

The Turing Guide. Jack Copeland, Jonathan Bowen, Mark Sprevak, Robin Wilson and others. Oxford University Press, Great Clarendon Street, Oxford, OX2 6DP, United Kingdom. 2017. xvi + 560 pages. Price: £75.00.

Alan Mathison Turing is widely considered to be the father of theoretical computer science and artificial intelligence (Charles Babbage is considered as ‘father of the computer’). *Time* magazine recognized Alan Turing as one of the twentieth-century’s hundred greatest minds and placed him in the company of the Wright brothers (aviation pioneers), Crick and Watson (structure of deoxyribonucleic acid), Alexander Fleming (benzylpenicillin), and so on. Indubitably the contribution of luminaries of the ilk of Isaac Newton, Albert Einstein, Thomas Alva Edison, Charles Babbage, John von Neumann, Max Karl Ernst Ludwig Planck, Claude Shannon and Alan Turing to science and technology is immeasurable. The *magnum opus* under review commemorates Alan Turing’s station in developmental biology, cryptography, mathematics, science, technology and philosophy.

The book under review is effectively divided into eight parts. The first and second parts contain four chapters each, the third contains eleven chapters, the fourth contains five chapters, the fifth part contains eight chapters and the sixth part contains three chapters. The penultimate part contains five chapters and the eighth part contains two chapters.

The first chapter provides an overview of Alan’s early life. The second chapter, authored by Alan’s nephew, mentions the secret work done by Alan. The third chapter authored by a polymath who worked with Alan for twelve years, dwells on the originality and versatility

of Alan. It describes an interesting work in which Alan applied mathematics to his racquet based on his experiences of playing tennis. The fourth chapter describes the trial and sentence Alan had to suffer because of his sexual orientation (in 2009, the then Prime Minister of the United Kingdom, Gordon Brown, offered an apology for the treatment meted out to Alan Turing. In 2013, Alan Turing was granted Royal pardon by Britain’s Queen Elizabeth II). The chapter also contains an extract from Turing’s will which he signed on 11 February 1954.

The fifth chapter lays the foundation for understanding many of the successive chapters. The sixth chapter describes what might be appropriately labelled as Turing’s greatest invention – the universal computing machine. It also provides glimpses into the unparalleled work of John von Neumann. The seventh chapter provides an overview of the contributions of Kurt Godel, Alonzo Church and Alan Turing – some of the most iconoclastic mathematicians and logicians of all times hitherto. The eighth chapter delves into the origins of the stored-program concept. The ninth chapter is devoted to Turing’s contributions in breaking the codes used by Germany in the war that broke out in 1939. The tenth and eleventh chapters unravel the machine known as Enigma which was used for encrypting and transmitting messages in the Second World War. The twelfth chapter is a treatise on encryption and decryption. The thirteenth chapter dissects a cryptanalytic process called ‘Banburismus’.

Post-1941, Hitler used a cipher machine known as Tunny for communicating with his generals. The fourteenth chapter examines the encryption techniques used by Tunny and how Colonel John Tiltman, William Tutte, Max Newman and Turing were able to counter Tunny. The fifteenth, sixteenth and seventeenth chapters shed some light at Bletchley Park (Bletchley Park – also known as Station X – was once the top-secret home of World War Two codebreakers). The eighteenth chapter explores Turing’s journey to the United States which he undertook to gain insights into speech encryption. The nineteenth chapter is devoted to Bletchley Park. The twentieth chapter is about the world’s first universal Turing machine. The twenty-first and twenty-second chapters are devoted to ACE (automatic computing engine). The

twenty-third chapter uncovers Turing’s pioneering role in the domain of computer music. The twenty-fourth chapter is devoted to some of the greatest titans of computer science and technology: Charles Babbage, Ada Lovelace and Alan Turing. The twenty-fifth and twenty-sixth chapters highlight Turing’s groundbreaking work in the field of artificial intelligence. The twenty-seventh chapter is a fine exposition of the famed Turing test and the twenty-eighth chapter examines ‘intelligence’ from Turing’s point of view. The twenty-ninth chapter goes much beyond conventional thinking and provides a view of computing with networks of artificial neurons. The thirtieth chapter is devoted to Alan Turing’s concept of ‘child machine’. The thirty-first chapter is devoted to chess (including computer chess before computers!). The thirty-second chapter provides an introduction to extra-sensory perception. The thirty-third, thirty-fourth and thirty-fifth chapters dwell on morphogenesis as explained by Alan Turing.

Chapters 36, 37, 38 and 39 provide an overview of Turing’s contribution to mathematics. Turing contributed to group theory, probability theory, number theory, numerical analysis and many other areas of mathematics. The fortieth chapter is devoted to Maxwell Hermann Alexander Newman whose lectures Turing had attended at Cambridge University in 1935. The forty-first chapter poses a question which is shaking up the entire world and is unanswered till the time of writing this review. The last chapter of the book under review analyses Alan Turing’s expanding legacy: cultural, linguistic, political and scientific.

The book contains Alan’s photographs which coupled with the rhetoric make the book come alive. The book delves deep into the hidden facets of Alan Turing’s persona such as his yearning for love (page 5), death (some authorities claim that Alan committed suicide by biting into an apple laced with cyanide; while according to a police pathologist, Turing drank water containing cyanide; yet other authorities claim they found a glass jam jar containing cyanide solution in a laboratory adjacent to Turing’s bedroom. Alan’s mother, Sara, suspected that Alan might have died because he inhaled cyanide gas while conducting an experiment and then there are some others who believe that Alan in fact might not have committed suicide). The book contains

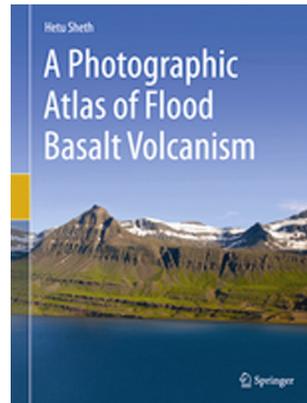
startling facts, for example, (i) Alan's father held a position in the Indian Civil Service; (ii) there was no sign of burning around Alan's mouth, although it is claimed that he consumed water containing dissolved cyanide; (iii) Alan was sentenced under the terms of the Criminal Justice Act 1948; (iv) Alan once wrote an incomplete story which described his own life in a subtle way; (v) Alan's mother, Sara, wrote a book on her son Alan; (vi) Turing buried some silver bars in the grounds of Bletchley Park or Shenley Brook End and no one has been able to find them hitherto!; (vii) people of the world have not been able to decipher a large segment of Turing's notes till the time of writing this review.

The book under review is devoted to Alan Turing who left this world circa fifteen days ere his forty-second birthday. But in his short life which he spent on this planet, he was able to carry out work which biology, computer and mathematics experts have not been able to understand till today.

Many experts/scientists have tried to document the contribution of Alan Turing. The historical drama film *The Imitation Game* is loosely based on the biography *Alan Turing: The Enigma* authored by Andrew Hodges.

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A Photographic Atlas of Flood Basalt Volcanism. Hetu Sheth. Springer International Publishing AG. 2018. xviii + 363 pages. Price: 219,00€. ISBN 978-3-319-67704-0, ISBN (eBook) 978-3-319-67705-7, hardcover.

This book fills a gap in the volcanological literature. A picture is worth a thousand words, and this compilation of over 300 pages and 582 colour photographs provides a supplement to textbooks which simply cannot contain enough images.

In the Foreword, Stephen Reidel explains that there is nothing like a field visit to a particular flood basalt province to understand its physical and volcanological features, but no single geologist will have the opportunity to see most flood provinces of the world. As Reidel writes, 'Geologists reading this volume can now easily get a broad understanding of the physical volcanological features shared by flood basalt provinces as well as those distinct to specific provinces'.

The photographs in this book come mostly from the well-known flood basalt provinces (Deccan, Columbia River, Paraná, British Palaeogene, East and West Greenland, etc.) but there are further examples from Portugal, Libya, Saudi Arabia, Turkey, Georgia, Patagonia and elsewhere. The author takes a broad view of what constitutes flood basalt volcanism, for as he says '...

boundaries between "small", "intermediate" and "large" flood provinces are artificial, and flood basalt size a continuum. This has a significance for our conceptual understanding of flood basalt volcanism and associated mantle–crust geodynamics'.

The photographs display the world of lava plains very well. They range from vast landscapes to small details enabling the reader to take a virtual field trip. The setting of the lavas and relation to neighbouring bedrock are also covered. The photographs are enhanced by clear and informative captions which retain the writing style of the contributors themselves. Furthermore the photographs were 'selected for their scientific and aesthetic value...'. Many of the illustrations are indeed beautiful, which enhances the appeal of the book.

The book consists of 12 chapters.

The Introduction is excellent and explains the need for this book, the way it is organized, and the essential background to the topic. There is also a helpful Glossary (10 pages) and References (16 pages). The extensive Suggested Reading section (10 pages or about 250 items) is useful and up-to-date for anyone wishing to go further.

This is by no means a textbook, but there is a one-page introduction to each section explaining the main points of interest, and with a good scientific approach it frequently stresses what we do not know and what researchers are looking for. It is essentially a complement to textbooks, and should be in most geology libraries as a visual reference book. It will also appeal to the many individuals fascinated by volcanoes and impressed by the beauty of volcanic landscapes.

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