

**THE STEAM-ENGINE: BEING A POPULAR
DESCRIPTION OF THE CONSTRUCTION
AND ACTION OF THAT ENGINE; WITH A
SKETCH OF ITS HISTORY, AND OF THE
LAWS OF HEAT AND PNEUMATICS**

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HUGO REID

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BEING A POPULAR DESCRIPTION OF THE
CONSTRUCTION AND ACTION OF THAT ENGINE;

WITH
A SKETCH OF ITS HISTORY, AND OF THE LAWS OF HEAT
AND PNEUMATICS.

ILLUSTRATED BY A NUMBER OF WOOD ENGRAVINGS.

By HUGO REID,
LECTURER ON CHEMISTRY, ETC.

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P R E F A C E.

THE Steam-engine is so interesting a subject—from the extent and variety of its applications, the great power with which it has armed mankind, the varied forms in which it meets us at every turn, the singular ingenuity of its construction, the beautiful mechanical contrivances which it presents, and the many great laws of nature which it illustrates—that there are few who do not desire some knowledge of its structure and mode of action.

The present work is designed to furnish to the general reader such an account of this great machine as may be easily understood by those who are previously unacquainted with the subject. The general laws of HEAT and PNEUMATICS, on which the action of the engine depends, are fully detailed; its construction and mode of action are minutely explained, so that, with the aid of the figures, it may be readily understood, even by those who have never seen an engine; and the different forms into which the engine is thrown, to fit it for its various applications, are separately described. A sketch of its origin and progress is given, as every one must be desirous to know some-

thing of the history of an invention, second only to that of Printing in the magnitude of the results which have flowed from it, and far surpassing that operation in the genius displayed in its conception, and the points of interest it offers to the intelligent observer.

It is hoped that this little work may furnish the general reader with all that he requires on the subject of the Steam-Engine, and enable him, when he meets one, to observe its motions with that interest and enjoyment which a knowledge of its structure is calculated to impart. The author trusts, also, that it may be useful, as an introduction or guide, to smooth the path for those who intend to prosecute the study more fully. In page 224 will be found a list of books on the Steam-Engine, which may be studied or consulted by those who wish to go farther than this work can carry them.

The full scope of Steam, in its varied applications, is yet but dimly seen. Even now, it may be deemed an eighth wonder of the world, from the changes it has wrought in the Arts and Manufactures. But its powers of increasing the swiftness, multiplying the means, and reducing the expense of locomotion, are only beginning to be developed. The wonders it is to work in this respect cannot be properly estimated until the time, which is fast approaching, when the great wilderness of the ocean shall present a stirring scene like what meets us near some crowded port. The ocean will be alive with steam. The paddle wheel

will be heard, and the dark wreath will be seen where nought but the howl of the tempest or foam of the breaker has before disturbed the solitude of the deep. The shipwrecked mariner, tossed in his open boat, or drifted in his shattered bark, with scarcely a hope to cheer him, will not then wait long for a rescue. Stirring, hurried, exciting, as the world is at present, it is calmness and lethargy to what a century will bring forth. What a busy, bustling, buzzing world it will be, when the people of the most remote climes will be whisking past each other on the waters, in every direction; when India, North and South America, the myriads of fruitful and sunny isles in the Indian and Pacific oceans, and the continent of Australia, will be connected by regular and frequent steam-communication; when the resources of these hitherto desert countries will be developed, capital introduced, the arts and comforts of civilised life established, a busy, active and intelligent population created,—when every little nook over the wide surface of the earth shall have its ships and railroads—its ports and marts, its spot where “merchants most do congregate;” and every port shall be crowded with these active messengers, arriving in rapid succession, with news, and travellers, and treasure, from all quarters of the globe.—Then will the power of steam be felt; and those joint sovereigns, the Printing Press and Steam-Engine, will receive the homage of all the nations of the earth, and be acknowledged as the master-spirits who have created a new world.

Since the remarks in the body of the work on the invention of the Steam-Engine were printed,* I have perused the life of Watt by Arago, in which there are some observations on that subject. Where there are so many, who have each contributed a little to an invention, it is not possible to fix on one as *the* inventor; and M. Arago properly remarks, "By seeking to discover a single inventor where it was necessary to recognise many, we have been in 'endless mazes lost.'" This remark is particularly just when applied to the invention of the Steam-Engine. As elsewhere remarked (par. 185,) no one, except Watt, can be singled out pre-eminently. But, on reading M. Arago's remarks, it does not appear that he has adhered to the rule he has himself laid down. Two Frenchmen, DE CAUS, and PAPIX, are particularly held forth, as the grand originators of ideas, which others have only extended; and peculiar honour is awarded to them, to the disparagement of PORTA, SAVERY, and NEWCOMEN; all of whom, according to my own view, and the two latter according to the generally received opinions, have claims fully equal, if not superior, to those of M. Arago's favourites.

In one point, I certainly concur heartily with the distinguished author of the Eloge on Watt; namely, with respect to the claims of the Marquess of WORCESTER. I cannot consider that there are any sufficient grounds for assigning to that nobleman, a place among the inventors of the Steam-Engine. See par. 183.

With regard to DE CAUS, M. Arago observes, "I cannot allow that that individual accomplished nothing which was useful, who, pondering upon the enormous power of steam, raised to a high temperature, was the first to perceive that it might serve to elevate great

* These are not altered from the first edition of this work.