree of moisture is necessary to induce this fer­mentation ; but when the other circumstances that are fa­vourable to the process exist, this moisture is always to be found even in the best-seasoned timber, in which, on the authority of Count Rumford, there still remains one fourth of its weight of water. This will be readily understood when it is remembered, that a very large portion of moisture is al­ways contained in the atmosphere, to the. influence of which the timber has been exposed. While moisture to a certain extent appears essential, a continued immersion, or perfect saturation, is inimical to this vegetable fermentation. Again, a moderate temperature, not so low as to induce congelation, nor so high as to cause evaporation of the moisture, appears to be favourable to it. The unavoidable dampness of the atmosphere in ships, and the difliculty of maintaining a free circulation of air, contribute much to the process of fermen­tation, and consequently to the destruction of the original structure of the fermenting mass, by the distribution of its several constituents, and its consequent decomposition.