

The Chemistry of the *p*-Block Elements: Syntheses, Reactions and Applications. Anil J. Elias. Universities Press (India) Pvt. Ltd, 3-6-747/1/A and 3-6-754/1, Himayatnagar, Hyderabad 500 029. 2019. xxiii + 624 pages. Price: Rs 1095.

The ever burgeoning 'old' field of main group chemistry which developed primarily as exploratory synthetic and reactivity chemistry of the main group elements has seen innumerable applications in a variety of fields during the past few decades. In recent years, the developments in this field have been quite rapid. The painstaking efforts made by Anil J. Elias over a 5+ year period culminated in a textbook on the chemistry of elements of the main group, in particular those belonging to groups 13–18.

Most traditional textbooks on main group elements provide an exhaustive amount of information on the chemistry of main group elements and their compounds. Almost always, chemistry of the main group elements is treated in several texts in a very 'descriptive' manner. Additionally, these texts have not kept pace with major developments that have taken place in main group chemistry in recent years, perhaps due to the rapidity with which applications have emerged for their compounds. One notable example where main group chemistry has made a big resurgence by way of 'modern' applications is in the field of materials science in recent years. Due to these issues, most texts on main group chemistry fail to attract and/or retain the interest of the reader/student for a long time. Elias' book is somewhat of a shift from this tradition. It grabs the attention of the reader/student while going through the pages by way of short anecdotes, industrial significance of the elements/com-

pounds, interesting pertinent applications without compromising on the essence of the chemistry of the main group elements. Additionally, I found that this text makes the reader more and more inquisitive to learn more about the chemistry since it is treated in a very apt and concise manner. Several applications of the main group elements and their compounds have also been included which makes reading very interesting. Some of the special features of this book include discussions on a rather controversial topic, i.e. d-orbital participation in main group compounds, anecdotes from a historical perspective, stories of Nobel Laureates, solved concept-based questions at the end of each chapter, several recent findings such as halogen bonds and applications of main group element compounds in the field of materials science. At the end of each chapter, for those interested in knowing more, supplementary reading material in the form of literature references have been included. Citations as recent as 2017 have been included which means that this text is the most updated in terms of the developments that have taken place in this field.

The book is comprised of 15 chapters, an appendix on solutions to end of chapter problems and exercises, and an index. Chapter one provides an overview of the significance of compounds of the *p*-block elements and major discoveries made in this field. Structure and bonding aspects of compounds of *p*-block elements have been collected in chapter two. Chapters 3 through 15 describe the chemistry of the elements of groups 13 to 18. At the end of each chapter, few multiple choice questions with answers, problems and exercises and references for supplementary reading have been included. Each chapter is quite nicely organized with just about the required amount of information on the chemistry of these elements.

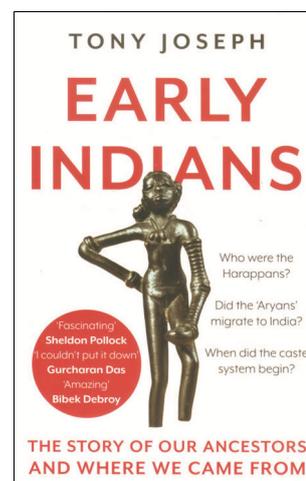
The occurrence of a few 'typos' here and there in the text detracted somewhat from my first impression. While annoying, these 'typos' and also non-inclusion of illustrations in boxes, which I found in a few other texts to be especially attractive, catching the attention of the reader, and also useful, did not present any unresolvable ambiguities, and were for most part obvious.

This book demands a place in every library of a university offering science courses. Based on the material covered,

readability, and interest value to a wider cross section of chemists, this textbook is a worthy addition to the personal library of any undergraduate or postgraduate student and teachers teaching chemistry courses.

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Early Indians: The Story of Our Ancestors and Where We Came From. Tony Joseph. Juggernaut Books, KS House, 118 Shahpur Jat, New Delhi 110 049. 2018. xvi + 262 pages. Price: Rs 699.

Tracing back the origin of Indian population is always fascinating, because of the existence of enormous diversity with respect to language, social structure, religion and culture. It has been a matter of long debate among the scholars of different disciplines such as archaeologists, linguists, anthropologists and geneticists. To the best of our knowledge no effort has been made to consolidate the finding of the above disciplines to narrate the tale about our origin to the common readers. We appreciate Tony Joseph for his efforts in writing this book with enthusiasm and in-depth curation of existing knowledge in this field.

Joseph has presented new findings from the fields of archaeology, anthropology, linguistics and genetics (including ancient DNA) and very precisely describes the complete story in four chapters. He has synthesized the chronology



National Museum of India, Ancient Harappan Civilization, Getty Images

A figurine of a woman from the Harappan Civilization. Some see the figurine as a 'Mother Goddess'.

of movement of modern human into the Indian subcontinent from the first Out-of-Africa humans to recent migrants, citing the relevant references.

In the first chapter, he relates the story of the arrival of the first modern human in this subcontinent about 65 thousand years ago, through southern coastal route. He calls them *First Indians* and uses the metaphor *the base of Indian Pizza*. Additionally, he discusses how archaic humans who inhabited India before the arrival of modern humans were replaced, and he discusses the evidence of particularly large population sizes (relative to other world populations) 40,000 to 20,000 years ago. This claim is based on archaeological findings of stone tools, which were only used by archaic human elsewhere in the world; unfortunately there is no significant fossil evidence to support this view.

Geneticists gather evidences from mitochondrial and Y chromosomal DNA to arrive at conclusion about maternal and paternal ancestry respectively. The maternal ancestry of all Indians was traced back to major haplogroup M, which is also present in the enigmatic tribal groups of the Andaman Islands. The majority of (70–90%) Indian maternal ancestry comprises the Haplogroup M2, which is the most ancient subclade of M. However, Joseph points out that only up to 40% of paternal ancestry

could be attributed to first Indians with majority contributed by sex-biased migrations into the subcontinent. These sex-biased, historical male-mediated migrations might have replaced some of the paternal gene pool of the first Indians. A similar trend was seen in Great Andamanese, where their original paternal gene pool was replaced by modern Y chromosome.

Joseph describes the emergence of first settlers and farming culture at the site of Mehrgarh in Baluchistan around 7000 BCE, with evidence of gene flow from farmers near Zagros Mountains in Iran in the second chapter by combining evidences from archaeology, linguistics and genetics.

Harappan culture, which was an advanced urban culture with long range of trade relationships with contemporary civilizations is elaborately covered in the third chapter. To describe the genetics of the Harappan civilization, Joseph synthesizes evidence from archaeology, linguistics and a recent large scale ancient DNA study to prove and argues that these people had ancestral components both from First Indians as well as from Iranian farmers of Zagros Mountains. However, evidence will be more conclusive when ancient DNA data from actual Harappan site, rather than its surrounding populations, is available. On the basis of findings from linguistic study, Joseph hypothesizes that the Dravidian family of languages, which is currently being spoken in southern India, emerged from the migration of people of Harappan civilization southward during its decline. Nevertheless, he carefully emphasizes that this does not mean that the majority of the genetic components of those proto-Dravidian speakers were from the people of the Indus Valley Civilization.

In the last chapter, Joseph discusses more recent migrants, i.e. Indo-European speaking people, who later mixed with the people of Harappan civilization, which by that time was at its decline while people were migrating southwards and eastwards in search of places with better monsoon rainfall conditions. This influx of steppe ancestry or people who carried Indo-European language to the subcontinent is supported by Y chromosomal and archaeological studies.

Taking his cue from our genetic studies and other evidences, Joseph concludes that there is no pure population in India. Rather, India has a mixed ancestry of separate ancestral components, which migrated at different point of times and contributed a significant part of Indian population and culture. He debunks the claim of Aryan or Vedic culture among Harappans, rather he highlights that the Indo-Aryan culture incorporated aspects of the Harappan culture later after 2000 BCE. To describe these multiple levels of culture, he continues to use the effective 'pizza' metaphor for the Indian population with First Indian as its base with different thickness in different regions and different subsequent migrations formed its toppings.

All throughout his story, Joseph is careful in combining and correlating evidence from every possible field with a special emphasis on the recent findings from ancient DNA findings. Despite the compelling story that is emerging and carefully related in Joseph's book, there are still some missing links that will be filled by evidences from study on ancient DNA from actual Harappan sites as well as sites from times both before and afterward (there is at present no published ancient DNA from the country of India itself!) and upcoming whole genome sequencing of tens of thousands of Indians. Given the availability of current evidences from archaeology, genetics, linguistics and anthropology however, this is an excellent narration of the story of early human in the Indian subcontinent. For the public, this book presents a serious and compelling story of Indian population history, but it is also a story that continues to unfold and change as in new scientific papers published every year. Readers should be cautious while assimilating conclusions, as new and highly relevant evidences will continue to emerge.

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