

## BOOK REVIEWS

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*The Chemical History of Color*, Mary Virginia Orna, Springer, Heidelberg and New York, 2013, xv + 153 pp, ISBN 978-3-642-32641-7, \$49.95, softcover (978-3-642-32642-4, \$39.95, eBook).

The subject of color encompasses a broad range of disciplines, including physics, chemistry, biology, physiology, psychology, geography, geology and the arts, and there are many intersections. The topic is also steeped in a rich history, from prehistoric times, through the industrial revolution and up to the present day. There have been many books written over the years on various aspects of color, with a large proportion devoted to the chemistry of dyes and pigments which provide the range of synthetic colors that enrich our lives. It is thus a delight to find this new book with such a unique take on the historical development of our understanding of the phenomenon that is color. The book illustrates not only in the way that advances in science, notably chemistry, have impacted on our understanding of color, but also, conversely, the immense contributions towards developments in science that have taken place in the quest to understand color.

It is not a long book, in keeping with the philosophy of the series, Springer Briefs in Molecular Science: History of Chemistry. The stated series aim is “to present concise summaries of historical topics covering all aspects of chemistry, alchemy, and chemical technology.” This book meets this aim admirably and the author’s style ensures that it is an easy and captivating read. Since acquiring my copy, I have read it a few times. It is a delightful combination of historical accounts and anecdotes surrounding the subject of color, while at the same time dealing properly with the science. The book may be read not only as entertainment, but also as an excellent way to acquire a broad introduction to the essential chemical and physical principles of color. For such a short book, it is packed full of useful and remarkably detailed informa-

tion. The author achieves this throughout the chapters by liberal use of tables which provide details of timelines, technical milestones and landmarks. It also makes good use of illustrations, many in color. A notable feature of the text is way in which the author deals with those scientists who have made the most important discoveries or have developed the most important theories, by relating the stories of their scientific contributions as influenced by their individual personality and character traits. The stories are also enhanced by relevant use of quotations. Although some stories may already be well-known to the reader, the author has a knack of finding a new twist to a familiar story.

The book is logically structured into eight chapters, organized into specific themes and in terms of the chronology. In chapter 1, the colors used by ancient civilizations are introduced. Color has indeed fascinated mankind for centuries. A commonly overlooked feature of the history of color is that in ancient times not only natural but also synthetic colors were used. The ancient Egyptians manufactured colors from rudimentary applications of inorganic chemistry, the most notable product being Egyptian blue. Chapter 2 deals with the evolution of our knowledge of the physics of color, in the context of the nature of light, its interaction with matter and the operation of the human eye. It is in this chapter that the greatness of the individuals who were involved in this experimental and theoretical development of the subject comes to the fore. The early contribution of the ancient Greek philosopher, Aristotle is acknowledged and, rather later, the physics of light was one of the many interests of Leonardo da Vinci. Other relatively more recent historical figures of note include Robert Hooke, Albert Einstein, Max Planck, Michael Faraday and James Maxwell. However, the chapter rightly gives particular prominence to the immense contribution of Isaac Newton. In chapter 3,

the chemical causes of color are outlined in a historical context, dealing with the development of current theories of bonding in organic and inorganic compounds and the mechanisms by which they can give rise to color. Chapter 4, labeled as “from antiquity to the Perkin era,” relates the historical development of the materials and processes used in coloration of a range of substrates, such as human skin and hair, glass and artists’ colors. There is, of course, special mention of the development of dyes for textiles, from the Tyrian purple of antiquity through to Perkin’s mauveine, the first synthetic textile dye produced on an industrial scale. This link illustrates how the color purple and its association with wealth and opulence played such a pivotal role. Chapter 5 takes up the next phase of the story when the Western European textile dye industry blossomed, with the processes involved in the search for new dyes evolving from a semi-empirical to a theoretical approach, as knowledge of structural chemistry advanced. The notable contributions from such as Hoffman, Kekulé and von Baeyer are discussed. The chapter concludes with a summary of the legacy of the dye industry, its recognition of research as such an essential sustaining feature, and its broad influence on political, educational and social structure within society. The final three chapters deal with some selected specific color-related themes, bringing the story

through to modern times. Chapter 6 discusses the role of color in analytical techniques, for example those using the human eye as a detector of color change, and also in chromatography, spectroscopy and color measurement. Chapter 7 deals with some applications of color in biology and biochemistry, including staining techniques and chemotherapy. The book concludes, in chapter 8, with a series of miscellaneous topics, related by alliteration—foods, photochemistry, pharmaceuticals, fireworks, fun and the future.

This little book is not expensive and I would recommend it as essential reading for anyone with an interest in color. That probably includes most of us. The book will be of interest not only to those seeking a readable introduction to the fundamental principles of the science of color, in the context of its historical development, but also to individuals already familiar with the subject who will find gems of new or clarifying knowledge. I have reviewed many books on color over the years, generally positively, but I can honestly give this one my most enthusiastic recommendation. The author quotes Benjamin Franklin as saying “About light, I am in the dark.” After reading this book, no one will be making such a statement.

*Robert Christie, Heriot-Watt University, Scotland, UK, R.M.Christie@hw.ac.uk*

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*King of Poisons: A History of Arsenic*, John Parascandola, Potomac Books, Washington, DC, 2012, ix + 197 pp, ISBN 978-1-59797-703-6, \$27.50.

John Parascandola, a distinguished historian of chemistry, pharmacy and medicine, has produced a learned and accessible volume on perhaps the most notorious of the elements—arsenic, the king of poisons. The book begins with two chapters on the source of arsenic’s fascination for many, its role as an intentional poison in fact and fiction. The next two chapters can also be considered as a pair, discussing hazards posed by arsenic exposure to those who work with it and to the larger public. The book closes with a chapter on the possibly beneficial side of arsenic’s toxicity: its applications in medicine, broadly construed.

Chapter 1, “King of Poisons: *Arsenic and Murder*,” begins with some of the chemical basics of arsenic as an instrument of homicide. The arsenic compound of choice for deliberate surreptitious poisoning is arsenic trioxide ( $\text{As}_2\text{O}_3$ ), which is white, easily soluble, odorless, tasteless, and fairly readily available for much of the past few centuries. The more common naturally occurring sulfides of arsenic, realgar and orpiment, on the other hand, would be difficult to get victims to ingest, since they are highly colored and insoluble. The effects of ingesting arsenic are unpleasant and often lethal. A victim is likely to experience vomiting and diarrhea, and possibly burning in the mouth or gut. These symptoms could be confused with those of common diseases, such as cholera, making homicide difficult to diagnose, particularly before the availability of forensic tests for arsenic. The chapter