

3
THE BACKGROUND TO
NEWTON'S PRINCIPIA

*A Study of Newton's Dynamical Researches
in the Years 1664-84*

2 BY
JOHN HERIVEL

BRITISH LIBRARY
LENDING DIVISION

21 APR 1966

W61-2506

OXFORD
AT THE CLARENDON PRESS

1965

CONTENTS

List of Plates	xi
General Introduction	xiii
Short Titles and Abbreviations	xvi

PART I

NEWTON'S DYNAMICAL RESEARCHES, 1664-1684

1. The main line of development of Newton's dynamical thought	1
1.1 Newton's first steps in dynamics	1
1.2 Newton before the problem of circular motion	7
1.3 The solution to the problem of Kepler-motion	14
1.4 The final synthesis of Newton's dynamical system	22
2. The influence of Galileo and Descartes on Newton's dynamics	35
2.1 The influence of Galileo	35
2.2 The influence of Descartes	42
3. Newton's concept of <i>conatus</i>	54
4. Tests of the Law of Gravitation against the moon's motion	65
5. The motion of extended bodies	77
5.1 Kinematical aspects	77
5.2 Centre of motion in the dynamical sense	78
5.3 Dynamics of a single rotating body	81
5.4 Collision between two rotating bodies	82
5.5 Discussion in later researches	84
6. Order of composition and dating of manuscripts	87
6.1 Order of composition of earliest manuscripts	87
6.2 Dating of earliest manuscripts	91
6.3 Order of composition of later manuscripts	93
6.4 Dating of later manuscripts	96
6.5 Paget's propositions	102
6.6 The status of manuscript VIII	108

PART II

NEWTON DYNAMICAL MANUSCRIPTS, 1664-1684

Introduction	119
I. Extracts from early notebook	121
II. Dynamical writings in the <i>Waste Book</i>	128
III. The Vellum Manuscript	183
IVa. On circular motion	192
IVb. On motion in a cycloid	198
v. The <i>Laws of Motion</i> paper	208
VI. Extracts from MS. Add. 4003	219
VII. Extracts from correspondence prior to 1684	236
VIII. The Kepler-motion papers	246
IX. The tract <i>de Motu</i>	257
xa. Drafts of definitions and laws of motion	304
xb. Drafts of definitions	315
XI. The lectures <i>de Motu</i> of 1684	321
Note regarding Previous Publication of Newton Dynamical Manuscripts	327
Bibliography	328
Index	331