

Contents

1. Introduction	1
2. The Empirical Determination of Physical Concepts in Kant's <i>Metaphysical Foundations of Natural Science</i>	19
(a) Conceptual Determination	27
(b) Phenomenology and the Determination of Motion	35
i. Phoronomy	39
ii. Dynamics	41
iii. Mechanics	43
(c) Regulative and Constitutive Principles	45
(d) The Parallelogram Law	55
(e) Conclusion	69
3. Helmholtz on the Comprehension of Nature	76
(a) Helmholtz's Arguments for Force Centrality in the <i>Conservation of Energy</i>	79
(i) The Philosophical Argument	80
(ii) The Mathematical Argument	88
(b) Helmholtz's Later Criticisms of his Determinacy Argument	93
(c) Empirical Determinacy and Geometry	97
(d) Conclusion	101
4. Colour-theory and Manifolds	105
(a) Newton's Barycentric Colour-wheel	109
(b) Helmholtz's 1852 "Über die Theorie der zusammengesetzten Farben"	111
(c) Graßmann's 1853 "Zur Theorie der Farbenmischung"	113
(d) Helmholtz's 1855 "Über die Zusammensetzung von Spectralfarben"	117
(e) Maxwell's 1855 "Experiments on Colour"	122
(f) Conclusion	128
5. The Road to Empirical Geometry	134
(a) Phase 1	140
(b) Phase 2	146

(c) Phase 3	148
(d) Conclusion	157
6. Helmholtz on Geometry, 1868–1878	162
(a) The Four Papers	165
(b) The Papers of 1868	168
(c) “Über den Ursprung und Bedeutung der geometrischen Axiome” (1870)	180
(d) “Über den Ursprung und Sinn der geometrischen Sätze” (1878)	184
7. Conclusion	197
Bibliography	215
Index	220