

# **THE SCIENTIFIC REVOLUTION**

## **An Introduction to the History and Philosophy of Science**

**John Andrew Schuster**

BA (Columbia), MA (Cambridge), MA, PhD (Princeton)

Fellow

Australian Academy of the Humanities

Honorary Research Fellow

Campion College,  
Sydney

Affiliate Research Fellow

Unit for History & Philosophy of Science  
Faculty of Science  
University of Sydney

© J.A.Schuster 1995  
ISBN 0-86418-337-2

# Contents

---

|                  |   |     |
|------------------|---|-----|
| <b>Section 1</b> | <b>The History of Science and the Cult of 'Facts'</b>   |     |
| Chapter 1        | Introduction  | 1   |
| Chapter 2        | Historians, and Historians of Science, Face the Facts   | 5   |
| Chapter 3        | The Problem of "Whig History" in the History of Science   | 14  |
| Chapter 4        | The "Theory-Loading" of Facts and Perceptions   | 19  |
| <b>Section 2</b> | <b>Conflict and Revolution in Science - Copernicus vs. Aristotle</b>  |     |
| Chapter 5        | Aristotle (384-322 BC) His Natural Philosophy and Cosmology   | 32  |
| Chapter 6        | Ptolemy's Astronomy and the Rationality of the<br>Greek / Medieval World View                                   | 41  |
| Chapter 7        | Copernicus I: What He Did and What He Did Not Do  | 54  |
| Chapter 8        | Copernicus II: Is Copernican Theory True?<br>For Whom, Under What Circumstances - Another Look at the ScoreCard | 65  |
| <b>Section 3</b> | <b>The Myth of Scientific Method - Two Tales</b>  |     |
| Chapter 9        | The Commonly Accepted Myth of Scientific Method   | 75  |
| Chapter 10       | Popper's Attempt to Save Scientific Method  | 82  |
| Chapter 11       | The Role of Presuppositions and Metaphysics   | 99  |
| <b>Section 4</b> | <b>How Do Scientists Really Do Science?</b>   |     |
| Chapter 12       | Compromise, Negotiation and Political Tactics<br>- Tycho Brahe and Copernican Theory                            | 109 |
| Chapter 13       | Johannes Kepler (1574-1630) and the Revolution in Astronomy   | 123 |
| Chapter 14       | Galileo and the Telescope: Do Instruments Discover<br>the facts that Prove Theories ?                           | 139 |
| <b>Section 5</b> | <b>An Attempt to Revise our Understanding of How Science Works</b>  |     |
| Chapter 15       | Kuhn and the Nature of Science and the Scientific Revolution  | 154 |
| Chapter 16       | Kuhn and his View of Scientific Revolutions   | 161 |
| <b>Section 6</b> | <b>Raising the Stakes, Society, Politics and Scientific Change</b>  |     |
| Chapter 17       | Galileo and the Church I  | 169 |
| Chapter 18       | Galileo and the Church II   | 181 |
| Chapter 19       | Natural Philosophies at War in 17th Century I:<br>Defining Mechanical Philosophy                                | 187 |
| Chapter 20       | Natural Philosophies at War in 17th Century II:<br>The Defeat of Magical Neo-Platonism                          | 195 |
| Ch 20 Appendix   | Bacon and Baconianism [pages A and B]   |     |
| Chapter 21       | How facts & Problems Evolve when Natural Philosophies Change:<br>Newton and the Theory of Universal Gravitation | 204 |
| Chapter 22       | Newton's Post-Mechanical Philosophy of Nature and his Path<br>to the Law of Universal Gravitation               | 212 |
| <b>Section 7</b> | <b>What is at Stake in Understanding the History of Science ?</b>   |     |
| Chapter 23       | Old and Outdated Tales of the History of Science I: Internalism   | 221 |
| Chapter 24       | Old and Outdated Tales of the History of Science I: Externalism   | 228 |
| Chapter 25       | Beyond Internalism and Externalism: Sociology of Scientific<br>Knowledge & Contextualist History of Science     | 234 |
| Chapter 26       | Social Factors in the Scientific Revolution   | 242 |
| Chapter 27       | Robert Merton's Sociology of Science: Baconianism, Puritanism &<br>Science                                      | 252 |
| Chapter 28       | Schuster and Taylor vs. Shapin on 'The Origin of Modern Science' and<br>The Nature of the Early Royal Society   | 259 |