

BOOK REVIEWS

the people who may have built the monuments, the vandalism that many of these sites are subjected to, the importance of preserving and studying the sites further and their unique role in informing us about the age of their creators, in the absence of any written records of those periods. The book is well produced, is interesting to read and easy to understand and is reasonably priced. It deserves wide circulation.

Megaliths, as the book describes, literally mean 'built of large stones'. But not all megalithic structures are vast in size like Stonehenge. They come in various sizes and configurations; some are associated with burial sites, while others are not. They could be in the form of circles of boulders on the ground, grids of stones numbering as many as a few thousand sometimes aligned in cardinal directions, single standing stones called menhirs (which this reviewer first read about in the Asterix stories), menhirs grouped in patterns, small chambers called dolmens and in many other forms.

There are over 3000 megalithic sites in India, with a large number located in the south, but sites are known in many other parts of the country as well. These megaliths are associated with the Iron Age, with many sites believed to have been built between 1500 BC and AD 200, but the construction could have started earlier. European megaliths are believed to be much older, the earliest having been erected in the Neolithic or late Stone Age (c. 4000 BC to 1500 BC). While there are differences in type between megaliths in different regions, there are many similarities too even amongst sites which are far from each other and which were built centuries apart. The knowledge therefore could have been transferred in some manner across the great divides over space and time, or similar patterns could have emerged independently as different groups of builders passed through various stages of development. Erecting the megaliths would have involved considerable skills, effort, time and cost and the structures should therefore had great symbolic value and perhaps even some practical importance. Properly aligned structures would provide identification of the equinoxes and solstices, and the cycles of the Moon.

All these matters and more are described concisely and yet lucidly in the book. The first four chapters provide an introduction to megaliths in general and

Indian megaliths in particular, and a discussion on who the megalith builders could have been and their life as gathered from artifacts found at the sites and cave and rock paintings near the sites. Chapter 5 presents a detailed description of important megalithic sites in Karnataka and Chapter 6 has a discussion of megalithic architecture. The next two chapters have various speculations and a discussion of possible astronomical significance of some of the megaliths. The book ends with some unanswered questions and, most importantly, a discussion of the blatant way in which many of the sites are being destroyed.

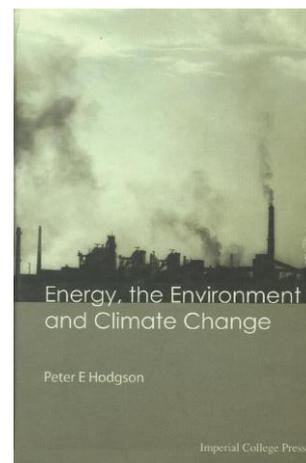
The book has many beautiful images of megalithic sites (taken mostly by the author). At the end there is a brief bibliography, a list of latitude and longitude of sites discussed in the book, and a map with known megalithic sites marked by Robert Brubaker. What is missing is a glossary of terms and a list of dates pertaining to various eras mentioned in the book; these would have been useful for the non-expert reader the book is directed at.

The author of this book, Srikumar Menon, is a person of many interests. Trained as an architect, he has a passion for astronomy and has spent time in astronomy institutes working on various projects. He has great interest in archeology of the Indian subcontinent. He now teaches at Manipal University and has research fellowships and projects for studying megalithic sites.

This interesting little book shows how important it is to document megalithic sites and to preserve knowledge about them for posterity. It should be possible to use modern technology to make detailed images and maps, and to record coordinates of all components of at least the most important sites. These would be fine projects for students working in a variety of fields, guided by people like the author who have a broad background and great interest. Information about the sites would then be available for analysis in the future, even when many of the sites are lost to human and natural depredation.

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Energy, the Environment and Climate Change. Peter E. Hodgson. Imperial College Press, 57 Shelton Street, Covent Garden, London WC2H 9HE, UK. 2010. xxi + 202 pp. Price: US\$ 105.00.

Peter E. Hodgson, the author of this book, passed away on 8 December 2008 at a ripe age of 80. It rarely happens that one gets to write a book review much after the author's demise. Unlike many fellow scientists, Hodgson was active till the very end. Barely two months before his demise, he was designing new courses for university students and was also simultaneously working on two books. The first being this book and the other being one on Galileo.

Hodgson specialized in nuclear physics and was a lecturer at Oxford. His association with nuclear research goes back to 1950s. Appropriately so, this book is not as much about energy, or environment or climate change (notwithstanding the title), as much about nuclear energy. Nuclear energy remains the central theme of the book from the very onset to the end; discussions of everything else, including other energy options, environmental concerns and climate change are just supportive and peripheral to its seamless narrative. The author especially seems concerned about the nuclear naysayers. The editorial review fittingly summarizes it, '... the book contains many interesting facts, thoughts, and counterarguments to nuclear naysayers'.

One of the most notable features of this book is its lucid, easy and popular writing style. It is less intended for the specialists but more for a generalist audience. It has succeeded immensely in presenting a complicated subject in an interesting story format. However, the

story remains incomplete with the demise of its author in 2008, as it largely snapshots a period prior to 2008 or even much before in many instances. As a consequence of this lag, any reference to the forward march of shale gas, an energy game-changer, is absent from this book as is the Fukushima disaster and its consequences – an important milestone in the future of nuclear energy. Readers today will certainly be interested in knowing how these new developments have impacted the cost competitiveness, safety concerns and other such calculations of nuclear energy presented in this book.

The book has a total of ten chapters. In the very first chapter, Hodgson talks about the global energy and supply imbalance and the resulting energy crisis. Chapters 2 and 3 discuss different energy sources, with the former introducing the non-renewable energy sources of coal, oil and natural gas, and the latter introducing the renewable energy sources, i.e. hydro, wind, solar, tidal, wave, geothermal, ocean thermal, biomass and hydrogen. Chapter 4 is exclusively devoted to describing nuclear energy. Chapters 5 and 6 compare the performance of different energy sources on their safety and environmental pollution concerns. Chapter 7 discusses the climate change challenge. In the last three chapters Hodgson discusses political, psychological and moral questions related to energy choices.

Hodgson argues the case of nuclear power for its possibilities in providing energy security to energy impoverished nations, energy access to all especially in developing countries, a solution to environment pollution (land, air and water pollution) and, a must-have solution, if humanity wishes to contain global warming at safe levels. He provides a number of useful and illustrative tables comparing the cost-effectiveness, relative pollution and safety hazards from different energy sources, including nuclear. In my opinion the treatment in chapter 7 titled 'climate change' is less than adequate and is not rigorous. Hodgson selectively quotes some of the non-scientific books written on this highly debated issue. He however fails to quote the new and advanced literature on climate change, which could have further supported his ideas and arguments. Selective referencing remains an issue in other chapters as well.

Despite the obvious potential to address the pressing problems of energy security, energy access, environmental degradation of land, air and water, and climate change, development of nuclear energy has not progressed in the desired manner, largely owing to the safety concerns. In Hodgson's words 'It is quiet extraordinary that many excellent books on energy crisis, global warming and climate change ..., make only briefest reference to nuclear power, brushing it aside with few critical remarks about nuclear accidents and the disposal of nuclear waste'. He argues that the average number of deaths associated with the production of every 1000 MWy of electricity is 40 for coal, 10 for oil, 3 for hydroelectricity, 5 for wind, 5 for solar PV and only 1 for nuclear power. He further argues that there are about 16,000 deaths each year due to emissions from coal power stations in the United Kingdom alone, and from 1976 to 1982 there were 1102 deaths due to oil-tanker accidents, and 'these deaths could have been avoided if they (coal/oil-based power plants) had been replaced by nuclear power'. This discussion reminds me of the concerns many people have about air travel, compared to travelling by road or rail, while many times more people have died in road or rail accidents than say in air crashes. However, I feel what drives the paranoia for nuclear or air travel is the sense of helplessness, and a sense of being not able to do anything in the event something goes wrong? Another major concern that led many to denounce nuclear energy is the nuclear proliferation concern. In the words of Mohamed ElBaradei, the former Director General of the International Atomic Energy Agency, 'should a state with a fully developed fuel-cycle capability decide, for whatever reason, to break away from its non-proliferation commitments, most experts believe it could produce a nuclear weapon within a matter of months'. Hodgson dodges this important concern.

Nuclear power generation first started in the mid-1950s and then it steadily increased throughout the 1960s. The Three Mile Island and Chernobyl accidents struck in the 1970s and 1980s respectively, which effectively stalled the rapid development of new nuclear power plants. Today nuclear power produces more than 10% of the world's electricity. This is contradictory to the author's claim that 'there seems to be a widespread and

deep-seated psychological aversion to nuclear power'. Negative public sentiments in the wake of nuclear accidents and high initial investment costs have certainly gone against its appeal. However, the author's observation is certainly justified to some extent in the context of the Fukushima disaster (which of course is not discussed in the book). Post-Fukushima, a sudden fear psychosis gripped people's mind across the world. In 2011 alone, worldwide nuclear output fell by 4.3%, the largest decline on record. About 25,000 people died due to tsunami and earthquake, while no fatality was reported due to nuclear radiation alone. Experts suggest that cancer risks in future will remain low.

Though the book was not written keeping in mind the Fukushima disaster and its fallout on the nuclear energy industry, it provides a timely and soothing reassurance about the safety of nuclear energy while stressing the fact that nuclear energy cannot be ignored as its successful deployment is essential for addressing global environmental problems of local air pollution, climate change, energy security and world peace.

Hodgson was a deeply religious man. He worked devotedly to integrate science and religion. He sincerely thought that nuclear energy is the answer to the world's pressing problems of energy security, energy access, global peace, environmental degradation and climate change. However, deluded deeply by the perceived misinformation (on nuclear energy) by vested interests and media indifference, he lost hope in the earthly beings and rested his hope for a nuclear revival with the church's advocacy. Though post-Fukushima, opponents of nuclear energy have become more vocal and influential. However, the potential of nuclear as 'low carbon energy source' cannot be denied. This book certainly forces us to rethink whether the decarbonization of global economy is delayed or undermined due to our prejudices and biases towards nuclear energy – if so, humanity may end up paying a heavy price for this.

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