

latter was in a letter written to Max Born in 1926. While Bohr maintained that 'it is wrong to think that the task of physics is to find out how nature is. Physics concerns what we can say about nature'. In contrast, Einstein held the view that 'physics is an attempt to grasp reality as it is thought, independently of its being observed'. Jammer also discusses in sufficient detail the Einstein-Podolsky-Rosen Paradox – the locality principle according to which 'the properties of one system cannot be affected by what is done to another system in space-like separation from the former', the experimental support by Alain Aspect to the non-locality predictions of quantum mechanics, etc., David Bohm's ideas of implicate order, all of which have profound philosophical significance. In this context, Jammer quotes appropriately from G. S. Stent's article 'Does God Play Dice?' in *The Sciences* 19 March 1979. What is significant is that unlike Einstein, Bohr did not regard the world as an objective reality.

Jammer in the end proceeds to an extensive discussion of the influence of Einstein's work on cosmology, in raising the status of the field from a jumble of mythical speculations to a respectful scientific discipline. The question of the origin of the universe could at least be scientifically addressed. The big bang theory, the discovery of the microwave radiation, the crucial contributions of Penrose and Hawking are all discussed in sufficient detail.

The book is eminently readable by specialists as well as by non-specialists. It is replete with quotations from Einstein and from many of his colleagues and critics. Very extensive references to all topics covered are available. Definitely the book throws a lot of new light on Einstein's personality as well as on his views on many issues of general interest and dispels many of the wrong views on Einstein.

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Medicine's 10 Greatest Discoveries. M. Friedman and G. W. Friedland. Universities Press (India) Limited, 3-5-819, Hyderguda, Hyderabad 500 029, India. 1999. 263 pp. Price: Rs 200.

The history of medicine is, inexplicably not taught in medical colleges in India. There are also not many medical teachers to whom an eager student can turn to for guidance on the subject. It is no wonder that medical graduates who are familiar with great names in medical history are small in number.

This book by Friedman and Friedland will satisfy the need of those who need an introduction to the history of medicine. It is also an excellent commentary on how a discovery evolves from a previous one. What makes the book distinct among texts of medical history is the narrative style. Instead of a chronological record of events, the authors engage the readers with a weave of excitement of discoveries and candid portrayal of the personae of the pioneers.

The authors have chosen the ten discoveries carefully. Initially the authors selected hundred most significant ones from more than 5000 discoveries and then focused on twenty five. Three dealers of rare medical books and four physicians who are zealous gatherers of exceptional medical publications vetted the list of the finally picked up ten discoveries. Some of the living scientists who played major roles in the achievements were also interviewed for seeking historical facts. The milestones thus singled out are renowned ones. They include description of the human anatomy, explanation of the concept of circulation of blood, origin of the germ theory of diseases, initiation of vaccination, introduction of anesthesia, discovery of X-rays, finding methods to grow cells in culture, recognition of the antibiotic nature of penicillin, realization of the harmful nature of cholesterol and determination of the structure of deoxyribonucleic acid. What is not so well known are the names of the heroes responsible for some of the above mentioned discoveries. Authors found to their dismay that none of the physicians who taught at either Stanford University or at University of California Medical School was aware of Ross Harrison who pioneered the tissue culture technique. They also did not recollect Nikolai Anichkov who

demonstrated the link between atherosclerosis and cholesterol and Maurice Wilkins who shared the Nobel Prize with Watson and Crick. Many also did not recognize Antony Leeuwenhoek and his discovery of the microscopic world of living organisms or connect Crawford Long with the initial use of anesthesia for surgical purposes. Presidents of John Hopkins and Yale Universities where Ross Harrison worked, were unable to recall who Harrison was. So much is our concern for our illustrious predecessors!

Each of the ten chapters in the book contains descriptions of the background of the awesome discoveries. The chapters also have details of important experiments. There are vivid descriptions of the experiments by which Harvey demonstrated that valves in the veins permit blood to flow only in one direction to the heart, how Pasteur demolished the concept that living matter 'sprang' from non-living matter, and the experiments that led to the discovery of the relationship between cholesterol and atherosclerosis. Not only are the initial discoveries detailed, but subsequent related breakthroughs are also rendered. The biographical sketches of the scientists do provide insights into their tensions, disappointments and frailties. One also gets to know the bitter animosity and hostile exchanges among some of the great men. Robert Koch was critical of Pasteur's impatient hastiness in announcing the anthrax vaccine. He wrote: 'Such goings on are perhaps suitable for the advertising of a business house, but science should reject them vigorously'. Koch, however, a few years later in introducing tuberculin moved on in the same way as Pasteur did earlier. The dramatic events connected with the discovery of DNA are retold with candour. There is an extensive verbatim account of an interview with Raymond Gosling on the Franklin-Wilkins conflict.

There are fourteen black and white pictures. The third skeletal drawing in Vesalius's *Fabrica*, the only illustration in Harvey's book *De motu cordis*, a drawing of the cowpox pustules on the hand of a milkmaid, taken from Edward Jenner's book and a photograph of Nikolai Anichkov are some of them. These are rarely seen elsewhere.

Several hitherto unknown facts are available in the book. The role of chance in Roentgen's discovery of X-rays and Fleming's recognition of antibacterial

properties of penicillin is often cited. It is not so well known that if rain water had not remained in an open container for several days, bacterial growth would not have occurred for Leeuwenhoek to discover the microbes with his microscope. Similarly, Crawford Long by chance remembered one morning that he felt no pain while having a good time at an 'ether party' even though he had severely bruised his limbs.

A thought-provoking aspect brought to our attention is that none of those involved in the great medical discoveries can equal the genius of Beethoven, Mozart, da Vinci, Michelangelo, Newton and Max Planck. The medical celebrities had however intense curiosity, abundant talent and a flair for painstaking research. Roentgen would not have discovered X-rays if he had not been inquisitive about the greenish-yellow emissions in a barium platinocyanide coated screen, a little away from his Crookes tube. Vesalius had to fight against hungry wild dogs in cemeteries to collect from human corpses, bones for his study. Interestingly it was not money but yearning for fame and recognition that motivated almost all the discoverers.

There are many anecdotes that enrich the narration. There are enlightening and quotable notes as well. Why did Fleming view penicillin only as an external germicide and not as a possible chemotherapeutic drug? The authors answer: 'It was not the first time nor would it be the last, that recognition of a revolutionary medical discovery was delayed for many years because medical thinking was constrained by an obsolete paradigm of reasoning'.

Those who scan for trivia will not be disappointed. Here are some noteworthy examples. Humphrey Davy, the surgeon chemist not only invented the Davy lamp, but was also a poet whom Wordsworth and Coleridge admired. Wordsworth even asked Davy to edit the famous second edition of *Lyrical Ballads*. Can you imagine that only ten persons other than his second wife attended the funeral of Robert Koch? Among the ten there was only one scientist. How many know that Pasteur Institute was constructed with a grant of 100,000 francs sent to Pasteur by the Russian Czar in appreciation of saving sixteen Russian peasants bitten by a rabid wolf? When the Institute was founded, Joe Meister whom Pasteur had treated for a bite of a rabid dog, became

the custodian. Another surprising fact is that the Royal College of Surgeons of London demanded that Jenner pass a test in Greek and Latin before being considered for their fellowship. This was after Jenner had attained fame for his discoveries and Oxford University had conferred an honorary degree. In contrast, Leeuwenhoek, an unlearned shopkeeper and a draper who knew no language except his native Dutch was invited by the Royal Society to become its fellow.

In their concluding chapter, the authors select the greatest medical achievement of all times. Their favourite is William Harvey's elucidation of the circulation of blood in the human body. Harvey introduced for the first time, experimentation in medicine. The authors mention: 'His discoveries made medicine begin to move as a science'.

Friedman and Friedland have also selected from the ten top discoverers, the most amiable companion for a vacation. Their pick is Edward Jenner. To them, Vesalius is too conceited, Harvey is not congenial, Roentgen is not sociable, Harrison and Fleming are boring, Wilkins is too withdrawn and Anichkov looked grim. What they have to say about Jenner merits recital. 'If he vacationed with us and observed that we had no desire to hear about his marvelous experiments with cowpox, he would tell us about his discovery of coronary artery disease or describe the lovable and not so lovable eccentricities of his beloved mentor, John Hunter. If we were tired of these matters, he would tell us about the seasonal migration of English songbirds, as well as give further details about his beloved cuckoo. Seeing that we had heard enough of these trenchant observations, Jenner then might recite his own verses and get ready at a minute's notice, to charm us with the lovely music he would create with his violin and flute. He would be happy to have us see, from the carriage drawn by two of his fine horses, his beloved Berkeley countryside. He would invite us to see Berkeley from the air, riding in one of the hydrogen balloons that he had invented. After these rides, he would warm us up with his claret. Oh yes, we would enjoy such a time with Edward Jenner'. Who would not? The book has also an antislavery song penned by Jenner.

This is certainly a splendid book enthralling from beginning to the end. One

can read it over a weekend or during a long train journey. Important references for each chapter are there at the end of the book. The index is adequate. The minor flaws in the Indian edition are that the print is of small font and that the pages are likely to come off the spine with frequent use. These are offset by the affordable price. The book is definitely, worth possessing. At your leisure you may contemplate on your own preferred discovery or hero.

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Disinvesting in Health – The World Bank's Prescriptions for Health. Mohan Rao (ed.). SAGE Publications (India) Pvt Ltd, M-32, Greater Kailash, Part I, New Delhi 110 048. 1999. 238 pp. Price: Rs 225.

This timely publication raises several important issues concerning health care systems from an interdisciplinary perspective. The current crisis in the health sector has its bearing in the global policies, priorities of the nation state and health delivery system at the local level. All contributors of this book have directly or indirectly expressed their doubts about globalization, privatization and marketization of health industry coinciding with massive changes in the macro policies of our country. At the same time, none has glorified the interventionist approach of the state in the post-independence period. The discourse revolves around 'public sector versus private sector' polarization. While experiences of the voluntary sector show that the health sector has a segmented market in which a sizable chunk of product market manages without pharmaceutical industry, labour-market manages without trained nurses, doctors and super specialists and factor market depends solely on herbs, roots,