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From ancient times, humans have tried to understand the workings of the world around them. The roots of modern physical science go back to the very earliest mechanical devices such as levers and rollers, the mixing of paints and dyes, and the importance of the heavenly bodies in early religious observance and navigation. The physical sciences as we know them today began to emerge as independent academic subjects during the early modern period, in the work of Newton and other 'natural philosophers', and numerous sub-disciplines developed during the centuries that followed. This part of the Cambridge Library Collection is devoted to landmark publications in this area which will be of interest to historians of science concerned with individual scientists, particular discoveries, and advances in scientific method, or with the establishment and development of scientific institutions around the world.

## James Nasmyth, Engineer

This autobiography was first published in 1883, and recounts the life of the Scottish scientist and inventor James Nasmyth (1808–90), who was arguably the last of the early pioneers of the machine tool industry, most famously remembered for his invention of the steam hammer. He also produced and manufactured several other important machine tools, including a hydraulic press which used water pressure to force tight-fitting machine parts together. All of these machines became popular in manufacturing, and all are still in use today in modified forms. Nasmyth retired from business in 1856 at the age of just 48, and pursued his various hobbies including astronomy; he was co-author of *The Moon: Considered as a Planet, a World, and a Satellite* (1874) with James Carpenter. This autobiography follows a chronological order, and a list of Nasmyth's inventions is given at the end of the book.

# James Nasmyth, Engineer

*An Autobiography*

JAMES NASMYTH
EDITED BY SAMUEL SMILES

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# JAMES NASMYTH

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## ENGINEER

## AN AUTOBIOGRAPHY

EDITED BY

SAMUEL SMILES, LL.D.

AUTHOR OF 'LIVES OF THE ENGINEERS'

WITH A PORTRAIT BY GEORGE REID, R.S.A., ETCHED BY PAUL RAJON,
AND NUMEROUS ILLUSTRATIONS

LONDON
JOHN MURRAY, ALBEMARLE STREET
1883

# PREFACE.

I HAVE had much pleasure in editing the following Memoir of my friend Mr. Nasmyth. Some twenty years since (in April 1863), when I applied to him for information respecting his mechanical inventions, he replied: "My life presents no striking or remarkable incidents, and would, I fear, prove but a tame narrative. The sphere to which my endeavours have been confined has been of a comparatively quiet order; but, vanity apart, I hope I have been able to leave a few marks of my existence behind me in the shape of useful contrivances, which are in many ways helping on great works of industry."

Mr. Nasmyth, nevertheless, kindly furnished me with information respecting himself, as well as his former master and instructor, Henry Maudsley of London, for the purpose of being inserted in *Industrial Biography, or Ironworkers and Toolmakers,* which was published at the end of 1863. He was of opinion that the outline of his life there presented was sufficiently descriptive of his career as a mechanic and inventor.

During the years that have elapsed since then, Mr. Nasmyth has been prevailed upon by some of his friends—more especially by Sir John Anderson, late of Woolwich

Arsenal—to note down the reminiscences of his life, with an account of his inventions, and to publish them for the benefit of others. He has accordingly spent some of his well-earned leisure during the last two years in writing out his numerous recollections. Having consulted me on the subject, I recommended that they should be published in the form of an Autobiography, and he has willingly given his consent.

Mr. Nasmyth has furnished me with abundant notes of his busy life, and he has requested me, in preparing them for publication, to "make use of the pruning-knife." I hope, however, that in editing the book I have not omitted anything that is likely to be interesting or instructive. I must add that everything has been submitted to his correction and received his final approval.

The narrative abundantly illustrates Mr. Nasmyth's own definition of Engineering; namely, *common sense applied to the use of materials.* In his case, common sense has been more especially applied to facilitating and perfecting work by means of Machine Tools. Civilisation began with tools; and every step in advance has been accomplished through their improvement. Handicraft labour, in bone, stone, or wood, was the first stage in the development of man's power; and tools or machines, in iron or steel, are the last and most efficient method of economising it, and enabling him to intelligently direct the active and inert forces of nature.

It will be observed that Mr. Nasmyth, on his first start in life, owed much to the influence of his father, who was not only an admirable artist—"the founder," as Sir David Wilkie termed him, "of the landscape painting school of Scotland"—but an excellent mechanic. His "bow-and-string" roofs and bridges show his original merits as a

designer; and are sufficient to establish his ability as a mechanical engineer. Indeed, one of Mr. Nasmyth's principal objects, in preparing the notes of the following work, has been to introduce a Memorial to the memory of his father, to whom he owed so much, and to whom he was so greatly attached through life. Hence the numerous references to him, and the illustrations from his works of art, of architecture, as well as of mechanics, given in the early part of the book.

I might point out that Mr. Nasmyth's narrative has a strong bearing upon popular education; not only as regards economical use of time, careful observation, close attention to details, but as respects the uses of Drawing. The observations which he makes as to the accurate knowledge of this art are very important. In this matter he concurs with Mr. Herbert Spencer in his work on *Education*. "It is very strange," Mr. Nasmyth said some years ago, "that amidst all our vaunted improvements in education, the faculty of comparison by sight, or what may be commonly called *the correctness of eye*, has been so little attended to." He accordingly urges the teaching of rudimentary drawing in all public schools. "Drawing is," he says, "the Education of the Eye. It is more interesting than words. It is graphic language."

The illustrations given in the course of the following book will serve to show his own mastery of drawing — whether as respects Mechanical details, the Moon's surface, or the fairy-land of Landscape. It is perhaps not saying too much to aver that had he not devoted his business life to Mechanics, he would, like his father, his brother Patrick, and his sisters, have taken a high position as an artist. In the following Memoir we have only been able to introduce a

few specimens of his drawings; but "The Fairies," "The Antiquary," and others, will give the reader a good idea of Mr. Nasmyth's artistic ability.

Since his retirement from business life, at the age of forty-eight, Mr. Nasmyth's principal pursuit has been Astronomy. His Monograph on "The Moon," published in 1874, exhibits his ardent and philosophic love for science in one of its sublimest aspects. His splendid astronomical instruments, for the most part made entirely by his own hands, have enabled him to detect the "willow leaf-shaped" objects which form the structural element of the Sun's luminous surface. The discovery was shortly after verified by Sir John Herschel and other astronomers, and is now a received fact in astronomical science.

A Chronological List of some of Mr. Nasmyth's contrivances and inventions is given at the end of the volume, which shows, so far, what he has been enabled to accomplish during his mechanical career. These begin at a very early age, and were continued for about thirty years of a busy and active life. Very few of them were patented; many of them, though widely adopted, are unacknowledged as his invention. They, nevertheless, did much to advance the mechanical arts, and still continue to do excellent service in the engineering world.

The chapter relating to the origin of the Cuneiform Character, and of the Pyramid or Sun-worship in its relation to Egyptian Architecture, is placed at the end, so as not to interrupt the personal narrative. That chapter, it is believed, will be found very interesting, illustrated, as it is, by Mr. Nasmyth's drawings.

S. S.

LONDON, *January* 1883.

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EDINBURGH CASTLE FROM THE VENNEL, GRASSMARKET. BY ALEXANDER NASMYTH.