disadvantaged throughout their career just because they were women.

None of the women in Lilavati's Daughters regrets her decision to opt for science and contemplates that if she has to restart her career today, she will choose the same profession again. Put plainly, these women scientists have enjoyed their lives in science and are proud of their accomplishments and the success of their young colleagues/students. Throughout the book, quotes such as 'Research for me is a way of life' (Renu Khanna-Chopra), 'Even on a bad referee report day I am happy I do science' (Rama Govindarajan), 'All the gender-biased adversities have made me stronger and even more ambitious to succeed, and I do science without regret and apology' (Bindu Bambah) and 'I cannot remember a time when I did not want to go to my lab – it is my dream place and I never feel bored' (Chitra Mandal), sum up their joy in doing science.

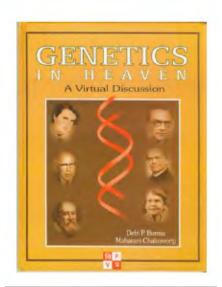
The book has no specific agenda, no conclusion and the short essays have not been organized in any particular fashion, but many stories do point towards the issue of gender bias in the positions of power within the scientific community and emphasize the importance of having female role models in this arduous profession of science. This book provides tangible examples of career paths of successful women scientists, which will certainly aspire young girls to achieve their dreams.

The book does have some typographical errors here and there, but you tend to neglect them as you cruise along. The only reservation I have about the book is the lack of representation of women scientists from the industrial sector. Success in industry and academia is measured by different yardsticks; while it is a team achievement in the industry, academia focuses on individual accomplishments. Reflections on the career paths and the challenges faced by women scientists employed in the industry would have offered more food for thought. Despite this, the book serves its purpose by bringing visibility to the unsung heroines of Indian science and by acknowledging their contributions to science, both as researchers and as mentors.

Overall, the book is well indexed, well composed, easy read and highly inspirational and deserves a place in your personal collection as well as on the bookshelf of every college and university library. The book is a must-read for future generations of scientists who will be inspired by the lives of these remarkable Indian women scientists. Despite having no manifesto, *Lilavati's Daughters* successfully drives home the point that a more conducive work environment for women researchers will help them reach their full academic potential and will allow the nation to tap the entire scientific talent pool.

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Genetics in Heaven: A Virtual Discussion. Debi P. Burma and Maharani Chakravorty. Vigyan Prasar, A50, Institutional Area, Sector 62, Noida 201 307. 2008. 95 pp. Price: Rs 100.

This little book of about one hundred pages presents a historical account of the development of genetics from the times of Charles Darwin and Gregor Mendel, up to the period when the human genome was sequenced, spanning little more than a century and a half. The unusual feature of this book is the novel style of narration. It is written in the form of informal conversations between Darwin and Mendel, imagined to take place in Heaven. Other luminaries of the past (also imag-

ined to be in Heaven) such as Barbara McClintock, Oswald Avery, Erwin Chargaff, Francis Crick, Rosalind Franklin, Rene Dubos and J. B. S. Haldane are brought in to participate in the conversation, as and when necessary. Some who have not made it to Heaven yet are contacted through an ingenious device called the Time Telescope (with its audiovisual attachments!), invented by none other than Galileo Galelei (another Heavendweller), whom Darwin and Mendel are imagined to meet in Heaven. These doyens include Joshua Lederberg (an earthling at the time of writing of the book), James Watson, Paul Berg, Frederick Sanger, John Sulston, Craig Venter and others. Through their conversations the story of genetics is unfolded. This style is indeed novel and many basic concepts and anectodotal titbits are presented. Even professionals could find bits of information that they may not be aware of. Although it is claimed that the book could be read and understood even by laymen with some interest in and exposure to science, the language is technical and esoteric, very much so in places. I wonder how much a lay reader would gain by reading this book. However, serious students and teachers of genetics might find this book a good supplement to regular textbooks. A major drawback of this book is the complete absence of illustrations, which could have been of great help in grasping the concepts. In a lighter vein, I wish Darwin and Mendel had bumped into another illustrious 'swargvasi', namely Leonardo Da Vinci who, with the help of Galileo and his gadgets, could have located the source of necessary material and come up with excellent illustrations. As everyone knows, Da Vinci was good at scientific drawings when he was an earthling!

The authors could have been less uncomplimentary towards Watson and Crick (W-C) and refrained from calling them (through the words of Rosalind Franklin) as Mr Wicked and Mr Crook (p. 30). Even Darwin and Mendel (who meet Watson just a few pages earlier in the narrative) are depicted to describe him as arrogant and upstart (p. 47). All this could have been avoided. The authors (again through the words of Chargaff and Franklin) are critical that the W-C duo got the Nobel Prize without doing any experiment. True, Chargaff and Franklin provided information on base equivalence in the DNA and the possibility of a

helical structure respectively, and the role of H-bonding in protein structure was known from the work of Linus Pauling. But the beauty of the work of Watson and Crick lies in the fact that they used the available information to come up with the double-helical structure of DNA, which explained the three cardinal attributes of the genetic material, namely replicability, mutability and information storage. Having all the information available, others also could have come up with the same model, but none did. Is it a fault of Watson and Crick that they did, while others did not? Rosalind Franklin could have had genuine grievances and disappointments in her career, but I feel it is somewhat uncharitable to project her as an ungracious person in defeat.

There are a few errors, historical and scientific, in the early part of the book dealing with Stone Age genetics. Some are listed below in the hope that they might be rectified in future editions.

- 1. Watson, Crick and Wilkins got the Nobel Prize in 1962, not in 1958 (p. 10).
- 2. It is odd to have Mendel use the terms 'genotype' and 'phenotype'. These words were coined by the Danish botanist, Wilhelm Johannsen in 1909, i.e. 25 years after Mendel's death (p. 11).
- 3. The term 'transforming principle' was coined by Frederick Griffith and not Avery, who along with McLeod and McCarthy identified it as DNA (p. 17).
- 4. The classical work of Gierer and Schramm on tobacco mosaic virus could have been included to show that in some viruses RNA is the genetic material (pp. 11–20).
- 5. Joshua Lederberg discovered mating in *Escherichia coli*, but it was William Hayes who identified the causative agent as the F (Fertility) factor (p. 41).
- 6. In  $F^- \times Hfr$  crosses there is no transfer of the F factor from the donor to the recipient, whereas in  $F^+ \times F$  crosses there is. (The former is a chromosome transfer process and the latter is a plasmid transfer process. The small frequency of chromosome transfer which Lederberg detected in the latter is due to the presence of a few Hfr cells in the donor population; p. 42.)
- 7. A minor typo. It should be English language, not English literature (p. 61).

The conversational style found in the book is odd. The characters are imagined to be engaged in informal coversation. Therefore, it is natural to speak to one another using shortened first names such as Jim, Bill, Fred, etc. But they talk using last names and that too without any prefix such as Mr, Dr or Prof, etc. It is neither informal nor formal. This aspect needs to be given attention to, in future editions. In summary, this book is the outcome of an interesting and novel idea of presenting information. Its usefulness could be greatly enhanced if some illustrations are provided and adequate attention is paid to small details, some of which are listed above.

R. JAYARAMAN

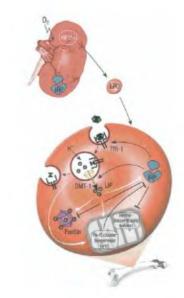
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Annual Review of Nutrition, 2008. R. J. Cousins, Dennis H. Bier and Barbara A. Bowman (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 28. 480 pp. Price not mentioned.

The first and last chapters in this volume make for absorbing reading. In a recent symposium that reflected on the greatest discovery in nutrition during the last 30 years (albeit in a small select audience), the winner was the discovery of the role of folic acid in preventing birth defects<sup>1</sup>. It is fitting that the prefatory chapter in this issue is by Irwin Rosenberg, whose elevating journey in translational science involved the elucidation of the nutritional importance of folate; and the translation of that science into policy through folate fortification. The diet-heart hypothesis, which for so long only involved research into the role of dietary fat, now includes research into many other nutrients, prime among which are the B vitamins, with their link to homocysteine; Rosenberg's research in this area is exemplary. The last chapter is no less absorbing, dealing as it does with bioethical considerations in nutrigenomics. The transfer of technology between borders is much faster than the resolution of resulting ethical difficulties. Specific to nutrition, there are issues surrounding the development of cohorts with biobanks of biological samples that could be used to define biomarkers of risk of later disease. How are these samples to be stored and used? Who would guard their (and the

donor's) interests? How will commercial exploitation be handled in a way that benefits all society? These are questions that we must address, and while some solutions are presented, more discussion is needed in a specific national context, that may create more nuanced approaches. Another issue relates to the 'unhealthy quest for health' with the seemingly unattainable summit of the nutrigenomically personalized diet, and the ethical dilemmas that are related to such information. Thus far, the promise held out by early breakthroughs in genotyping and informatics has not been borne out; there are far more unknowns relating to the phenotype and environmental aspects, than are known. In the present condition, it seems ever more likely that the simple exhortation to 'eat more fruits and vegetables' will be the effective way forward to a healthy diet for all, rather than a complex individualized paradigm. Population rather than individual specific strategies are far more suitable from the current nutrigenomic state of the art, and the review of these issues is well presented<sup>2</sup>.

India has a burgeoning obese population<sup>3</sup>, as do other countries, and this is related to a positive energy balance due to too little physical activity or too much food energy intake. Weight reduction strategies that seek the creation of a negative energy balance through increased energy expenditure, such as exercise have not been successful in the long term,



The iron-responsive element/iron-regulatory protein (IRE/IRP) regulatory network in erythropoiesis.