

'empirical deficiencies' (p. 112) or 'failed to meet the experimental support' (p. 113), or it was suspected whether 'it is at all a theory' (p. 116).

What made Einstein and the theory of relativity popular was the solar eclipse of 6 November 1919. Astrophysicists proved the correctness of Einstein's view that light bends when it passes near a heavenly body. In Chapter 8, 'In the wake of a solar eclipse', the author gives glimpses of the political situation after World War I. It is crucial to the following chapters to show Einstein's international reputation as a scientist as well as a politically active pacifist. At the same time it throws light on the political interests of the Nobel Committee in the international context. In 1920, 1921 and 1922, Einstein was nominated 8, 14 and 17 times respectively. According to the author, in 1920 the Nobel Committee recognized some of Einstein's achievements such as the finding on Brownian movement, theoretical work on changes of specific heat of solid bodies and photoelectric effect, but about relativity it was noted that 'more experimental tests were needed before one could take seriously Einstein's candidacy for a prize based on it' (p. 146). Neither the Committee nor the experts (who were also members) changed their views about Einstein's contributions, in particular the theory of relativity, until C. W. Oseen – a physicist with specialization in mechanics and mathematical physics, appeared on the stage. He prepared the ground for Bohr's and Einstein's Nobel Prize, as we see in 'Finding the right formula – Einstein + Bohr'. This chapter which is the backbone of the present book, explains the causes which favoured Einstein. First, Oseen in his report divided Einstein's findings in such a way that he could appease the experimentalists, who had power in the committee. He did not give importance to the theory of relativity. Second, two members of the Committee had died and the new members changed the balance. Third, in order to appease opponents like A. Gullstrand, the Nobel Committee did not change its opinion on relativity. Fourth, another influential opponent Arrhenius, who in the past wrote negative reports, changed his views. Being pro-German, he wanted to integrate the German scientific community, which was internationally boycotted after World War I. Also, Arrhenius wanted to main the international character of the

Nobel Prize. In Elzinga's words: 'In Einstein's case, it was obviously a much easier task to uphold this ideal. He himself was a symbol for peace and progress, so the symbolic capital of recognition was easily converted into political currency. Not only that, in the eyes of many people it also, in turn, helped reassert purity of the prize as cultural capital' (p. 190).

In fact, the story of Einstein's prize has been told in the first 11 chapters. Chapter 12 entitled 'A celebrity at the amusement park: Göteborg 1923', might seem to be out of place. But it is not so, as it gives the causes for opposition to the relativity theory. Elzinga shows that in order to understand the opposition to the theory of relativity one needs to understand the influence of Swedish philosophers during 1915–1930. Elzinga's one of the most important conclusions is that the ideals of science are reigned by the research culture in which it is done. Understandably, the reactions of the press to Einstein's visit and his lecture are also given in this chapter.

The present book is recommended to the general public as well as experts from social and natural sciences.

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1. Friedman, R. M., *The Politics of Excellence – Behind the Nobel Prize in Science*, AWH Freeman Book, New York, 2001, pp. 119–140.

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**Just Genes: The Ethics of Genetic Technologies.** Carol Isaacson Barash. Praeger Publishers, CT, USA. 2007. Price: US\$ 49.95.

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The subject of genetics, genetic engineering, and genetic technologies is very topical for the present time (and indeed perhaps for any other). Developments in the field, of which the most significant landmarks may be Mendel's breeding

experiments, Watson and Crick's description of the structure of DNA, and the successful conclusion of the Human Genome Project, give rise to many hopes and fears about the uses of the new understanding and power. The specific topic of ethics in relation to genetics has been addressed in several books, the best-regarded of which is arguably that of Reiss and Straughan<sup>1</sup>. (I have also heard good things about the recent one by Berry<sup>2</sup>, but have not read it myself.)

The present book is thus quite topical, and addresses a subject likely to be of interest to many. Some of the issues addressed by it can be gleaned from the headings of a few chapters: 'Introduction: Are We Ever Talking Just about Genes?', 'The Use and Abuse of Genetic Information: Genetic Privacy and Genetic Discrimination', 'Genetically Modified Foods: Do We Become What We Eat?' and 'Cloning and Stem Cells: Fact, Fiction, and Ethics'.

Unfortunately, in spite of its very interesting subject, this book cannot, in my opinion, be called a good one. A major complaint I must make of it is that it is, simply put, rather poorly written – in a style that violates basic principles of English composition we all learn in college and even earlier. Consider the sentence (p. 2), 'Crossbreeding of crops and animals, for example, had been done for hundreds of years, though largely by accident or intent' – what else could there be, beside accident and intent? Elsewhere (p. 57), reference is made to 'the late 1950s' (sic) discovery that the human Y chromosome plays a major role in sex determination', suggesting that the late 1950s were the sentient agents that made such a discovery. Many technical words are used before being defined (or without being defined).

Some errors in scientific writing also ought to have been corrected; e.g. (p. 105), 'Geneticists now use the following algebraic equations to describe the origins of variability:

$$Vp = Vg + Ve \text{ and that } Vp = VgXVe^{15}.$$

It took me a little while to realize that  $X$  should actually be  $\times$ , that the two equations should have been on different lines, and that the superscripted '15' is actually a reference to an endnote, not a mathematical power in the algebraic expression. It would also have been preferable that  $Vp$ , etc. be indicated with proper

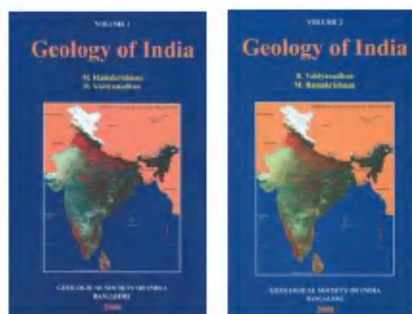
subscripts as  $V_p$ , etc. and that they first be described before use in the expression. One consistently gets the impression that the author is tossing scientific words and phrases around without a sufficient understanding of them.

There also appear to be some claims or statements in the book that might cause raised eyebrows amongst scientists specializing in genetics (a specialist in that science could go more in depth on this), which tend to show the author, and her fact-checker (if any!) in poor light. There also are some strange unsourced claims that appear questionable even to a layman; e.g. (p. 2), 'The word *gene* comes from Greek meaning (sic) "to give birth to"'. *The Oxford American Dictionary* says it comes 'from German Gen, from Pangen, a supposed ultimate unit of heredity', which *Webster's* also seems to support. This is a strange error considering that the author elsewhere (p. 60) takes the trouble to supply a dictionary definition for the much less technical *privacy*. Similarly (p. 116), 'Pythagoras in sixth century BC (sic) advised individuals to avoid fava beans, *because he had observed that some people became sick upon eating them*' (emphasis added) – there does not appear to be any authentic record of what, if anything, Pythagoras observed and concluded (though the basic advice to avoid fava beans is widely attributed to him), and such speculations ought not to be presented as facts.

1. Reiss, M. J. and Straughan, R., *Improving Nature? The Science and Ethics of Genetic Engineering*, Cambridge University Press, Cambridge, 2004.
2. Berry, R., *The Ethics of Genetic Engineering (Routledge Annals of Bioethics)*, Routledge, 2007.

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**Geology of India. Vols 1 and 2.** M. Ramakrishnan and R. Vaidyanadhan. Geological Society of India, P.B. No. 1922, Gavipuram P.O., Bangalore 560 019. 2008. 556 and 428 pp. respectively. Price: Rs 1500 (both volumes).

Geology in Greek means science of the earth. This book is about the science of the earth of India. The earth has a history that goes back to ~4600 m.y. Are there earth materials that go back to ~4600 m.y.? The oldest dated earth materials are ~4200 m.y., and based on current knowledge the oldest dated Indian crust is not older than ~3500 m.y. Geological records of the evolution of India, therefore, date back to ~3500 m.y. (3,500,000,000 years). Much has happened since then, and this book is a compilation of the events and history that has shaped the geology of India. In the preface to the book, the authors have done well to reiterate the following, 'Classical geology is firmly rooted in stratigraphy, in conjunction with structural geology in deformed terrains. Stratigraphy is fundamental for building models of metamorphism, tectonics, and crustal evolution, and is therefore the prime focus of this book'. As stratigraphy is 'unfashionable', there is a need to re-emphasize that stratigraphy lies at the core of geological thought and must be accorded its central place in developing and deepening geo-scientific knowledge of the Indian region.

The book is organized in two volumes, the first of which deals with the Precambrian terrains of India. Volume 1 by M. Ramakrishnan (except for Chapter 1 on Introduction and Physiography and Phanerozoic part of Chapter 2) includes an account of the cratons (Dharwar, Bastar, Singhbhum, Bundelkhand and Aravalli), the mobile belts (Eastern Ghats, Pandyan and Satpura), besides the Precambrian of the Himalaya. Additionally, the Proterozoic sedimentary basins and

their evolution have also been dealt with in this volume.

This volume deals with two other aspects, an opening chapter that gives a physiographic account of the Indian sub-continent. This is in keeping with the traditions established in the earlier generation of textbooks on the geology of India by late D. N. Wadia and late M. S. Krishnan respectively, that opened with detailed accounts of the physiography of the Indian sub-continent. The strength of this chapter lies in the many maps that illustrate different assemblages of land-forms from the various terrains of India, in addition to several maps of India, illustrating its seismic zones, soils, natural vegetation and its geo-hydrological provinces. A summary of the two-volume book has been provided in the second chapter of Volume 1 entitled 'Geology of India: A synopsis'. This overview provides a useful indication of what to expect from the book. Further, this 58-page chapter provides a summary account of the geology of India that is particularly useful for the non-specialists like, soil and agriculture scientists, civil and hydrological engineers, petroleum technologists, ecologists and environmental scientists amongst others.

For those engaged in the disciplines of geology, stratigraphy and palaeontology, presentation of the data and synthesis follows a natural division – the Precambrian and the Phanerozoic. The Precambrian includes all the records from the beginning of the earth until ~540 m.y., a time when important changes took place in the evolutionary history of life forms on the earth. Volume 2 by R. Vaidyanadhan (except for the Deccan Traps part of Chapter 9) includes chapters on the Paleozoic, Mesozoic and Cenozoic succession(s) of the various geological provinces of India. Further, there are chapters that are India-centric and highlight some of the significant and special aspects of the Phanerozoic geology of India. These, expectedly, include a chapter each on the Gondwana super-group, Deccan Volcanic Province and associated Inter-trappean Beds, Siwalik Group, and one that deals with the geology of offshore basins, an aspect that has merited much attention in the past few decades in view of India's oil exploration, and the significant oil and gas discoveries. In conformity with Volume 1, a large number of maps, sections, diagrams and field illustrations and