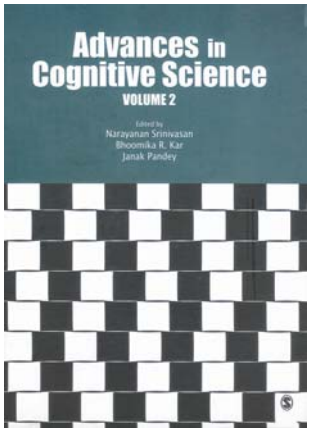

Advances in Cognitive Science. Vol. 2. Narayanan Srinivasan, Bhoomika R. Kar and Janak Pandey (eds). SAGE Publications India Pvt Ltd, B1/I-1, Mohan Cooperative Industrial Area, Mathura Road, New Delhi 110 044. 2010. xviii + 295 pp. Price: Rs 895.

The book under review is an edited volume of 15 papers selected from presentations made in the Second International Conference on Cognitive Sciences organized by the Center for Behavioural and Cognitive Sciences, University of Allahabad in 2006. The book gives a flavour of research in the fields of cognitive psychology, neuropsychology, cognitive neuroscience and computational neuroscience which are constituent fields of cognitive science. In keeping with the broad scope of cognitive science, the book is divided into four sections: Learning and memory; Perception and attention; Time perception; Language, cognition and development. Cognitive psychology is the core emphasis and the chapters give a glimpse into the variety of research questions in it.

The first section is on 'Learning and memory'. Overmier and Holden in the first chapter elegantly demonstrate how animal experiments can inform on human associative learning. Importantly, the promise of outcome expectancies in the treatment of mentally challenged individuals is noteworthy for clinicians. Tamura and colleagues write about alignment effect in map reading and navigation in the second chapter. The efficacy of global landmarks in minimizing the cost of misaligned maps as well as the superiority of numerical versus iconic landmarks while taking turns is shown by experiments on human volunteers. Destrebecqz, in the third chapter, has answered the question of explicit knowledge being conscious and implicit knowledge being unconscious with the probe of sequence learning. The reaction and accuracy data of learning and recognizing sequences with 0 and 100 ms inter sequence delay favours recognition. The author argues that consciousness is a continuum with representation as one end and awareness on the other end. Ahmed *et al.* have explored stages of skill acquisition with behavioural data again using reaction time and accuracy as measures. Clustering analysis was used wherein dendrograms represent the stages of learning in individual subjects. The authors have found an elegant method to show the dynamicity of skill acquisition. The last chapter in this section is from the area of computational neuroscience. Joseph *et al.* fill a gap in the modelling of basal ganglia function. Mediation of the exploration and reach function of the arm is attributed to the inhibitory–excitatory connection between sub-thalamic nucleus and globus pallidus interna nuclei in their Actor-Critic-Explorer (ACE) paradigm.

The second section is on 'Perception and attention'. Ladavas and Serino summarize studies on monkeys and right brain-damaged patients which describe the modularity of peripersonal space, module-specific cross modal integration and the experience-dependent plasticity in the extent of peripersonal space. In blind subjects the near space becomes peripersonal space due to constant use. The next chapter is by Sereno *et al.* on reflexive spatial attention. The time lapse between a spatial cue and the target in that location results in either speeding of the response (facilitation) or slowing down of response (inhibition of return) to the target. Using results from behavioural experiments, neuronal recordings from monkeys and modelling, the authors hypothesize that a single adaptive mechanism widely distributed in the brain can explain this two-way modulation of attention. Next, Srinivasan *et al.* review research on the ability of emotional faces to influence attentional and cognitive control processes with a few of their studies using behavioural and electrophysiological techniques as illustrations. Mavirtsaki *et al.* from the computational perspective describe simulations over time and space (sSOTS) which models human visual search over space and time. Altering the model properties to simulate posterior parietal cortex damage has modelled clinical symptoms of spatial attention and visual search seen in patients with PPC lesions.

Section 3 is on 'Time perception'. The subjective experience of overestimating the duration of a new target stimulus after a saccadic eye movement is termed as 'saccadic chronostasis' by Yarrow. Yarrow who first reported this phenomenon, reviews findings to conclude that time estimation of the post-saccadic target duration commences 50 ms before saccade initiation called as antedating hypothesis. An illusory time line of stimulus duration post saccade helps maintain continuity of visual experience during the saccade. A duration illusion is the subject of the next chapter by Pariyadath and Eagleman. They describe experiments which demonstrate that durations of predictable stimuli are shorter whereas that of unpredictable stimuli are longer. The hypothesis posed by them is that subjective duration is proportional to the amount of neural energy usage or neural response. The chapter on 'Implicit timing' by Penney *et al.* makes a case for study of implicit timing using the behavioural method of Stop-RT task and the electrophysiological measure of mismatch negativity. Unlike explicit timing wherein conscious judgements are made about duration, implicit timing in continuous tasks could be a separate system of time estimation. The next chapter is by Pouthas on 'Localization and dynamics of cerebral activations involved in time estimation'. Describing research which have used EEG, PET, fMRI and combination of EEG with PET she argues for localizing time estimation to a distributed network consisting of Pre SMA, anterior cingulate, parietal regions and basal ganglia. Duration is coded by the amount of neural activity as seen in increased amplitude of CNV for longer durations.

Section 4 on 'Language, cognition and development' consists of two chapters. Kar and Shukla review research on the effects of remediation of auditory temporal processing in dyslexia. Cognitive and MMN paradigms have identified deficits in auditory processing and phonemic processing in dyslexia. The PASS and fast forward remediation programs developed to treat dyslexia are described and their efficacy is discussed. fMRI has shown hypo activation of left posterior temporo-parietal areas and hyper activation of inferior frontal areas. The diffi-

culties in conducting ERP studies with rapid succession of stimuli are discussed. Posner and Kar on 'Brain networks of attention and preparing for school subjects' review development of language, phonemic discrimination, reading, numeracy, attention and its neural basis again from the developmental perspective. The concurrent development of reading in a language with transparent orthography such as Hindi and in an opaque language such as English which occurs routinely in India is discussed.

The book gives a glimpse into the rich tapestry that is cognitive science. The chapters offer brief reviews or experimental studies with new and clear insights into specific topics. There is no comprehensive coverage of any one topic of cognitive science, but as the title of the book suggests varied topics are covered in brief. Hence the book would not serve as a textbook or a reference book. The editors have given an introduction prior to each section which summarizes the papers in that section. This together with the brevity and crispness of the chapters makes the book easy to read.

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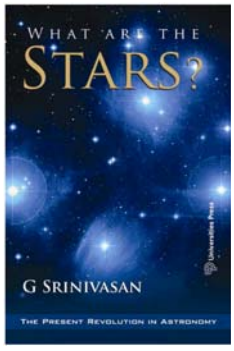
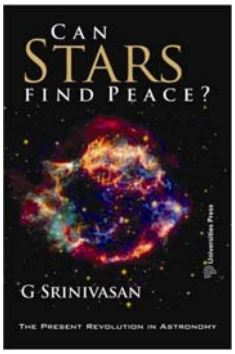


What are the Stars? G. Srinivasan. Universities Press (India) Pvt Ltd, 3-6-747/1/A and 3-6-754/1, Himayatnagar, Hyderabad 500 029. 2011. xiii + 246 pp. Price: Rs 270.

I know of no comparable book in the present-day literature that so successfully conveys the excitement of the development of our knowledge of the physics of stars, including the newest discoveries, and at the same time is so profound and explains the fundamentals of the science so well. In its style it reminds me of the books of Richard Feynman and George Gamow.

I expect that the book and the series will be appreciated by students as well as teachers. Teachers will find here many examples of beautiful and simple ways to explain complex problems in spectroscopy, radiation physics, nuclear physics, neutrino physics, gas dynamics, etc. Having myself taught the subject of stellar physics for decades, I still found here a number of original and elegant ways to explain complex physical problems which were completely new to me. This made the reading of this book an extra great pleasure.



Can Stars Find Peace? G. Srinivasan. Universities Press (India) Pvt Ltd, 3-6-747/1/A and 3-6-754/1, Himayatnagar, Hyderabad 500 029. 2011. xiii + 254 pp. Price: Rs 270.

This book gives an excellent treatment of the evolution of stars, from their formation until their final stages, in which they 'find peace' as a white dwarf, a neutron star or a black hole. In order to understand how these three types of 'compact stars', which have extreme densities, can exist in nature, Srinivasan gives a clear explanation of all the necessary physics, particularly the quantum-statistical behaviour of the particles that make up matter: atomic nuclei and electrons.

[To have an impression of the extreme densities of matter in these three types of compact stars: white dwarfs have densities of the order one to one hundred million kilograms/litre, and neutron stars hundred trillion kilograms per litre; a volume of a raindrop in a neutron star contains as much matter as all 7 billion people on Earth together.]

It was this quantum-statistical behaviour of matter which led S. Chandrasekhar in 1930 to his discovery that white dwarfs cannot be more massive than about 1.44 times the sun (the so-called Chandrasekhar limit), which in 1934 led to the prediction that more massive stellar remnants collapse to a neutron star. It was 33 years later that these neutron stars were discovered. And their existence then led to the confidence that black holes, predicted by Oppenheimer and Snyder in 1939, must also exist.

The work of Chandrasekhar thus is at the basis of all our knowledge about the final stages of stars, and it is for this work that he was awarded the Physics Noble Prize in 1983. It is thanks to this work that we know that at the end of life indeed stars 'can find peace'.

This story is the main theme of this book, and this history and its physics background, are told in a clear and fascinating way. I am convinced that the book will be inspiring for university students in physics and other natural sciences, in India and elsewhere.

I know of no other book on the evolution of stars of similar scope and breadth that is accessible for undergraduate students.

I would be delighted to have this book as basic course material for the undergraduate students in physics in my University.

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Annual Review of Astronomy and Astrophysics, 2010. Roger Blandford *et al.* (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 48. xiii + 723 pp. Price: US$ 84.

Reviews of scientific papers are not a new phenomenon, although there has been a spectacular rise in the number of review journals in the recent past. In the old German tradition dating back to the 19th century, there used to be a class of articles called 'Jahresbericht', which were comprehensive records of annual contributions made to a topic of research.