of the view that there is no sharp dividing line between basic and applied research and that a thorough knowledge of theoretical chemistry is a prerequisite for solving industrial problems. An excellent example of this was Bhatnagar's solution of a difficult problem faced by Steel Brothers in oil drilling, that of coagulation of mud during drilling operations. Various elaborate chemical and mechanical methods suggested failed to prevent coagulation. Bhatnagar, with his knowledge of colloid chemistry, suggested using certain Indian plant gums to keep the mud in a colloidal condition. This simple method was highly successful. This may be regarded as the beginning of the industry–academia partnership in India. Synergy with research has been the strength of Indian industry ever since. The growth of the Indian pharma industry to its present status as a global player for supply of generic drugs is a striking example of the result of such synergy.

Steel Brothers were so pleased with the solution of their problem that it offered Bhatnagar monetary rewards. Consistent with his idealism he got this offer converted into a grant to his laboratory and scholarships for research students. This again earned him much accolade and consequently University Chemical Laboratories, began to attract the attention of industry more and more.

The fascinating story of the setting up of the Board of Scientific and Industrial Research (BSIR) and of CSIR, and the subsequent setting up of the National Laboratories is described in some length in the book. It is not generally known that the rapid development of the Science and Technology (S&T) structure in independent India was the result of the convergence of two science and technology streams, the national movement stream and the colonial government stream. The initiative for the former was taken as early as 1934 by a few scientists in Calcutta, which included J. C. Ghosh and M. N. Saha, who started drawing up a National S&T Plan, and in 1938 advised Subhash Chandra Bose, then President of the Indian National Congress, to constitute a National Planning Committee with Pandit Jawaharlal Nehru as the Chairman. This committee set up 29 sub-committees concerned with different areas of industrial development, which submitted their reports by 1939. These sub-committees were also instrumental in bringing together, for the first time, political leaders, scientists, industrialists and economists on one platform, so that an independent India could, without waste of time, start implementing the plans for scientific, technological and industrial development.

After the start of the Second World War, the Government of India, as a measure of economy, decided to reduce governmental expenditure on S&T development. However, Sir A. Ramaswami Mudaliar, Commerce Member in the Viceroy's Executive Council, was a patriot with a vision of the country's long-term development. While approving that the Bureau of Industrial Intelligence and Research be shut down, he recommended the establishment of a Board of Scientific and Industrial Research to coordinate and direct the work in all scientific institutions towards helping in the war effort.

Bhatnagar was the obvious choice to head the Board because of his demonstrated experience of industrial research and leadership qualities. In 1940 he joined the BSIR as its first Director. The next development was the formation of CSIR in 1942, as an autonomous body to control and administer all S&T developments, including funding of projects in universities. Plans for setting up of 11 specialized National Laboratories were drawn up between 1942 and 1947, and the foundation stones of four were laid even before independence. After independence Pandit Jawaharlal Nehru became Chairman of the Governing Body of CSIR/BSIR. In the very first Governing Body Meeting held on 25 August 1947, immediate decisions on S&T and industrial development could be taken because the necessary groundwork had already been done. And the developments since then are quite well known. If India is shining today, it is because of its S&T strength, the foundations for which were laid by bureaucrats like Ramaswami Mudaliar, scientists like Bhatnagar and political leaders like Pt. Nehru, who were committed to protecting national interest in their own spheres of activity, and saw in science and technology the instrument needed for social transformation.

This biography makes fascinating reading for those interested in the history of S&T development in modern India and of the persons behind it. It should be included in the science teaching curriculum of schools and colleges.

This biography was first published in 1948 by New Book Society of India, New Delhi, and has been long out of print. The book has been recast by NISTADS, an index appended, original photographs digitally retouched, new ones added and a brief glimpse of Bhatnagar by the Director, NISTADS included, all of which adds to its value. NISTADS has indeed rendered a great service by publishing this edition of the biography of Shanti Swarup Bhatnagar, one of those visionaries who played a vital role in building the edifice of scientific and industrial research in modern India.

I have not been able to understand the purpose of reproducing in this new edition a note from the publisher on p. 240 (titled reprinted from the blurb) containing disparaging remarks about Bhatnagar, both as a scientist and as a person, which, to say the least, is in extremely poor taste. Let the reader judge the scientific, technical and managerial contributions of Bhatnagar from the biography. I hope the publisher will remove this meaningless note from future reprints.

NITYA ANAND

Lumbini,
B-62, Nirala Nagar,
Lucknow 226 007, India
e-mail: nityaanand@sify.com

Annual Review of Phytopathology 2004. Neal Van Alfen *et al.* (eds) Annual Reviews Inc, Palo Alto, CA 94303-0139, USA. Vol. 42. 498 pp. Price: $74.

Annual Review of Phytopathology published since 1963 is a very useful and comprehensive resource for updated research in plant pathology. This is how it was and is now, as it covers the significant developments in the field of phytopathology, including: pioneer leaders, development of concepts. plant disease diagnosis, pathogens, host–pathogen interactions, epidemiology and ecology, breeding for resistance, plant disease management and some special topics. The present volume has contributions on most of these aspects which add immensely to the knowledge of the readers. To signify that this is the genomic era, it also carries two contributions, one on the genome analysis of bacterial wilt pathogen, *Ralstonia solancearum* and the second, on the comparative genomics of two bacterial pathogens of citrus, *Xanthomonas citri* and *Xylella fastidiosa*.

One might wonder if the Annual Reviews still covers all plant pathogens. The answer is 'yes, it does, even in the present volume

of 2004' as the reader gets to read the latest on plant viruses (tobacco mosaic virus, viruses that are transmitted by fungi, satellite viruses), nematodes (their evolution and molecular diagnostics), fungi (*Fusarium* that causes head blight of wheat and barley) and a whole lot more, in proportion, on bacteria (that includes chapters on their detection/diagnosis, genome analyses, microbial diversity and type III secretion systems [TTSS] in bacterial diseases). Therefore the *Annual Review of Phytopathology* stays true to its original character while it has gotten better by providing the readers with the best and the latest.

Perhaps, I am biased in saying that in the present volume phytobacteriology appears to occupy the centre-stage. Anne Vidaver, a well-known bacteriologist at the University of Nebraska-Lincoln writes the prefatory chapter (which is devoted to pioneer leaders) and concludes with her remarkable prophetic write-up on challenges in plant pathology (projections to 2025). Dr Anne Alvarez, University of Hawaii, well known for her work on the development and use of monoclonal antibodies (MAbs) for the detection of pathovars (races) of plant pathogenic *Xanthomonas*, including *X. oryza* pv. *oryzae* (causal agent of bacterial blight of rice) and several other xanthomonads in ornamental crop plants, documents the use of MAbs and all the different rapid molecular tools that are now being used to detect plant pathogenic bacteria.

There are two other chapters devoted to aspects relating to plant pathogenic bacteria and these I consider as the jewels in the crown of the present volume. These are (i) A chapter by Allen Collmer (Cornell University, Ithaca, NY) and James Alfano (University of Nebraska-Lincoln) who describe TTSS as double agents in bacterial disease and in their defence on the basis of emerging information from bioinformatic methods in different pathogen genome projects. They describe [through a developed model] the TTSS-secreted proteins as molecular double agents that betray the pathogen to plant defences in some interactions and suppress host defences in others. (Examples cited are, flagellin of *Pseudomonas syringae* and harpins of *P. syringae* and *Xanthomonas campestris*). (ii) The chapter by Moreira *et al.* (University of Sau Palo, Brazil) that provides a glorious in-depth analysis on the comparative genomics of two bacterial pathogens of citrus, *Xanthomonas axonopodis* pv. *citri* (XAC) (syn: *Xanthomonas citri*) and *Xylella fastidiosa* (XF). They provide a list of genes that are over represented in XAC and list pairs of genes that they consider as XF-XAC-specific genes/gene clusters which are important to the colonization of citrus (sweet orange) in their particular environment and also for their survival. Interestingly, there are no common set of genes that could be related to life in the same host.

These are some of the genuinely good attributes of this volume. The editors consciously have put together the best of leading plant pathologists as writers of the chapters or contributions, which makes the volume very, very worthwhile. These contributions which are contained in this volume do justify well the high rank (#5 by impact factor) it enjoys among 136 other plant science publications assessed by the ISI Journal Citation Reports (JCR). Overall, it is a symbol of the celebration of the science of plant pathology, again in 2004. I whole-heartedly commend the volume to everyone including student/scientist, interested in plant pathology, microbiology and plant-associated bacteria.

SAM S. GNANAMANICKAM

Department of Botany,
Centre for Advanced Studies in Botany,
University of Madras,
Guindy Campus,
Chennai 600 025, India
e-mail: gmanick@vsnl.com