

The elegance of the book and the translation by Sarma are beyond comparison and shall add new perspectives to the history and content of Indian astronomy and mathematics.

The epilogue of Volume I, discussing the tradition of proofs in Indian mathematics, is a valuable addition to the work and helps students and scholars alike to understand the nuances of Indian scientific tradition better. Also, it helps gain the right perspectives on great works like that of Āryabhaṭa, which have met with hostile criticism at the hands of certain Western scholars.

Last but not the least, certain facts which mar an otherwise excellent edition need to be mentioned here. Absence of Sarma during the final stages of publication of the work has facilitated the addition of some spurious content in the name of an epilogue to an otherwise perfect edition of *Yuktibhāṣā*.

Ramasubrahmaniam *et al.* have been overzealous in adding, their published work on *Implied Heliocentric Picture of Planetary Motion*, which is already under challenge, to the monumental work of Sarma. The epilogue as above which presents a speculative interpretation of the computational contrivance of Nīlakaṇṭha's *Tantrasaṅgraha* has no connection with *Yuktibhāṣā* at all. Reference to *Tantrasaṅgraha* at the outset in *Yuktibhāṣā* is only in a general sense to mean the traditional wisdom adapted for his particular epoch and in the discussion on planetary theory, Jyēṣṭhadeva only explains the algorithmic deviation that is incorporated in *Tantrasaṅgraha*. No change in the geocentric epicycle model of planetary motion is discussed. Over enthusiasm for giving reference to *Tantrasaṅgraha* is evident also in Volume I (p. 173), where the original text explains the traditional method of using the avāntarayuga of 576 years in the computation of planetary mean longitudes.

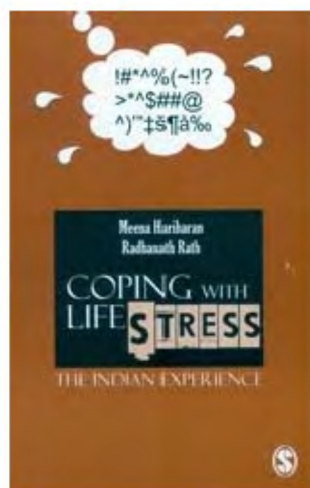
Text of the *Yuktibhāṣā* and the translation by Sarma do not refer to *Tantrasaṅgraha* in the discussion on the avāntarayuga of 576 years (210,389 days). Explanatory notes by Ramasubrahmaniam *et al.* give the impression that the minor period owes its origin to *Tantrasaṅgraha* of Nīlakaṇṭha. In fact, the *Tantrasaṅgraha* dyugāṇa or day-count of 1,577,917,200 could not have given the perfect integer day count of 210,389 days in 576 solar years. The original text and the translation by Sarma are clear in specifying that there will be 'no bhagaṇaśeṣa at the end

of 576 years or 210,389 days'. This is not possible with the *Tantrasaṅgraha* yuga conception of 1,577,917,200 days. Any reference to *Tantrasaṅgraha* is unwarranted as the technique of mean planet computation using Dhījagannūpura (210,389) has its origin with Haridatta (AD 681) in his work *Grahacāranibandhana*. The arithmetic involved is $210,389 \times 7500 = 1,577,917,500$ days of Āryabhaṭa and not 1,577,917,200 days of Nīlakaṇṭha.

It is hoped that the publishers shall do the needful to relieve the great work of K. V. Sarma of the burden of a spurious thesis.

K. CHANDRA HARI

C-207, Gandhar Tower,
ONGC Colony,
Baroda 390 009, India
e-mail: chandra_hari18@yahoo.com



Coping with Life Stress: The Indian Experience. Meena Hariharan and Radhanath Rath. Sage Publications India Pvt Ltd, B-1/I-1, Mohan Cooperative Industrial Area, Mathura Road, New Delhi 110 004. 2008. 286 pp. Price: Rs 375.

In this book, the authors have not only provided the theoretical underpinning of the phenomenon of stress and coping with it, but through their analysis of several case-reports drive home the fact that there cannot be any single unitary global explanation, as the perception of stress and modalities of coping with it vary across cultures and societies. Their insights into the Indian experience are valuable and highly rewarding.

Modern life for many is not about the process, but 'end results'. It is often characterized as 'the tyranny of ends'. Modern existence is driven by relentless

desire to 'achieve' things and judge ourselves on the basis of what we have 'achieved'. Thus we become prisoners of the 'end result', do not enjoy the process of doing things and turn our lives into a monotonous pursuit of demands and expectations that have a negative effect on our well-being. Modern lifestyles, such as 'workaholism', 'rat race', etc. inexorably ensue from such ruthless chase in life. Often we accept things that are thrust on us. We increasingly tend to do things that we really do not like doing, with a distant goal of achieving something else which others impose on us and which we feel are not worthwhile. The origin of stress can be traced to this incongruity between being able to live our lives and being obsessed by false demands made on our lives that outweigh our capabilities and interests.

Stress is primarily a process of motivation since it requires a form of adaptation or coping with the demand or set of demands in a given situation that concerns the physical, mental and social well-being of the agent. Often stress is associated with such emotions as anger, anticipation or fear, because stress usually accompanies such emotions. Nevertheless, stress by itself, it is not considered a particular emotion.

Ann L. Weber in *Introduction to Psychology* (Harper Collins, New York, 1991) makes a distinction between 'motivation' and 'emotion' by claiming that the former involves a thought process that both brings forth and directs goal-oriented behaviour, whereas the latter includes subjective experiences, and feelings that accompany motivational states.

The critical factor in coping with life stress is that it involves thought processes and evaluation of the situation in which agents or cognizers find themselves. The relevant thought processes and evaluation often lead the agent and the cognizer to decide that the demands of the situation outweigh the skills they have. This in turn induces them to label the situation as 'stressful' and react with a stress response. If they decide that their coping skills outweigh the demands of the situation, then the agent or the cognizer does not perceive it as 'stressful'.

The study of stress and coping with it has evolved as an interdisciplinary research programme encompassing several disciplines, beginning with all areas of psychology such as health psychology, environmental psychology, neuropsychology and developmental psycho-

logy to areas of biology and medicine interfacing in psycho-neuroimmunology, and spreading into the area of anthropology and sociology.

The interactions between the 'mind' (cognition and learning) and the 'brain' (biological/physiological), and the role each plays with regards to stress has been debated for decades.

How an agent cognitively processes a particular situation and the manner in which he can bring about the so called 'cognitive restructuring' of the situation may result in changing how the agent behaves in that particular situation, i.e. 'behavior modification', 'biofeedback' which uses 'operant conditioning' to alter involuntary responses. The early work on stress and coping (e.g. Seyle, H., *The Stress of Life*, McGraw-Hill, New York, 1956) was primarily psychological.

Some other studies (e.g. Lazarus, R. S. and Folkman, S., *Stress, Appraisal, and Coping*, Springer, New York, 1984) refer to the level of appraisal (e.g. primary and secondary) that determines the level of stress and the unique coping strategies that the individual is involved in. A level of appraisal is called 'primary' when the agent makes a conscious evaluation of the matter at hand, whether it is a harm, loss, threat or a challenge. The secondary-level appraisal takes place when the agent raises the question 'what can I do?' by evaluating the available coping resources around him, such as physical resources – how healthy one is, or how much energy one has; social resources – family or friends one has to depend on for support in the immediate surroundings; psychological resources – self-esteem and self-efficacy, and also material resources – how much money the agent has.

These theories assume that the body has its distinctive way of coping with stress. Any threat or challenge that an individual perceives in the environment triggers a chain of neuroendocrine events.

M. Frankenhaeuser, *A Psychobiological Framework for Research on Human Stress and Coping* (Plenum, New York, 1986, pp. 101–116) conceptualized these events leading to two separate responses: sympathetic/adrenal response, with the secretion of catecholamines (epinephrine, norepinephrine) and pituitary/adrenal response, with the secretion of corticosteroids. The sympathetic/adrenal response takes the message from the brain to the adrenal medulla via the sympathetic nervous system, which secretes epinephrine and norepinephrine.

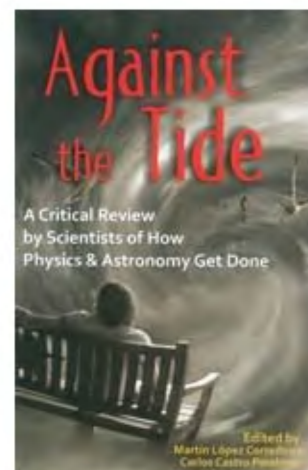
According to W. B. Cannon (in his *Bodily Changes in Pain, Hunger, Fear and Rage: An Account of Recent Research into the Function of Emotional Excitement*, 2nd edn, Appleton, New York, 1929), this is the basic 'fight or flight' response, where the heart rate quickens and the blood pressure rises. In the pituitary/adrenal response, the hypothalamus is stimulated and produces the corticotrophin releasing factor to the pituitary gland through the blood veins. Then the adrenal corticotropic hormone is released from the pituitary gland to the adrenal cortex. The adrenal cortex in turn secretes cortisol, a hormone that will report back to the original brain centres together with other body organs to stop the whole cycle. Since cortisol is a potent hormone, its prolonged secretion will lead to health problems such as the breakdown of cardiovascular system, digestive system, musculoskeletal system, and the recently established immune system. Also when the organism does not have a chance for recovery, it will lead to both catecholamine and cortisol depletion, and result in the third stage of the general adaptation syndrome of exhaustion.

Understanding how these two approaches (viz. 'mind'/cognition/learning and 'brain'/biological/physiological) integrate is fundamental to developing a new theory in understanding the process of stress and coping. The present reductionist model of stress either emphasizes a purely physiological perspective, where the brain is the sole determinant of the presence of stress, or claims that the mind affects the body and follows a uni-directional path from the mind to stress. A new transactionist model is being suggested which will follow a bi-directional path, where stress and its reduction in turn influence both the brain and the mind. Thus, by way of stress, the brain and the mind both mutually affect one another.

Hariharan and Rath suggest, through their analysis of the Indian experience, new modalities of coping such as the practice of Pranayama, deep breathing, progressive muscular relaxation, etc. although longitudinal studies are crucial and need to be carried out. Once such studies are done, this can develop into a new transactionist model and provide a novel perspective in coping with life stress.

AMITABHA GUPTA

503, Whispering Woods,
Powai Vihar Complex, Bldg No. 3, Powai,
Mumbai 400 076, India
e-mail: agcg503@gmail.com



Against the Tide: A Critical Review by Scientists of How Physics and Astronomy Get Done. Martin Lopez Corredoira and Carlos Castro Perelman (eds). Universal Publishers, Boca Raton, Florida, USA. 2008. 265 pp. Price not mentioned.

This book deals with the tension between the scientific establishment of a given time, and scientists with radical or heretical ideas, who work outside the mainstream, and have difficulties in having their ideas accepted or even seriously critiqued. The book is a collection of essays edited by Martin Lopez Corredoira, who is an astrophysicist and philosopher, and Carlos Castro Perelman, a theoretical physicist. The book is available on sale, and can be ordered on the Internet, but is also available in its entirety for free download from <http://philsci-archive.pitt.edu/archive/00004046/>.

The general theme of the book is that much of the scientific activity at the present time confirms to a set of ideas and paradigms which are unquestionably accepted by the vast majority of practising scientists. Most work is done within this framework, and those who disagree with it find it difficult to survive academically, because they are denied grants, positions, research facilities like observing time on telescopes, invitations to speak at conferences, the opportunity to publish in the best research journals, and even to post their papers on open electronic archives heavily used by the community. These difficulties make it impossible to air radical ideas, or glaring inconsistencies in experimental or observational data, which challenge the very foundations of mainstream science. This suppression of dissent and challenging new ideas, without examining them carefully