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## BOOK REVIEWS

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**Fuelwood from Wastelands** by O. P. Vimal and P. D. Tyagi (Published by Yatan Publications, 208, Defence Colony Flyover, New Delhi 110 024), 1986, pp. 376, Price Rs. 250.00 and US \$40.00.

The wastelands, though not clearly defined in our country, has a great potential to raise tree crops. With the impending woodfuel crisis, there is a concern and need to develop wastelands to meet the fuelwood demands. In this direction lot of publications have been coming but this book tops as a very exhaustive and informative work on the subject of suitability of tree species, both indigenous and exotic for wastelands.

This book is in three parts, of which Part-I is an overview highlighting the various uses of wood in eight chapters followed by five appendices. Nearly 68.5 % of the domestic cooking is by fuelwood in rural areas and is mostly gathered free of cost by villagers. This pattern of consumption is likely to continue and has been depicted in Chapter 1, with suitable tables.

Chapter 2 deals in detail with the present social forestry projects in India, their concept and objectives. Our country is heading towards an energy crisis and so energy forestry should get the required priority in our developmental plans. The growth data (diameter) of several energy trees have been given but they are not comparable since the growth depends upon the quality of the site, management practices and age. However, they have suggested that the current agricultural techniques should be employed to maximise productivity of Energy forests.

Chapter 3 details the extent of wastelands of different categories and their characteristics. They have also suggested suitable species for each category of land concluding that the choice of species depends to a large extent on soil characteristics.

Nitrogen fixing tree species play a major role in improving wastelands and has been highlighted in Chapter 4. Fuelwood is directly burnt to obtain energy in developing countries like India and so only surplus fuelwood (biomass) could be utilized in wood conversion process like carbonization, pyrolysis and gasification. This is dealt in Chapter 5. Gasifiers will be feasible only when they are supported by their own energy plantations. Chapter 6 deals with power generation from energy plantations. Fast growing short

rotation tree species, being renewable natural resources, should meet our future energy needs. In order to close the widening gap between fuelwood demand and supply, several wood saving improvized chulas (stoves) have been developed in our country and are enumerated in Chapter 7. In the concluding remarks (Chapter 8), the need for proper choice of species, their improvement and selection for different agroclimatic zones have been stressed. A suitable policy, according topmost priority to fuelwood programme has been emphasized.

Valuable information such as chemical composition, nutritive value, yield of oils, waxes, gum, etc., of 86 tree species are tabulated in Appendices I to V. This compilation is very useful and could be stored in computer software for easy retrieval according to species, characteristics, climatic zones, uses or soils.

Part II gives a detailed description of 32 nitrogen fixing trees and shrubs whereas Part III deals with 55 non-nitrogen fixing trees and shrubs. The details are systematically given starting from the description of each species, their distribution, environmental requirements, method of establishment, fuel yield, chemistry and uses, etc.

Lastly, the bibliography has been arranged as, general, covering 169 references and species-wise, covering 85 species (both nitrogen fixing and non-nitrogen fixing separately) in 899 references. A subject (species) index has also been given for easy reference at the end.

In general, it is a very comprehensive compilation of existing data on tree species. There is a dearth of suitable reference books in forestry and therefore the efforts of the authors are timely and commendable. This would be a very useful reference book for forest and agricultural colleges and also for tree farming, as there is no single book that gives all such different information of 86 tree species. A few photographs would have enhanced the value of the book.

It is in hard cover but the price appears to be slightly on the higher side for Indian readers.

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**Text book of Vertebrate Embryology** by N. N. Majumdar (Published by Tata McGraw-Hill Publishing Co. Ltd., 12/4, Asaf Ali Road, New Delhi 110 002) 1985. pp. 334. Price Rs. 34.50.

Embryology, a premier discipline of Biology, has always been a progressively developing field, incorporating newer concepts from time to time. Trying to keep pace with this progress, several text books have appeared, with the primary objective of giving adequate information to students. It is gratifying to read this new text book on Vertebrate Embryology by N. N. Majumdar of the Delhi University. On several counts, this is an important addition to the existing literature on the subject.

The author begins with a generalized description of the development of a typical vertebrate, and the text gradually progresses to include detailed information on variations in the type/pattern of development in different groups of Vertebrates. Several general and important aspects of the developmental processes, viz. cell division, gametogenesis, protein synthesis, role of cytoplasm in development, etc. are presented, and contribute to a satisfactory treatment of the subject. Incorporation of the principles of experimental Embryology adds further value to the book. The appended glossary provides basic and immediate source of information to the readers. On the whole, the book offers the long awaited integrated information on the principles and patterns of vertebrate development and embryology.

Priced at a subsidised rate of Rs. 34.50 per copy, this could be regarded as the best among the books on vertebrate embryology by Indian authors and should be useful as a source book on embryology for students as well as workers on embryology.

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**Impact of Science on Rice**, International Rice Research Institute, Manila, Philippines, 1985, pp. 303. Price: Paperback \$19.70 (plus air mail. \$6.00 or surface mail \$2.00 Postage)

This is a compendium of the papers presented at the "Multilevel Symposium on Rice Research: Ac-

complishments and Challenges", June 5-8, 1985, organized by the International Rice Research Institute, as part of its 25th anniversary celebrations. Besides recording of the formal addresses by the Chief organizers and others who hosted the Symposium, the book carries the texts of papers presented by the representatives of international gathering. Ministers concerned of sixteen rice-growing countries of the world have presented the respective country's status reports on the advancements made in rice production. These countries represent the large, medium and small nations, in respect of area under rice. All of them have paid rich tributes to IRRI for its contribution to the increases in rice output.

The Director General of IRRI Dr. M. S. Swaminathan has reviewed IRRI's research from various angles, making out a strong case for more intensive research efforts in the future. He has indicated six major thrust areas of research and training and several approaches in achieving the set goals. The long term ecological and economic sustainabilities of rice production are to be covered through IRRI's international programmes to be further intensified in the coming years.

The management of agricultural research in the context of world and Asian food production programmes and the role of IRRI in support of such programmes have been emphasized in a few papers. More emphasis has been laid on cooperative research at the international level and with the other International Research Institutes under the Consultative Group for International Agricultural Research (CGIAR), in another set of papers.

The future lines of research have been indicated not only by the Director General of IRRI but also by five other papers presented under the Group 'Forward Edge' and by the first Director General, Dr. R. F. Chandler Jr. in the closing session of the meet.

The book is a very important historical document as well as a pace-setter for future scientific approach in rice research and development in the world.

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**Interpretation of Complex EPR Spectra** by G. M. Zhidomirov, Ya. S. Lebedev, S. N. Dobryakov, N. Ya. Shteinshneider, A. K. Chrikov and V. A. Gubanov., (Published by Oxonian Press Pvt. Ltd., New Delhi, 1985 pp. 249, Price: not known).

The EPR methods find diverse applications in the solid state, transition metal chemistry, free radicals, radiation induced chemical processes, mineralogy, catalysis and kinetic investigations. EPR is useful wherever unpaired electrons and nonsinglet states of paramagnetic ions are involved in low concentrations. The interpretations of EPR spectra involve the spin-Hamiltonian method wherein the spin variables are used for the calculations. This book deals with the analysis of EPR spectra based on the spin-Hamiltonians encountered in practical applications. Of the four chapters, the first one deals with the interactions determining the form of spin-Hamiltonians for the EPR spectrum of a paramagnetic particle. Discussion encompasses the cases of free radicals and ionized defect centers in solids, triplet states of molecules and paramagnetic ions with incomplete d-orbitals. The second chapter contains the analyses of isotropic EPR spectra with the hyperfine structure. Theoretically calculated spectra of complex situations require larger number of parameters that determine the form of the spectra. The reconstruction of EPR spectra from a larger number of Lorentz and Gaussian lines is only marginally adequate for the isotropic spectra since proper selection of magnetic parameters and the correlations with the hyperfine constants are more arbitrary. The different approaches for a rational analysis have been presented. Chapter 3 deals with the interpretation of EPR spectra of paramagnetic centers in solid matrix and is the longest chapter of the book, obviously because of the large volume of literature on this subject. The EPR spectrum of solid depends on the orientation of the

paramagnetic centres with respect to the external magnetic field. The calculated anisotropic spectrum greatly depends upon the judiciously selected spectral—and lattice-dependent parameters, where the success achieved is considerably less than in the case of isotropic spectra. Besides, the general approximation of individual lines with Gaussian and Lorentzian shapes is not fully justifiable. Also that, in samples such as polycrystals and glasses, where the paramagnetic centers of a collection of all possible orientations prevail, the spectral interpretations become more complex. The structural interpretations of spectra with a single symmetric line of unresolved structure form the subject matter of Chapter 4. It may appear hard to obtain any information from such spectra. A quantitative analysis of line shape enables us to abstract structural characteristics in this case.

Through this book the authors demonstrate that, though the interpretation of EPR spectra should have a sound theoretical basis, it cannot be reduced to a mere computational work. Often it needs cross-checking with changing experimental conditions as of microwave power variation, spectra at different frequencies, isotropic substitution and thermal stability studies. On the whole, the authors have tried to project the trends and prospects of developments in deciphering the EPR spectrum. Although the authors intend the book for graduate students and in a limited way, as a reference for research workers, it is more loaded with mathematical equations that the former purpose is marginally satisfied. Systems relating to others than of spin 1/2 or 1, such as of rare earth ions, are not dealt with, in detail.

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