6 In this issue

GUEST EDITORIAL

7 The simple matter of sustainability
Stephen A. Matlin, Henning Hopf, Alain Krief and Goverdhan Mehta

CORRESPONDENCE

9 Revenue generated by CSIR through research projects
Gangan Prathap

NEWS

10 R. A. Mashelkar wins the TWAS-Lenovo Science Prize
S. Priya

11 Quantum chaos, dynamical systems and Schrödinger equations and quantum unique ergodicity
Yves Colin de Verdiere

12 Wading through black carbon aerosols, climate and sustainability
K. Krishnamoorthy

14 Understanding the role of molecular motors in living cells: an odyssey from physics to biology
Siddhesh S. Kamat

16 Much More than Moore – a journey from VLSI to disease biomarkers
S. A. Shivashankar

18 A short note on Sendhil Mullainathan’s contributions to development economics
Bindu Ananth

20 Overhauling the communicational inconsistencies in Indian science
S. Badrinarayan, Bhavisha P. Sheth, Kavita Pal, Kshama Lakshman, Palatty Allesh Sinu, K. Sri Manjari, Viswas Konasagara Nagaleekar and Wairokpam Premi Devi

22 Science Last Fortnight

COMMENTARY

26 The concept of measuring happiness and how India can go the Nordic Way
Sangeeta Bhattacharyya, R. Roy Burman and Sudipta Paul

SCIENTIFIC CORRESPONDENCE

29 Temporal shift in timing of breeding of European starling (Sturnus vulgaris Linnaeus) population
Zdravko Dolenc

30 Simple estimates for optimization of potassium nutrition in vineyards
Vinod C. Naraboli, S. Srikanth, Ajay K. Bhardwaj, Shankar Meti, Ashok S. Alur and Mavinakoppa S. Nagaraja

32 Brainea insignis (Hook.) J.Sm. – a conservation priority fern of North East India
B. S. Kholia, S. Sharma and B. K. Sinha
GENERAL ARTICLES
35 A Granger causality test of the causal relationship between the number of editorial board members and the scientific output of universities in the field of chemistry
Xing Wang

40 Perspectives from India on geoengineering
Vikram Mathur and Aparna Roy

REVIEW ARTICLES
47 Intricacies in the approval of radiopharmaceuticals – regulatory perspectives and the way forward
Sandeep Sharma, Sanyog Jain, Ashish Baldi, Rajesh K. Singh and Rakesh Kumar Sharma

56 Rainfall estimation techniques over India and adjoining oceanic regions
Anoop Kumar Mishra and Mohammad Rafiq

RESEARCH ARTICLES
69 Neuroanatomical correlates of perceiving the intensity and pleasantness of intense saltiness in healthy subjects
Andy Wai Kan Yeung

75 Regression equations for estimating tree volume and biomass of important timber species in Meghalaya, India
Krishna Giri, Rajiv Pandey, R. S. C. Jayaraj, R. Nainamalai and Subhash Ashutosh

82 Biophysical performance of different multipurpose trees species in Jharkhand, India
Bikash Das, Pradip Kumar Sarkar, Neelam Kumari, P. Dey, A. K. Singh and B. P. Bhatt

89 Impact of ultraviolet-B radiation on growth and biochemical composition of Botryococcus braunii Kutz.
Chidambaram Kurinjimalar, Ganapathy Kavitha, Rangaraja Thevanathan, Govindaswamy Kulandaivelu and Ramasamy Rengasamy

96 Coal–rock interface recognition based on permutation entropy of LMD and supervised Kohonen neural network
Yong Li, Gang Cheng, Xihui Chen and Chang Liu

RESEARCH COMMUNICATIONS
104 Metal constituents of e-waste black powder and its potential utilization
Pawan Kumar Bharti, R. K. Singh, Raju Joshi, Shambhu Thakur and A. K. Tyagi

108 Development of web-based combine harvester custom-hiring model for rice–wheat cropping system
Roaf Ahmad Parray, Indra Mani, Adarsh Kumar and Tapan Kumar Khura

112 Carbon sequestration potential of Hardwickia binata Roxb. based agroforestry in hot semi-arid environment of India: an assessment of tree density impact

116 Myco-potash solubilizers
B. K. Parida, R. V. Vyas, Y. K. Jhala and S. Dasgupta

121 Effects of small rainfall events on Haloxylon ammodendron seedling establishment in Northwest China
Guohua Wang, Qianqian Gou and Wenzhi Zhao
Assessment of ergonomic parameters of coconut climbing devices for women
Bini Sam, Hameeda Bindu Vahab and S. Regeena

BOOK REVIEWS

Third Thoughts, Steven Weinberg; reviewed by C. P. Rajendran

Gary A. Lamberti and F. Richard Hauer (eds); reviewed by T. V. Ramachandra

COVER. Periodic table of the chemical elements for the International Year (2019), illustrating limitations in element supplies. See page 7.

Indexed in CURRENT CONTENTS/GEOBASE/ CHEMICAL ABSTRACTS/IndMED/ SCOPUS/WEB OF SCIENCE