stan Steel, the operating corporation for building the plant, selected a number of engineering graduates for training in Germany and Agrawal was one of them. After a year's training in Germany he returned home to Rourkela and his professional career from then on was totally intertwined with the growth of this plant with a few years of interlude at Durgapur and Bokaro steel plants.

Rourkela proved to be a challenging assignment. The German engineers were sent back but Indian engineers were still not ready to take over the responsibilities and add to that, the roof of the steel making shop collapsed and totally paralysed the entire steel making operations. Thousands of tonnes of iron lay waste at the plant waiting for their conversion to steel. Agrawal tells us the story how the sick plant was repaired back into full performance with the cooperation of German engineers and the determination of Indian workers. Engineers do not usually put things dramatically, but if there was a period of high drama it was then with the Minister ringing up every hour asking for updates and blast furnaces belching out hundreds of tonnes of pig iron that the plant could do without.

Even after this, Agrawal was not left free to carry out the modernization of the plant. The bureaucracy intervened and he was sent to Durgapur and later was invited to help the newly-built Bokaro steel plant. But Rourkela would not part with him so easily and he was persuaded by the Steel Minister to return home to Rourkela as its General Manager. He would stay at Rourkela for over seven years nursing it to outstanding performance. When he left Rourkela for Chairmanship of the Steel Authority of India, its annual production of steel was over 1.5 million tonnes.

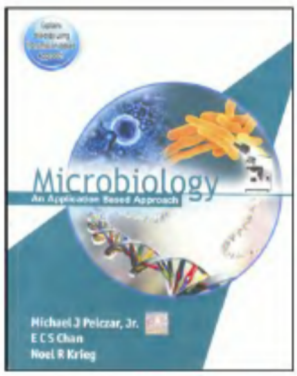
The steel plants come out with townships with over thousands of people living there. The General Manager is the de facto Sherriff of the town though not with much power to administer. The towns were not free of the political turmoil, strikes and gheraoes. Agrawal narrates an incident when fears of Hindu–Muslim riot paralysed the entire township with key personnel operating the plant walking away from their work centres. The unattended coke ovens with their continuous generation of gas came close to exploding and in the midst of a military imposed curfew. Agrawal had to bring in stealth the needed engineers from their homes to deal with the crisis. For an engineer at that position, it is not mere technology or production schedules, but physical and mental stamina and crisis management skills.

He got along well with many of his political masters. In the narrative, the late Steel Minister Mohan Kumaramangalam comes out as a visionary and a brilliant leader. Even when he had to choose between the union leaders (the Minister was an avowed Marxist) and the administration that Agrawal was heading, he chose to help him to defuse the crisis. Alas, not all the leaders or bureaucrats were that enlightened; some tried to force their influence and there were instances when some petty government officials wanted him to be an informer on his former ministers who were then not in power. Agrawal fought against all these shenanigans of Delhi. Perhaps these petty bureaucratic intrigues should have persuaded him to accept an invitation from Indonesia. The years he spent there should have been less hectic and yet satisfying for him; he was engaged in helping to train Indonesian engineers to run their steel plants.

The industrialization of a newly independent India had made many heroes who toiled to speedily transform a poor agrarian nation into an industrial power to reckon with. Their tales are worth hearing and they form an essential ingredient of India's historical fabric. Agrawal's *Journey of a Steel Man* fits elegantly into this archive. We need to hear of more of such tales. Alas, engineers of that vintage preferred slide rules to keyboards!

V. S. ARUNACHALAM

Center for Study of Science, Technology and Policy (CSTEP), Old CAIR Building, Raj Bhavan Circle, High Grounds, Bangalore 560 001, India
e-mail: vsa@cmu.edu



Microbiology: An Application-based Approach. Michael J. Pelczar Jr, E. C. S. Chan and Noel R. Krieg. Tata McGraw Hill Education Private Limited, 7 West Patel Nagar, New Delhi 110 008. 2010. 1052 pp. Price: Rs 575.

The authors Michael J. Pelczar Jr, E. C. S. Chan and Noel R. Krieg had already written a book *Microbiology: Concepts and Applications* – international edition published by McGraw-Hill Inc. in 1993. The present book entitled *Microbiology: An Application Based Approach* written by the same team of authors and published by Tata McGraw-Hill in 2010 seems to be an Indian edition of the same book with a minor change in the title.

These authors have been writing books on microbiology since 1958 and have long-term experience of teaching and research in varied fields of microbiology at prestigious universities in USA and Canada. These titles were well read and most recommended in the subject of microbiology for undergraduate courses since 1960s at most universities and colleges in India.

The book under review is basically addressed to highlight the dependence of life on this planet on the activities of microorganisms. Microbes contribute towards solving many problems of immediate concern to human beings such as improvements in food production, the mining of ores, cleaning of oil spills and industrial pollutants, increasing agriculture produce, etc. Through the techniques of recombinant DNA technology, microbes are being 'tailor-made' to produce valuable industrial and pharmaceutical chemicals, disease-resistant crops, vaccines and other products. Modern techniques in molecular biology have led to understand regulatory metabolic processes in bacteria which are being

extrapolated to understand life processes in higher forms. It is the understanding of these processes which have been explored in application of microbiology in varied fields like agriculture, pharmaceuticals, industrial production, waste water treatments, mining of ores, vaccines developments, development of diagnostic kits, etc. The principle underlying the use of microbes for the said applications has been dealt with in detail in the relevant chapters in this book. Concept-based understanding is emphasized for a given application avoiding the non-required information based details. The book thus covers major areas where the knowledge of microbiology is being applied. It can be recommended for undergraduate course in microbiology, B Pharm, B Sc (Biotechnolgy), and post graduate courses in life sciences, botany and zoology as already addressed by the authors.

The book gives a concise information in a systematic way on different aspects of the subject. Parts I–IV cover an overview of microbiology, microbial growth and nutrition, control of microorganisms, and major groups of microorganisms. This basic information is required for the students of any discipline to learn microbiology. Parts V and VI discuss basic aspects of microbial metabolism and microbial genetics. These enable students to understand the underlying principle of the use of microorganisms for varied applications that are discussed in part XI on industrial microbiology. Parts VII to IX deal with principles of virology, medical microbiology and immunology, the knowledge of which will help students understand host–parasite interactions, host defense mechanism, viruses and cancer, development of antibiotic resistance and related concepts. Part X covers principles of microbial ecology required to understand use of microorganisms in agriculture practices and waste water treatments, and related applied fields. Each chapter is divided into sub-titles like objectives, overview, summary and key terms. At the end of each topic a small questionnaire is provided in the form of 'Ask your self' to enable the reader to reproduce what has already been presented in that section. Appropriate illustrations make the understanding of concepts more easier. The book thus is very well suited for the courses mentioned.

However, if the book is not considered as the reprint of the book *Microbiology: Concepts and Applications* published by the same authors in 1993 as there is minor change in the title, information gathered in the subject from 1993 till date should have been covered, some of which are plant–microbe interactions, microbial diversity in extreme habitats, biogas, biofuel, emergence of antibiotic resistance, new viral infections, etc. This is required because citing the publication year as 2010 in the book under review gives a false impression to the reader that the book has updated information till 2010.

ANJANA J. DESAI

Department of Microbiology,
Faculty of Science,
M.S. University of Baroda,
Vadodara 390 002, India
e-mail: desai_aj@yahoo.com