

**ON HEAT, IN ITS RELATIONS TO
WATER AND STEAM. EMBRACING
NEW VIEWS OF VAPORIZATION,
CONDENSATION, AND
EXPLOSIONS**

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On Heat, in Its Relations to Water and Steam. Embracing New Views of Vaporization, Condensation, and Explosions by Chas. Wye Williams

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CHAS. WYE WILLIAMS

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WATER AND STEAM:

EMBRACING NEW VIEWS

OF

VAPORIZATION, CONDENSATION, AND EXPLOSIONS.

BY

CHAS. WYE WILLIAMS, A.I.C.E.,

Author of Treatise on the "COMBUSTION OF COAL, CHEMICALLY AND PRACTICALLY CONSIDERED," and of the "PRIZE ESSAY ON THE PREVENTION OF THE SMOKE NUISANCE."



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ADDRESS.

TO THE DIRECTORS AND PROPRIETORS OF THE
CITY OF DUBLIN STEAM-PACKET COMPANY.

GENTLEMEN,

In 1840, I had the honor of addressing to you my Treatise on the Combustion of Coal. I have now, after an interval of twenty years, to present to your notice a Treatise on Heat, in connection with the generation and properties of steam, written in the hope that it may remove some of the uncertainties, and correct some of the errors, which prevail in reference to its application in the Steam Engine, and, in particular, in Steam Navigation.

I have now to express my acknowledgment of the obligation I feel for the confidence you have reposed in me during a period of thirty-seven years, since I entered on the duties of Managing Director in your service.

I have the honor to be,

Gentlemen,

Your faithful and obedient Servant,

CHAS. WYE WILLIAMS.

LIVERPOOL, SEPTEMBER 10TH, 1860.

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In addition to the above, the memoranda of the last ten years have supplied much matter on other branches of the inquiry. Time, however, pressed, and it was found impossible to complete the necessary experiments without a considerable delay; and, further, it would ill become an octogenarian to look for the realization of all that appeared worthy of note. The following additional heads have therefore been postponed, viz. :—

- I.—OF THE JET IN AID OF DRAUGHT.
- II.—FEED WATER, AND THE MEANS OF HEATING IT.
- III.—PRIMING—ITS CAUSE AND PREVENTION.
- IV.—SUPERHEATED STEAM.
- V.—MECHANICAL MEANS OF IMPROVING THE VACUUM.
- VI.—LIQUID AND VAPOUR ATOMS—THEIR RELATIVE VOLUME.
- VII.—ELECTRICITY OF STEAM.

P R E F A C E .

PROFESSOR MILLER opens his chapter on *heat* by observing:—
“ Upon the due understanding of the principles and application
“ of heat much of the successful prosecution of chemical research
“ depends.” Under the conviction that the knowledge of these
principles, as regards the application of heat to liquids, is still
imperfect, and capable of a large extension, the following views
are submitted to the general reader:—

The several changes of which the element, water, is susceptible,
under the influence of heat, have attracted the attention of philo-
sophers in all ages. Many have made it their special study, and
have given the result of their researches in elaborate publications.
So numerous, indeed, have been these works, and so universal the
inquiry, that it would appear almost impossible to supply any
additional facts, or throw any new light on the subject. On a
close examination, however, of the works, even from the highest
authority, we find so much of doubt, variance, and even contra-
diction, as to suggest the absolute necessity of further investiga-
tion. In pursuing the inquiry, the ablest among us will discover,
not only that much has still to be learned, but more to be
unlearned, before we arrive at a true knowledge of the relation
which heat bears to liquids and ariform matter; and that,