

the per capita consumption of milk in a family and we want to compare the pattern of milk consumption over different economic levels of individuals in two populations. The income distributions of families may be quite different in the two populations. The families in the population can be ranked by income and the regression of milk consumption on the income rank in the two populations can be compared. This leads to the QR function. Papers nos. 28 and 30 respectively, deal with the weak convergence in the Skorohod metric and the law of the iterated logarithm for the empirical cumulative QR function.

In publishing selected papers of Rao, the editors aimed at 'reaching the broad spectrum of theoretical and applied statisticians to generate new ideas and promote research in the various fields to which Professor Rao has contributed'. Undoubtedly, this goal will be achieved. The editors have done a very commendable job in compiling these volumes.

The editors also rightly thought that Rao himself is the best person to explain the context and motivation for the wide variety of problems on which he has worked for the last sixty years. Thus, the present volume includes 'Three score years of research in statistics' by Rao. This article is a must for every research student in statistics and the editors may consider bringing it out as a separate booklet.

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**The Human-Brain: Essentials of Behavioural Neuroscience.** Jackson Beatty. Sage Publications India Pvt Ltd, M-32 Market, Greater Kailash-I, New Delhi 110 048. 2001. 505 pp. Price not mentioned.

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'The human brain is special both as an object and as a system – its connectivity, dynamics, mode of functioning and relation to body and the world is like nothing else science has yet en-

countered', stated Nobel Laureate Gerald Edelman. Others have called brain as the last frontier of ignorance. Recognizing the immense significance of improving our understanding of structure and function of the brain in health and disease, the 1990s was declared 'The decade of the brain' world over. This prompted intense scientific activity globally. It was no doubt facilitated by the emergence of a host of new techniques and technologies, ranging from molecular biology and recombinant technology and genetic engineering and real-time non-invasive imaging technique to visualize neuronal activity in conscious, cooperative human beings performing a variety of behavioural tasks. Advances in electronics, computers and information technology accelerated these developments. Parallel developments in psychology and behavioural science, till recently regarded as distinct disciplines, demanded a better integration with brain sciences, fully recognizing that the ultimate aim of all neuronal function is behaviour and with recent advances it was possible to explore the neural basis of behaviour. Thus, study of the brain was no more the restricted domain of neuro-anatomists, neurophysiologists, neurochemists or neuropathologists, but it emerged as a truly multidisciplinary activity which seamlessly embraced all these and acquired the designation – neuroscience.

Not surprisingly, newer sub-disciplines like cognitive neuroscience, computational neuroscience and artificial intelligence emerged. It has been stated that the sum total of the knowledge gained about the brain during the last decade or so, is more than what was learnt in the previous fifty years. It is becoming difficult for any individual to keep abreast with the voluminous new information being generated virtually on a day-to-day basis, and worse still, to access this gainfully. It is hoped that the new discipline of neuroinformatics which is currently being developed, will help in this respect.

Keeping all these developments in mind, it was timely that Jackson Beatty decided 'to provide a clearly focused, concise and coherent introduction to human brain from the perspective of contemporary integrative neuroscience'. The author has not attempted an encyclopaedic work, yet has managed to

summarize a vast amount of new information from the viewpoint of a behavioural neuroscientist. It is therefore, not surprising that the first chapter summarizes the various approaches to study the brain and mind, discussing the relative merits of reductionist and holistic approaches, the contributions of philosophical and empirical studies and enumerating the various techniques used for this purpose. Beginning with the contributions of the late 19th and early 20th century neuroanatomists like Camillo Golgi and Ramón y Cajal, progressing to electron microscopic and histochemical exploration of the structure of the brain, and to the more recent brain imaging – computerized tomography positron – emission tomography and magnetic resonance imaging, the chapter introduces an uninitiated student to the variety of approaches used to study the brain. This includes reference to electrophysiological and other investigations and even lessons one can learn from brain lesions. One would have wished that the students were also introduced to current molecular biology and genetic approaches.

The next three chapters elaborate the gross anatomy, electrophysiology and neurochemical aspects of the brain, its building blocks, the neurons and glial cells, the modes of their communication and the electrochemical processes involved. While providing an outline of all these, based on current knowledge, one is spared the tiring details which are the favourites of classical textbooks on the subject.

This is followed by an exposition of neural basis of the various functions of the brain, e.g. vision, hearing, movement, leading on to more complex behaviour like sleep and waking, emotion and stress, hunger, thirst and sex, language and cognition, learning and memory. Each one of these is a comprehensive account, written 'much the same way as ... Lecture'.

The last chapter introduces the reader to various disorders of the brain, thus bringing home the need for better understanding of the normal brain and at the same time summarizing some of the recent advances that have either already helped or suggest the future directions which may provide therapeutic approaches.

The book is well illustrated and provides enough references to recent

literature on the subject. I found the book very readable and recommend it to those who plan to enter the interdisciplinary field of neuroscience. I could not find any mention of the price, but I do hope that it would be affordable. More than the students of neuroscience, this book could be a useful primer for those working in an allied field, who wish to get a basic understanding of the human brain.

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#### **Detection and Isolation of Soil Fungi.**

Pierre Davet and Francis Rouxel, Science Publishers, Inc., Post Office Box 699, Enfield, New Hampshire 03748, USA. 2000. 188 pp. Price: not mentioned.

Soil as a reservoir for diverse populations of saprophytic and pathogenic fungi has been well recognized. Plant pathologists in particular, have appreciated the role of soil-inhabiting propagules of fungal pathogens in the onset of serious infections and epidemics on crop plants. Fungal metabolites originating from diverse genera and species of soil-inhabiting fungi and manufactured by fermentation processes have added further impetus to the need for a better understanding of the ecology, distribution, identification and culture of soil fungi. In this context, the publication of the book under review is a welcome compilation of information on the subject, on techniques from publications widely scattered in literature.

The subject matter is distributed in three parts. The first part describes the general principles associated with the basis for selective isolation and detection of diverse fungi, while the second part discusses, in considerable detail, the techniques and selective media formulations for the targeted culturing of a variety of important genera and species from natural habitats, with particular emphasis on phytopathogenic forms. The fungi have been listed in

alphabetical order without being grouped on taxonomic relatedness. A detailed bibliography and indices for fungal names, organic compounds used, and techniques and media, form the concluding part of the book.

Isolation techniques have been discussed in detail, bringing out the usefulness as well as the advantages and disadvantages of the different approaches to fungal screening such as dilution plate method(s), baiting techniques and isolation from plant parts such as roots for plant pathogens. Selectivity factors contributed by physical treatment of the soil samples as well as the groupwise selectivity of various chemicals and antibiotics have been well documented under the culturing technique, which are supplemented by a list of basal media formulations suited for culturing soil fungi. The description of the techniques as well as media formulations is simple and easily understood and may be practised by biologists undertaking studies on isolating specific groups of fungi from the soil. The major portion of the text is devoted to the application of techniques and selective media for a large number of plant pathogenic and saprophytic fungi and in most of the cases more than one method has been described which would be very useful.

As stated by the authors in the preface, the work is a book of recipes, which will certainly be useful to those interested in the study of plant pathogenic fungi as well as saprophytic forms, their ecological distribution and selective isolation. Some of the useful additions to the well-written text could have been the culture of predaceous fungi infecting protozoa and nematodes, litter fungi and fungi associated with marine habitats, including woody substrates. The overall organization of the subject matter and its presentation is very good. The book can be expected to fulfil the need for a comprehensive compilation of screening techniques for a meaningful study of the ecology and biodiversity of fungi from soil and other natural habitats.

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## **An astro-trilogy**

**Indian Mathematics and Astronomy: Some Landmarks.** Jnana Deep Publications, Bangalore, 261 pp.

**Indian Astronomy, An Introduction.** Universities Press, 3-5-819, Hyderguda, Hyderabad 500 029, ix + 207 pp.

**Astrology: Believe it or not?** Navakarnataka, 101, Crescent Road, Kumara Park, Bangalore 560 001, 153 pp.

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All three books by: S. Balachandra Rao.

Right at the outset I wish to congratulate Balachandra Rao for doing us the signal service of writing the above three books. In different ways these books answer many questions that come to the lay as well as the not-so-lay minds concerning our ancient scientific heritage. We never stop telling ourselves that our ancestors right from the Vedic times were well informed on several scientific fronts. However, when pinned down with the question: 'What exactly did they know and at what epochs in the past?', there are very few of us who can give a satisfactory reply. Balachandra Rao (BR hereafter) provides us with useful information in simple and readable form.

Briefly, the three books cover separate aspects of the above issue and are aimed at different readerships. The first one tells us about the development of astronomy and mathematics from the Vedic to the colonial times. This book will be and should be appreciated by a reader with some understanding of elementary mathematics, although even a more general type of reader can catch the flavour of the march of ideas. The second goes into technical details, re-deriving the mathematical results obtained by the ancients. Here knowledge of geometry, plane and spherical trigonometry and algebra will be required. The last book is aimed at general readership and describes the subject of astrology while pointing out why it is not a science. I strongly recommend this book to the general educated layperson, especially one who likes to regulate his/her life by astral considerations.

*Indian Mathematics and Astronomy* begins with an overview of the whole scenario and then proceeds in a chronological fashion, beginning with the Vedic lore, followed by the Vedanga