for water supply and sanitation services and the national government for setting standards for these activities. National government also has the responsibility of managing all water resources following the guidelines of IWRM, including local climate, hydrology, culture and customs of traditional communities. Some fundamental principles followed in making new water laws are noted here. (1) Water is considered a national resource, wherever it occurs and the State is the public trustee and custodian of water resources. (2) A river catchment in the unit of management. (3) Sufficient water is to be kept as reserve for basic human needs, ecological requirements and international obligations. (4) Economic incentives are to be given for conservation and valuable use. Using these basic premises and soliciting public opinion on these, two public laws were enacted for implementation: (i) Water Services Act on water supply and (ii) National Water Act on managing water resources. Because South Africa followed WCD and IWRM guidelines in water infrastructure projects, there have been fewer public protests on dam projects. On the other hand, considerable opposition is building on the privatization of water services.

Chapter 10 discusses that the conventional norms and institutions built around them are not meaningful in dealing with a multidimensional yet local resource such as water. Although international networking of experts and social activists helped in bringing forth the concept the IWRM, it did not help in making regimes or institutions on a global scale. Neither the State nor science has come up with any robust governing norms of water resources on either local or global scale. Controversies and conflicts over damming of rivers and marketization of water are only on the increase. Globalized societies with a diversity of views, experiences and of interests could only make the conflicts not only unavoidable, but unresolvable. The author concludes that we need to accept the social conflicts on environmental resources such as water as a reality and the norms of governance should include effective dialogues of all stakeholders.

The book is well organized. The water issues discussed here are of concern to all, notably water planners and policy makers. Some of the basic principles and objectives in making water laws in South Africa a decade ago are relevant to India. Information and knowledge to be gained from the book have the potential of developing a new paradigm on the economic development of populous nations. The book is for a serious reading of all concerned citizens.

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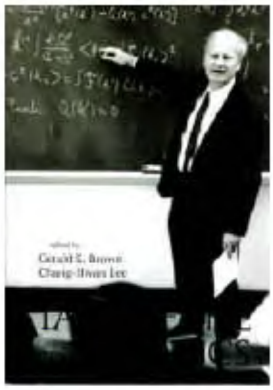

**Hans Bethe and his Physics.** Gerald E. Brown and Chang-Hwan Lee (eds). World Scientific Publishing Company Pte Ltd, New Jersey, USA. 2006. 314 pp. ISBN 9812566104 (paperback).

Hans Bethe (1906–2005) was the first man to win the Nobel Prize in Physics for his work in the field of astrophysics. In 1967, he was awarded the Prize 'for his contributions to the theory of nuclear reactions, especially his discoveries concerning the energy production in stars'. As we learn in the Preface, the present book is aimed at explaining Bethe's physics to the world.

In the first chapter 'Hans Bethe and his physics', Gerald E. Brown summarizes Bethe's important scientific contributions that are elaborated in Parts 2 and 3 of the book. Bethe's work on the splitting of atomic energy levels when an atom is inserted into a crystal, and the theory of metals are elaborated in 'Hans Bethe's contributions to solid-state physics' by N. David Mermin and Neil W. Ashcroft. Bethe's contribution to the theory of nuclear matter is discussed by Jeremy Holt and Brown in 'Hans Bethe and the nuclear many-body problem'. In 'Stellar energy generation and solar neutrinos', John N. Bahcall and Edwin E. Salpeter mention that Bethe did not return to astrophysics in earnest until 1978. In the 1950s and 60s, there was indirect impact on astrophysics due to Bethe. The turning point in the history of science, i.e. the calculation of the Lamb shift for real electron was done by Bethe in a train, while he was travelling from New York to Schenectady. With that he laid the foundation for the development of modern quantum electrodynamics. Freeman Dyson in 'Hans Bethe and quantum electrodynamics', illustrates this part of the story.

Part 4 of the book tells us about Bethe's social and political life. It explains his concern about the national and international politics, especially for peace and disarmament. This may seem contrary to his work on the making of the atomic bomb. It can be understood, if one considers that he was forced to flee from Germany. So far as the making of the hydrogen bomb was concerned, Bethe has justified in an interview as quoted by Sidney Drell (p. 254). It reads 'Just a few months before, the Korean War had broken out, and for the first time I saw direct confrontation with the Communists. It was too disturbing. The cold war looked as if it were about to get hot. I knew then I had to reverse my earlier position. If I didn't work on the bomb, somebody else would – and I had the thought if I were around Los Almos, I might still be a force for disarmament. So I agreed to join in the developing the H-bomb. It seemed quite logical'.

Bethe did not forget his European roots as Christoph Adami elaborated in 'Three weeks with Hans Bethe'. It is based on the author's personal diary. We learn that Bethe's research style was influenced by Arnold Sommerfeld and Enrico Fermi. He combined the methods of both, i.e. Sommerfeld's rigorous complicated mathematical techniques for a quantitative analysis and Fermi's shortcuts towards approximate results and to utilize the light touch of intuition (p. 116).

Experts from each of the mentioned fields have contributed papers. Not surprisingly, Bethe's scientific work has been explained well and the editors have accomplished their task.

Unfortunately, the book does not include an Index.

The editors have done a commendable job regarding the history of science. We

find information about Bethe's papers, correspondence, reports, etc. (pp. 312–313). From the history of science point of view, there are a few critical points. For instance, Hans Bethe in the chapter 'My life in astrophysics' (p. 34) mentions a rather absurd episode. 'Nobel's wife, he (Mr Rydberg of the Nobel Foundation) told me, had run-off with one of the leading mathematicians and astronomers of the time. So the Prize bequest had specified that the work honoured had to have practical application and that neither pure mathematics nor astronomy could be considered. Otherwise, Nobel feared, this man would have been one of the first winners'. However, historians of science have not been able to confirm such a story.

As the authors knew Hans Bethe personally (they were his friends, students and collaborators), it is understood that their views are subjective. Bethe has been presented as a man with no flaws.

The book is recommended for historians of science as well as scientists. It gives not only glimpses of Bethe's life, but also development of physics in the twentieth century.

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**The Atlas of Ideas: How Asian Innovation Can Benefit Us All.** Charles Leadbeater and James Wisdon. Demos, Third Floor, 136 Tooley Street, London, UK, SE1 2TU, London. 2007. pp. 48. ISBN: 1 84180 174 7. Licensed under Creative Commons.

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**South Korea: Mass Innovation Comes of Age.** Molly Webb. Demos, London. 2007. pp. 63. ISBN: 1 84180 171.0. Licensed under Creative Commons.

e-mail: hello@demos.co.uk; Cost of the pamphlets put together is British £40. Each costs £10. Electronic version is free to download under Creative Commons license.

It is difficult to believe that these four pamphlets with such abundance of data and insights have resulted from a mere 18-month study of science and innovation in Asia called *The Atlas of Ideas*.

The Demos team concludes rightly that the US and European pre-eminence in science-based innovation can no longer be taken for granted. Nor can the knowledge jobs that depended on it. The rise of China and India is sure to remake the innovation landscape. Every now and then, major newspapers and magazines report stories of incredible achievements from cities such as Shanghai, Beijing, Chongqing, Bangalore, Hyderabad, Chennai and Seoul. In a sense, this is similar to what happened in the mid-twentieth century, when the centre of gravity of science and innovation shifted from Europe to USA.

No doubt, both China and India face huge economic, social and environmental challenges, but both these nations believe that massive investments in science and technology can help them overcome these challenges. China has already started making such massive investments and India is following suit. In India industry has acquired a new confidence, with leading Indian companies acquiring much larger companies elsewhere in the steel and aluminum sectors. Pharmaceutical companies have graduated from what the Western press used to describe as copycats to partnering in R&D with international pharma majors. Both the Indian and the Chinese economies are growing at a phenomenal rate. One hopes that the industry's growing sense of confidence soon rubs onto the scientific establishment in India. Unfortunately, say the authors, the Indian innovation system looks ramshackle and improvised.

South Korea's transformation from 'hermit kingdom' to a global technology power is truly dramatic. Compared to China and India, Korea is miniscule. However, the Koreans have shown phenomenal determination with their orderly innovation system consisting of the three policies of industrial techno-nationalism, scientific techno-nationalism, and ubiquitous innovation. Of late, Korea has started emphasizing on collaboration.

Demos believes that it is important for the United Kingdom to collaborate with these countries in research and innovation. Not just because of cost advantage, but because of a wider range of advantages.

The second phase of the *Atlas of Ideas* project will commence in April 2007.

These four pamphlets must be read by those involved in science policy making.

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