Section 6.2 presents a bird song signal as the starting example (figure 6.8), but forgets it (in the maze of performance specifications and synthetic signals) until sec. 6.3.2.2 when it becomes 'Noisy Minor song signal'. The original time-function should have been given before figure 6.8 (Is figure 6.20(a) this time-function?). How about a comparison with windowed Fourier transform as applied to this signal? By the way, is the bird song an illustration of an FM signal?

Among mathematicians, a natural tendency is to generalize the latest results (obtained mostly by pioneers) to various spaces of functions. But it is not made clear how these generalizations can solve the existing practical problems.

Chapter 7 deals with certain classes of TFR having, what the authors call, *covariance property* with respect to 'TF displacement operators'. The mathematics is interesting and impressive but it is not clear what practical implications the proposed (generalized) framework has (as applied, for instance, to speech signal processing).

Chapter 8 describes a 'reassignment principle' meant to 'sharpen' TFR and time-scale representations. When do we know whether reassignment is required or not? Is it by human visual pre-processing or what? Can we decide upon stationarity, or otherwise, of a signal automatically?

In what sense is equation (8.3) 'closely related' to equation (8.2)? Why cannot primitive wavelet functions be synthesized to extract 'chirps' from signals (as presented in sec. 8.2.1)?

The general comments, first on page 236 (before the start of sec. 8.2.2) with respect to the limitations of (a) short-time Fourier and wavelet transforms and (b) Wigner–Ville distributions; and next, on page 264, while critically examining the implementation of the proposed reassignment principle, are revealing.

Chapter 9, which deals with TFR and array signal processing contains a clear description of the linear mathematical models for signal-to-noise ratio enhancement and blind source separation, among others. It would be interesting to know how the second and higher-order statistics (of signals) are related to TFR?

Chapter 10 examines a class of TFRs that are covariant to time shifts matching changes in the group delay function of the signal under consideration. It is strange that *no* (a) reference to and (b) comparison with short-time Fourier transforms have been made. Given a signal, how would one know what TF structure it corresponds to (so as to be able to choose the appropriate class of TFR schemes, from among the multitude in figure 10.4)? The listing of so many classes of TFR without motivation is confusing. Only one real-life example of the impulse response of a steel beam is given, and this too without the time-plot of the signal under consideration! What is the goal of analysing such a signal? How did the author choose the TFR schemes?

Chapters 11 and 12 seem to be out of place in this collection. How are self-similarity (SS) and intermittency properties of certain stochastic processes in any sense related to TFR? What is the motivation for choosing wavelet decomposition to deal with SS in Gaussian processes? Why not TFR? In Chapter 12, what is the role of wavelet transform-based compression in TF analysis? What has localization of signal properties to do with thresholding and compression?

Chapter 13 contains an interesting application of 'wavelet filtering' (due to Donoho and Johnstone) to the extraction of 'coherent structures' of turbulent flows (described by Navier–Stokes equations). It is not clear how accurate the results in practice are, and whether there is any 'compromise between accuracy in coherent vortex simulation and computational cost' in the light of comments made in the introduction (of this chapter).

To summarize, the book is of doubtful value to students and of marginal utility to specialists.

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Environmental Science. S. Ignacimuthu. Phoenix Publishing House Pvt. Ltd. 21, Prakash Apartments, 5, Ansari Road, Daryaganj, New Delhi 110 002. 2003. 274 pp. Price not mentioned.

Environmental science, with its multidisciplinary approach, has attained significant position as a scientific discipline. It is important for each citizen to understand about his surroundings. There is enormous information emerging from economic, ecological, political, sociological anthropological, legal and ethical considerations and there is need to bring in latest information and developments such as biosensors, role of biotechnology in remediation and conservation, global warming, carbon cestration and spin-off of various other disciplines such as nanotechnology.

The book under review serves as source material for students and teachers of environmental science. The book has been divided into five units: structure and function, environmental resources, environmental factors, environmental pollution and remedies, and environmental laws and ethics. After each chapter, a study outline, questions and references have been provided.

Each unit is again subdivided into several chapters. Unit 1 deals with ecosystem structure and functions, energy flow, bio-geo chemical cycle in the environment and habitats.

Unit II deals with environmental resources such as natural resources, biological resources and human resources. Natural resources include mineral resources, forest resources, land, water, atmosphere and energy. Biological resources contain crop and animal resources, but details of conservation and endangered species, gene bank and plant tissue culture which have been included here, should have been treated separately as tools to enhance resources. Chapter 6 on human resources deals with human population, health, disease causative agents and impact on animals and vegetation. These aspects should have been treated as a separate chapter on human ecology rather than on human resources.

Unit III deals with abiotic and biotic factors. The basic information for readers will help them to understand about various resources in a better manner. Hence these aspects should have been placed as Unit II.

Environmental pollution and remedial measures, and environmental biotechnology are placed in Unit IV. These chapters have been presented well compared to all other chapters, explaining the various polluting agents, waste treatment, biodegradation, restoration of degraded land, etc.

Unit V deals with environmental laws and ethics and environmental education. These chapters provide a brief account of existing environmental laws and acts.

Details of environmental education available have been explained. The last chapter deals with environmental ethics.

While presenting the subject, the author should have used a more practical approach so that there is an easy flow of thought from the ecosystem concept to perturbations and use of modern tools to overcome the problems. Normally, when environment and ecology are introduced, the habitat and ecosystem concept should come first followed by details of abiotic and biotic factors. Nutrient recycling and energy flow should follow this with productivity, production and resources, both biotic and abiotic. This should be followed by various polluting agents, changes in the normal component of the environmental segments followed by human ecology. Biotechnology as a tool to restore the ecological balance and environmental factors with existing environmental laws and ethics should be followed by environmental education. The continuity and linkages of sentences are inappropriate, thus rendering difficulties in understanding the concepts by the reader. Many errors have also crept in throughout the book.

On the whole, it is disappointing to note that such a wonderful subject as environmental science has been presented in this manner. Though all the basic concepts relating to environmental science have been covered, the real flavour and level of description is intermediate and from the users' point of view, it is a bit confusing as the author has tried to introduce many concepts within the framework of environmental science.

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The Fire Within. Hari Narain. Association of Exploration Geoscientists, CEG Building, Osmania University, Hyderabad 500 007. 2004. 253 pp. Price: Rs 400.

This book encapsulates the thoughts and vision of Hari Narain, a doyen among Indian earth scientists, who rightfully belongs to the galaxy of nation builders that began to emerge after independence. His contributions to post-independence earth sciences laid a solid foundation for indigenous research. An academic scientist himself, he had led a number of successful geophysical explorations for hydrocarbons and minerals that helped the expansion of industries based on such resources. Undoubtedly, he is one of the most influential earth scientists in India, who has shaped up many earth sciences institutions, most importantly, the Research and Training Institute in the Oil and Natural Gas Commission, Dehra Dun (now known as Keshav Dev Malaviya Institute for Petroleum Exploration) and the National Geophysical Research Institute (NGRI), Hyderabad. It was during his long tenure that NGRI developed into a thriving geophysical laboratory, the only one of its kind in the country. He also served as the Surveyor General of India for four years and was also a member of the first National Committee on Science and Technology. His services in the field of education are equally exemplary; he was the Vice-Chancellor of Banaras Hindu University (BHU) during a troubled period. A timely publication, *The Fire Within* celebrates Hari Narain's 81st birthday and 50th anniversary of his marriage; it constitutes a selection, made by his family, from among the general articles and lectures and reflections published over a period of 55 years. Among the themes covered are his vision on education, role of science in nation building, conservation of natural resources and rural development. Some are reminiscences, revealing the pain, pride and romance in building institutions; there are also a few essays on religion and Indian culture. The book wraps up with his thoughts on the status and prospects of earth sciences in India.

In the first part of the book one can trace the background and development of the author's views on education. BHU, with which he had intimate knowledge, is a microcosm of the higher education system, with all its strengths and weaknesses. He uses his experience as a mirror to reflect the problems of university education in the country at large. While taking pride in the age-old Indian tradition in education, he laments at the current falling standards in teaching as well as in learning. He lists several measures to improve the system. These include: restricted admission, open only to those who have the aptitude for higher learning (others should be diverted to vocational training), stringent selection method for teachers and better monitoring systems of their performances before they are made permanent, developing self-sustaining means of generating funds; selection of Vice-Chancellors based only on merit (not creed, caste, or religion); and better professional tie-up with research organizations and industry. The author's concern for the education sector is not confined to the university system alone; in fact, he presents a broader framework for an enlightened educational pattern. For example, in a letter to the minister for Human Resources Development, he narrates how to restructure the educational structure by giving importance to vocational training at the secondary level, thus making education more need-specific. The consequences of neglecting primary and secondary education in the country, where the drop-out rate is high are pointed out as another serious problem. One suggestion he makes here is that some universities, possibly one in each State, could be asked to take up the additional responsibility and function as a rural-cum-open university. This arrangement will work as a training programme in health, hygiene, land–soil–water management, agriculture, cottage and small-scale industries, etc. for the rural population.

In his scheme on integrated rural development, a major focus of this book, he further elaborates on his plan of action, which was submitted to then Prime Minister, Rajiv Gandhi in 1985. In fact, variations of this village-specific development scheme have been put to practice in some states like Kerala and West Bengal and to some extent in Madhya Pradesh. I doubt whether Hari Narain got the credit that is due to him for initially unravelling this plan, and for his tireless efforts in propagating its virtues (an example is the Karimnagar experiment on integrated rural development initiated by CSIR in 1971, with which Y. Nayudama and Hari Narain were closely involved). Some articles in this book focus on the application of science and technology to address issues like rural poverty and conservation of natural resources. The author realizes that the problems in India with its huge rural population, are vastly different from the Western countries – the reason why he always stresses the social role of science.

In an article entitled 'Science and technology for development', the author elaborates on his criticism of the standard of research in basic sciences in the coun-