

PREFACE

*The aim of an encyclopaedia is to gather together the knowledge scattered over the face of the Earth, to set forth its general plan to the men with whom we live and to transmit it to the men who will come after us, in order that the labors of past centuries may not have been in vain...*¹

Denis DIDEROT
Paris 1755

THIS BOOK is an outgrowth of a previous handbook article² on the history of shock waves. While preparing the manuscript for this handbook, it quickly became apparent that this field of enormous breadth could not be adequately treated without also including the evolution of research into percussion and explosion. Since the limited space available in the handbook confined the historical perspectives to a rather limited period of time (1759–1945), the author conceived the idea of providing readers interested in history with a more detailed description of this complex field of physics and engineering, in particular by (i) covering the period beginning from prehistoric to present times; (ii) including biographical sketches of eminent researchers; and (iii) illustrating the milestones using a picture gallery of authentic illustrations. A nine-year study of a large body of original literature brought to light many interesting historical facts which might be unknown in the shock wave physics and detonics community, and which have apparently never been reviewed in a wider context before.

History, in general, is understood as being our knowledge and criticisms of the past experiences of mankind. In particular, the *history of science* may be defined as an analytical approach to uncovering the roots of science and providing an overall explanation of its evolution. Traditionally, the history of science faces the problem of judging the significance of past achievements in terms of the experimental methods that are in current use and by the theories that are

currently accepted. Since progress in natural science and technology is generally advancing with increasing speed – the rapid progress in computer science and software development is only one striking example of our time – it has become more and more difficult to clearly distinguish between past and present achievements as well as to analyze their impact on other branches of science from the distant view of a historian. Recent achievements may be rated by future generations as important historical milestones, or may be forgotten completely.

The scientific and technical achievements of percussion, explosions and shock wave research made throughout human history are too immense even to be cataloged. Up to now they have been determined by estimating industrial and military applicability, and increasingly also by immediate commercialization. Since these branches of science and technology have grown explosively since the end of World War II, it is obviously difficult to give credit to all recent developments, particularly those from the last 25 years. Nevertheless, it appeared useful to treat the subject historically in an *encyclopediaic* approach by illustrating how current developments in various branches of modern science are based upon foundations in classical percussion and shock wave physics, and emphasizing their *phenomenological aspects*.

To provide the reader with quickly accessible and extensive information, the book is divided into six chapters:

Chapter 1 – INTRODUCTION – determines the position of the subject of this book in the general framework of natural science.

Chapter 2 – GENERAL SURVEY – provides some general remarks on the historical background of shock and detonation, illustrates the interrelations between the different disciplines, and discloses their genealogy and genesis from the principle of percussion.

Chapter 3 – CHRONOLOGY – illuminates the historical evolution of percussion, shock wave physics and detonics in terms of milestones. It attempts to specify each contributor's affiliation and the motivation of their research in tabular form. It also contains numerous cross-references to similar studies performed elsewhere, referring the reader to other milestones listed in the chapter and to corresponding illustra-

¹ See his article "Encyclopédie" in the famous French *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers*. S. Faulche, Neufchatel (1751–1772), ed. by Denis DIDEROT and Jean LE ROND D'ALEMBERT.

² P. KREHL: *History of shock waves*. In: (G. BEN-DOR ET AL.) *Handbook of shock waves*. Academic Press, New York (2001); vol. 1, pp. 1-142.

tions shown in the next chapter. Many milestones have been provided with comments made from the present point of view and with more recent literature on the subject.

Chapter 4 – PICTURE GALLERY – illustrates milestone achievements via facsimiles of figures as they were published in the original works.

Chapter 5 – BIOGRAPHIES INDEX – contains a collection of biographical sketches of eminent researchers in the fields of percussion, explosions, detonations and shock waves. Each biography is supplemented by a list of their most important publications relating to the fields addressed in this book, by secondary literature (such as memoirs, obituaries, Festschriften, *etc.*), and – as far as available – by a portrait picture.

Chapter 6 – SUPPLEMENTARY REFERENCES – comprises a catalogue of general references that provides the reader with additional biographical and bibliographical sources. It also contains numerous historical review articles and a list of some Internet home pages provided by institutes engaged in shock wave and detonation physics, as well as museums.

The encyclopedic key to the comprehensive body of references, milestones and illustrations given in this book is its detailed NAME INDEX and SUBJECT INDEX.

Hopefully, this encyclopedic approach may provide the reader with a better historical survey than a lengthy narrative description. Since this book contains more than 900 figures and almost 7,000 references, it may also help the modern scientist to illuminate the historical roots of his or her own field of investigation.

Last but not least, the book also tries to pass to the reader the author's joy of learning from early researchers about their motivations and how they proceeded to eventually arrive at significant contributions and ingenious discoveries. For the modern researcher that has quick and easy access to sophisticated instrumentation techniques and vast computer power, it might be amazing to learn about the modest circumstances under which our scientific ancestors found the solution to a problem: often reducing the essentials to a simple model, trying to work out an analytical solution, and checking the theory by rather crude experimental means.

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History of Shock Waves, Explosions and Impact

A Chronological and Biographical Reference

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