THE CAPABILITY OF STEAM SHIPS, BASED ON THE MUTUAL RELATIONS OF DISPLACEMENT, POWER AND SPEED

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The capability of steam ships, based on the mutual relations of displacement, power and speed by Charles Atherton

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CHARLES ATHERTON

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THE

CAPABILITY

OF

STEAM SHIPS,

BASED ON THE MUTUAL RELATIONS OF

DISPLACEMENT, POWER, AND SPEED;

ILLUSTRATED BY

TABLES,

ADAPTED FOR

MERCANTILE REFERENCE.

BY

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PREFACE.

In explanation of the object sought to be attained by the publication of the following Treatise, it may be premised that Shipping may now be regarded as in a state of transition; for, though the use of Sail may not be superseded by the agency of Steam, it seems apparent that the co-operation of sail and steam will be universally introduced. Under this aspect of shipping interests, it is desirable that the public have the means of becoming familiar with the mutual relation of Steam-ship Displacement, Power, and Speed, in order that the conditions of Steam-ship mechanical and nautical efficiency may be foreknown, and that the commercial balance account between estimated Speed and Cost may be duly calculated: in short, it is the compound combinations of Displacement, Power, and Speed, in relation to the Cost of Freight, which constitute the arithmetic of Steam-ship adaptation to the requirements of mercantile service.

Thus, to bring under view the mutual relations of Steam-ship Displacement, Power, and Speed, with reference to the Cost of Freight, is the task that has been attempted in this Essay. The results can only be regarded as approximate; and the system of calculation is admissibly still open to corrective research; but, being based on generalized data, derived from practical experience, it is expected that the Work will present a substantially

correct digest of the CAPABILITIES of Steam as now applied to Navigation; and that it will point out a course of investigation not hitherto thrown open, and on which much labour may be usefully bestowed.

The primary matter, however, necessarily brought forward for consideration as being the base of all Steam-ship calculations as respects the mutual relation of Power and Speed, and therefore, indispensable to the prosecution of these inquiries, is a proposition for assigning some *definite* and *legalized* STANDARD VALUE to the term HORSE-POWER as the UNIT of power applicable to Steam-ship Navigation; by which Constant Quantity, marine engine contracts may, as regards the measure of power, be assimilated, and by which the available ENGINE-POWER of all steamers may be duly registered together with the Tonnage and the Displacement of the ship at a given draught; but this proposition is of a nature that can only be dealt with by legislative authority on representations backed by the greatest commercial weight; and should this Essay promote the realisation of a step so essential in the progress of *systematizing* the science of Steam-ship construction, and of Steam-ship adaptation and management, its publication will have conduced to public utility in a department of national enterprise of the utmost importance to the manufacturing and mercantile interests of the country.

CHARLES ATHERTON.

Woolwich Dockyard,
1st. March, 1853.

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APPENDIX.

ERRATA.

PAGE 15—Last line of Table D, for "3822," read 2822.

PAGE 28—Line 2, for $\frac{\text{"H.P."}}{182{\cdot}000}$ read $\frac{\text{P.V.}}{182{\cdot}000}$.

PAGES 52, 53, AND 54—For "Index Number 871," read 862.

THE MUTUAL RELATIONS

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STEAM SHIP

DISPLACEMENT, POWER, AND SPEED;

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SECTION I.

THE NOMINAL HORSE-POWER GENERALLY REFERRED TO IN STEAM-SHIP NAVIGATION AND REGISTERED AS THE ENGINE-POWER, DOES NOT DEFINE THE MOTIVE POWER CAPABLE OF BEING DEVELOPED BY THE ENGINES. NECESSITY FOR DETERMINING UPON SOME SPECIFIC AND EASILY MEASURABLE AMOUNT OF POWER TO BE ASSIGNED TO THE TERM HORSE-POWER, AND ADOPTED AS THE STANDARD MEASURE IMPLIED BY THAT TERM.

At a period when Steam Ship navigation is being prosecuted with unprecedented energy; when vessels of stupendous magnitude are being projected with a view to the circumnavigation of the globe; when a value is assigned to time, which urges the realization of speed to a degree which can be obtained only by the expensive resources of art being applied, not merely to co-operate with, but even to supersede the spontaneous but uncertain power of the wind; when commercial enterprise is thus