

**AN ESSAY ON THE ELEMENTS OF  
CYCLOMETRY: INTENDED TO  
ILLUSTRATE THE RELATIONS  
WHICH EXIST BETWEEN, CURVES  
AND RIGHT - LINED FIGURES**

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An Essay on the Elements of Cyclometry: Intended to Illustrate the Relations which exist between, curves and right - lined figures by John Luccock

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**JOHN LUCCOCK**

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CYCLOMETRY: INTENDED TO  
ILLUSTRATE THE RELATIONS  
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AND RIGHT - LINED FIGURES**



*Second Edition*

AN

ESSAY ON THE ELEMENTS

OF

**CYCLOMETRY,**

INTENDED TO ILLUSTRATE THE RELATIONS WHICH EXIST  
BETWEEN

CURVES AND RIGHT-LINED FIGURES.

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BY JOHN LUCOCK,

AUTHOR OF "A TREATISE ON BRITISH WOOL," "LETTER ON THE  
SPANISH REVOLUTION," "NOTES ON RIO DE JANEIRO AND  
THE SOUTHERN PARTS OF BRAZIL," &c. &c.

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## DEDICATION

TO THE  
PRESIDENT, MANAGERS, AND MEMBERS  
OF THE  
**Leeds Mechanics' Institution.**

GENTLEMEN,

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PRESUMING that an Essay professedly elementary may be dedicated not improperly, nor unacceptably, to those who have associated for the very important purpose of promoting a knowledge of scientific principles, or with the still more laudable design of making themselves acquainted with the application of such principles to the common concerns of life, I present myself (a known and plain mechanic) to lay before you a small pamphlet, with a sincere wish that it may promote your views, by stimulating some to emulation and others to afford the means of improvement.

Nor is it possible, I apprehend, to ask for more powerful patronage than that of a Society, in which no interests clash, no designs can prevail but those which tend to mutual advantage, the only solid basis of social-order and happiness. You are experimentally convinced that the interest of work-people and their employers is one and inseparable, that they must both rise in the scale of society together, or, that by counteracting each other, both must suffer.

You still have a very few objectors to your plans, a still smaller number of opposers; but such persons, I conceive, must be ignorant of the great lessons taught by history, respecting manufacturing districts in every country of Europe, and in every period of modern time. They must be inobservant of the quality of our additional population, of the ignorant and vicious parts of the empire whence it is collected; they must have forgotten, what I am sure you still remember, that in periods of public pressure, the peace and good order of this neighbourhood was mainly preserved by the good sense of the suffering work-people themselves, when disorganization was triumphant around us. They forget likewise that times of pressure may, and must, return again, (may they be late,) and that a greater mass of good sense, the effect of education, will then be required to keep in check the discontented, the turbulent, and the designing.

Convinced that this is the natural and undeviating tendency of mental culture, I give to such Societies as yours the whole of my feeble support, have enrolled my name upon your lists, and am desirous of being esteemed,

Gentlemen,

Your very humble and most devoted servant,

THE AUTHOR.

*Leeds, July 21st, 1825.*

## PREFACE.

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ABOUT eighteen months ago the pith of the following pages, thrown as a trifle of some value amidst a heap of rubbish, was printed with an Introduction, stating "that, during severe and protracted illness, the writer attempted to alleviate the tedium of confinement by Mathematical Recollections; that he condensed into a small compass and printed them, because, to his untaught and perhaps debilitated mind, they seemed to contain something new and useful." He was soon told however that the argument in Prop. III. was inconclusive; that the doctrine itself was not true, and that the error might be rendered manifest by several different methods. He was aware indeed that the Proposition contradicted some generally received opinions, but thinking that possibly it might do so without being very erroneous, he re-examined, with all the diligence he was master of, not only the proposition itself, but also, every step of a very long argument, which led to that conclusion, and must even now confess himself unable to perceive either that he has drawn a false deduction, on some particular point, or that, upon the whole, he has merely argued in a Circle.



For this reason, with all due deference to better opinions than his own, he now lays a short abstract of the entire argument before the public, desirous that the Essay may meet with only such attention as the subject and his mode of treating it may be found to merit. One of the Propositions, the groundwork of some others, is very ancient, but the author became acquainted with it from modern sources, and is not at all aware that any other person has made use of it, in the way he has done, (he hopes with some success,) to ascertain the relations which subsist between the Circle and Right-lined Figures. In the very limited course of his mathematical reading nothing of the kind has fallen under his own notice.

Yet it does not become him, in such a case, to be confident. He may have lost his clue, and be still wandering amidst the hopeless mazes of a labyrinth, where multitudes of the most observant have become irretrievably bewildered. To fail, however, where the wisest have erred is no disgrace; and, in the smallest degree, to succeed offers a temptation which it is presumed few well-formed minds are desirous, or able, to resist.

The author thinks it right, however, to suggest, that in his opinion, nothing ought to be admitted as conclusive against his argument, which does not amount to *positivæ* and *geometrical* proof. So soon as this is adduced, he will gladly lay aside his present opinion, and acknowledge that he has spent his time in an idle pursuit. It requires all the nerve he possesses to persist in maintaining a doctrine, generally deemed incorrect and fanciful, to expose himself to the contempt almost universally poured by the learned, and especially by the ignorant, upon persons who like him, venture out of their sphere, to appear, a second time

(conscious that his first attempt has been discouraged,) as the advocate of a question undoubtedly encumbered with difficulties, which for many ages have baffled the best efforts of the greatest minds, and aware that the weight of these difficulties can be estimated, and even rudely guessed at, only by those who have many times attempted to remove them.

Perhaps the want of arrangement in this Essay may be justly complained of; in fact, the propositions are only the most important links of a long chain of argument, in which the author followed truth wherever he thought her visible, though dimly seen, and however devious and intricate the path might be through which she conducted him. In the first edition he had accidentally written in the form of Proposition, Construction and Demonstration, and, in order to give a sort of conformity to the whole, has persevered in the same plan, endeavouring as he advanced, to render the dependence of each deduction, upon some truth previously ascertained, as obvious as the nature of such an abstract would permit. He has frequently thrown into the form of Corollary and Notes what originally stood as independent and detached parts of the subject. Indeed several of the deductions were in the first instance Algebraic, and a good proportion of the labour required in condensation, has been spent in contriving the means of expressing them in a Geometrical form.

The Diagrams may appear somewhat more crowded than is generally deemed desirable, yet it was proper to have as few of them as possible, consistent with distinctness, and the pains taken to describe minutely every part of the Construction, it is hoped, will prevent, in a good measure at least, any obscurity which might arise from the circum-

stance of the same figure being referred to in different and very detached propositions. If however upon the whole, in this new appeal to the public judgment, the author should be found guilty of temerity, he will submit with patience; yet at the same time presumes to think, that upon this occasion, with more than usual reason, he hopes for candour.