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978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

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A System of Mechanical Philosophy

After a brief career at sea, during which he tested Harrison's chronometer for the Board of Longitude, John Robison (1739–1805) became lecturer in chemistry at the University of Glasgow. In 1774, having spent a period teaching mathematics in Russia, he returned to Scotland as professor of natural philosophy at Edinburgh. Despite his busy schedule, he contributed major articles on the sciences to the *Encyclopaedia Britannica*, giving an overview of contemporary scientific knowledge for the educated layperson. After his death, these and other pieces of his scientific writing were edited by his former pupil David Brewster (1781–1868) and were finally published in four volumes in 1822, with a separate volume of illustrative plates. This reissue incorporates those plates in the relevant volumes of text. Volume 1 contains articles on dynamics and on the construction of roofs, arches and bridges, as well as a previously unpublished manuscript on projectile motion.

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Frontmatter

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Frontmatter

[More information](#)

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VOLUME 1

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Frontmatter

[More information](#)

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Frontmatter
[More information](#)

A
SYSTEM
OF
MECHANICAL PHILOSOPHY.

By JOHN ROBISON, LL. D.

LATE PROFESSOR OF NATURAL PHILOSOPHY IN THE
UNIVERSITY OF EDINBURGH.

WITH NOTES,

By DAVID BREWSTER, LL. D.

FELLOW OF THE ROYAL SOCIETY OF LONDON, AND SECRETARY TO THE
ROYAL SOCIETY OF EDINBURGH.

IN FOUR VOLUMES,
AND A VOLUME OF PLATES.

VOL. I.

EDINBURGH:
PRINTED FOR JOHN MURRAY, LONDON.

1822.

Cambridge University Press
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Frontmatter
[More information](#)

Cambridge University Press
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John Robison Edited by David Brewster
Frontmatter
[More information](#)

CONTENTS
OF
VOLUME FIRST.

	Page
DYNAMICS,.....	1
Projectiles,.....	159
Corpuscular Forces,	205
Capillary Attraction,.....	216
Boscovich's Theory,	267
Rotation of Bodies,.....	339
Strength of Materials,.....	369
Carpentry,.....	496
Roof,.....	552
On the Construction of Arches,.....	616
On the Construction of Centres for Bridges,.....	661

Cambridge University Press
978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1
John Robison Edited by David Brewster
Frontmatter
[More information](#)

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

TO

THE REV. WILLIAM TRAIL, LL.D.

FELLOW OF THE ROYAL SOCIETY OF EDINBURGH,

MEMBER OF THE ROYAL IRISH ACADEMY, CHANCELLOR
OF ST SAVIOUR'S, CONNOR,

And the last of the Fathers of Scottish Science,

THE WORKS OF A FELLOW STUDENT,

WHOSE TALENTS AND VIRTUES HE ADMIRERD,

ARE RESPECTFULLY INSCRIBED

BY HIS SINCERE FRIEND,

THE EDITOR.

Cambridge University Press
978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1
John Robison Edited by David Brewster
Frontmatter
[More information](#)

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

PREFACE OF THE EDITOR.

AFTER the death of Dr Robison, in 1805, his friend and successor, the late Professor Playfair, undertook to draw up an account of his life and writings, and to arrange and edit the various articles which he had composed for the *Encyclopædia Britannica*. The public already know with how much ability Mr Playfair executed the first part of his task; and it is much to be regretted that he did not complete it, by superintending the publication of the present work. When we consider, however, his advanced age, and the numerous pursuits of his own, which he did not live to finish, we cannot be surprised at his declining to occupy his time with a species of labour by which he could neither add to his own reputation nor to that of Dr Robison.

Under these circumstances, I was requested by Dr Robison's family to superintend the publication of his scientific works, which consisted of

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

some manuscript articles on Projectiles and Corpuscular Action,* and of the articles which he had contributed to the fourth edition of the *Encyclopædia Britannica*. Having enjoyed the advantage of being one of Dr Robison's pupils, I could not decline a task which naturally devolved upon me; nor should I have felt myself at liberty to do so, had I been able to foresee the difficulties which I had to encounter in its execution.

As the work could not be extended beyond four volumes, it was necessary to select the most important articles for publication; and even when this selection was made, I could not confine them within the prescribed limits, without a process of abridgment, which was both troublesome and difficult. In doing this, however, I generally confined myself to the omission of those digressions of a political and religious nature, which, however appropriate they might have been at the time, were, in every respect, unsuitable to scientific discussions; though sometimes, from a diffuseness of style, and a redundancy of illustration, allowable in an *Encyclopædia*, I was enabled to abridge, without omitting any essential step in the investigation. The repetitions so unavoidable in articles written and published at different times,

* The manuscript articles are printed in vol. I. from p. 159 to 368.

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

PREFACE OF THE EDITOR.

vii

I have in some cases omitted ; but they still exist to a considerable degree, and, I am persuaded, they will not be regarded as defects by the reader who has occasion to study separately the articles in which they occur. Had the works of Dr Robison been put into my hands in MS. to be published for the first time, I should have felt that the responsibility of the author was transferred to the editor ; but, in the present case, almost all the articles had been previously before the public ; and had received from the hands of the author various corrections and additions. Under these circumstances, I was freed from every editorial responsibility, excepting that of the most humble kind.

In order to render this work as much as possible a system of mechanical philosophy, I was anxious that it should contain a complete treatise on astronomy. The short articles on Astronomy, and the articles on the Tides and the Precession of the Equinoxes, which Dr Robison had written for the *Encyclopædia Britannica*, were unfit to supply this desideratum. I found it necessary, therefore, to delay the work till the year 1820, when the copy-right of his *System of Astronomy* had expired. This work has therefore been used as a substitute for the astronomical articles contained in the *Encyclopædia*, and will be found one of the most valuable treatises on Physical Astro-

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

viii

PREFACE OF THE EDITOR.

nomy that has for a long time been given to the public.

Being desirous of making the work as complete as possible, I had proposed to give an account of the recent discoveries in science in the form of notes. I found, however, as I proceeded, that there was not room for any additional matter, excepting a few notes; and references to more recent works; and I felt that I could make no apology to the reader for inserting compositions of my own, while I was under the necessity of abridging the original work. In the article on the Steam-Engine, however, I deviated from this rule. The great improvements which had been made upon this engine since Dr Robison's article was written, rendered it necessary that considerable additions should be made to it. I had the good fortune to prevail upon our late celebrated countryman, Mr James Watt, to undertake the revision of the article; and though he intended only to correct imperfections, and supply some of the most prominent defects, yet he was gradually led to extend his views, and to compose those valuable additions on the History, the Principles, and the Construction of the Steam-Engine which enrich that part of the work.

To those who may examine Dr Robison's dissertations with a critical eye, it may be necessary

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

PREFACE OF THE EDITOR.

xi

to state, that they were all composed under the influence of that cruel disease with which he was afflicted for a long period of years. The knowledge of mechanical philosophy which they everywhere display possesses the rare quality of being at once practical and profound, and they are often enriched with original views and ingenious inventions, which it required only the tranquillity of health to perfect and mature. It was his destiny, however, to enjoy but at distant intervals that calm of mind which can alone sustain the ardour of discovery. At such periods, his ambition constantly reverted to those original pursuits which he was desirous of bringing to a close; but they were no sooner begun, than they were interrupted by renewed attacks of that painful disease which ultimately deprived him of his life.

Although Dr Robison's name, therefore, cannot be associated with the great discoveries of the century which he adorned, yet the memory of his talents and his virtues will be long cherished by his country. Imbued with the genuine spirit of the philosophy which he taught, he was one of the warmest patrons of genius, wherever it was found. His mind was nobly elevated above the mean jealousies of rival ambition, and his love of science and of justice was too ardent to allow him

Cambridge University Press

978-1-108-07037-9 - A System of Mechanical Philosophy: Volume 1

John Robison Edited by David Brewster

Frontmatter

[More information](#)

x

PREFACE OF THE EDITOR.

either to depreciate the labours of others, or to transfer them to himself.

To these great qualities as a philosopher, Dr Robison added all the more estimable endowments of domestic and of social life. His friendship was at all times generous and sincere. His piety was ardent and unostentatious. His patriotism was of the most pure and exalted character ; and, like the immortal Newton, whose memory he cherished with a peculiar reverence, he was pre-eminently entitled to the high distinction of a Christian patriot and philosopher.

EDINBURGH, *Dec. 22*, 1821.