

Current Content Alert Services

MONTH *July* YEAR *2020*

Compiler : Y.K.Rajoriya



LIBRARY
REGIONAL INSTITUTE OF EDUCATION
(NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING)
Capt. D.P. Choudhary Road, Ajmer - 305004
E-mail: rieajmer@yahoo.com Phone: 0145-2643721, 2643864; (Fax) 2643862

Library
RIE, Ajmer

S.No.	Name of Journals	Vol.No.	Pages
1	अनौपचारिकता	46(3)	1
2	Current Science	118(1-12)119(1)	2-34
3	Edutracks	19(8,10)	35-36
4	Indian Literature	64(315-316)	37-43
5	Journal of cell And tissue Research	20(1)	44
6	Journal of Chemical Education	97(3-)	45-50
7	Mathematics Teacher	113(3-4)	51-54
8	Resonance	25(1-6)	55-66

अनौपचारिका, वर्ष 46 अंक 3-4, मार्च-अप्रैल, 2020

खे.ना. 1, अजमेर
दिनांक 01/3/2020
हस्ताक्षर

समानो यन्त्रः समितिः समानी समानं मनः सहचित्तमेषाम्।
समानं मन्त्रमभिपन्वये वः समानेन वो हविषा जुहोमि॥
समानी व आकृतिः समाना हृदयानि वः।
समानमस्मि वो मनो यथा वः मुसहासति॥

ऋषेद

अनौपचारिका

समकालीन शिक्षा-चिन्तन की पत्रिका

वर्ष : 46 अंक : 3-4 • फाल्गुन-चैत्र-वैशाख वि.सं. 2019 • मार्च-अप्रैल, 2020 (संयुक्तांक)

क्रम

05 अपनी बात
शिक्षा के रंग : वसंत के संग

07 आलेख
शिक्षा की निरन्तरता और आश्रम
व्यवस्था : दूसरी किरत

12 आलेख
अध्यापक की भूमिका

14 कविताएं
अनामिका की कविताएं

19 बाल शिक्षा शास्त्री
बिन पानी सब सूख

22 कसौटी
परीक्षण की कसौटी पर शिक्षा

24 गांधी-150
मेरे सपनों का भारत

25 धरोहर
हम्मीर का सद्भाव

26 किताबें
पुस्तक मेले में किताबें

27 सबाद
शांति निकेतन से...

28 स्मृति शेष
बिछड़े सभी बारी-बारी

29 पिछला पत्रा
क्या अब भी दिङ्गी दिल चालों
की !!!

संस्थापक संपादक एवं सरक्षक : रमेश धानवी | कार्यकारी संपादक : प्रेम गुप्ता | प्रबंध संपादक : दिलीप शर्मा
एक प्रति तीस रुपये | वार्षिक शुल्क तीन सौ पचास रुपये | संस्थागत वार्षिक शुल्क पांच सौ रुपये | मैत्री समुदाय तीन हजार रुपये



राजस्थान प्रौढ़ शिक्षण समिति



अखबार - ऋषभ मुराणा, जोधपुर

७-ए, झालाना इंगरी संस्थान क्षेत्र, जबपुर-302004
फोन : 26001111, 2606302, 2606633
ई-मेल : raeajipur@gmail.com

अनौपचारिका | 04 | मार्च-अप्रैल, 2020 (संयुक्तांक)

Current Science Vol. 118 No. 1, 10 January, 2020

Founded: 1932

ISSN: 0011-3891

श्री.पि. ११, राजस्थान, अजमेर
दि. 06/1/2020
A.P. Singh

CURRENT SCIENCE

Volume 118 Number 1

10 January 2020

6	In this issue
	EDITORIAL
7	Conservation of species, all; big and small K. Chandrashekara
	CORRESPONDENCE
9	Congruence of endemism among four global biodiversity hotspots in India V. S. Chitale, M. D. Behera and P. S. Roy
9	UGC-CARE List Bhushan Patwardhan and Shubhada Nagarkar; <i>Response by</i> V. Venkateswara Sarma
	NEWS
11	Science Last Fortnight
15	Precambrian geodynamics E. V. S. S. K. Babu, V. M. Tiwari and Somnath Dasgupta
17	Current challenges in the management of forest insect pests and diseases Shailesh Pandey, Sudhir Singh, Mohd. Yusuf and Amit Pandey
19	Indian Academy of Sciences, Bengaluru – 85th annual meeting Pratik Pawar and S. Priya
	COMMENTARY
22	Data and ideology of science Sumit Bhaduri
	SCIENTIFIC CORRESPONDENCE
24	Optimal Ph D student-teacher ratio for Indian research universities: a production function approach Pranab Mukhopadhyay, P. K. Sudarsan and M. P. Tapaswi
26	Influence of rake angle, bucket width and teeth depth of dragline bucket on the resistive force in different rock types Shah Fateh Azam and Piyush Rai
	TECHNICAL NOTE
29	Improvement on the characteristics of transformer oil using nanofluids S. Sumathi and R. Rajesh
	GENERAL ARTICLES
34	Normalization of marks in multi-session examinations Abhay G. Bhatt, Sourish Das and Rajeeva L. Karandikar
40	Violence against doctors: a multisystem failure Gautam Ganguly



Current Science Vol. 118 No. 1, 10 January, 2020

RESEARCH ARTICLES

- 45 **Solar X-ray Monitor onboard Chandrayaan-2 Orbiter**
M. Shanmugam, S. V. Vadawale, Arpit R. Patel, Hitesh Kumar Adalaja, N. P. S. Mithun, Tinkal Ladiya, Shiv Kumar Goyal, Neeraj K. Tiwari, Nishant Singh, Sushil Kumar, Deepak Kumar Pankra, Y. B. Acharya, Anil Bhardwaj, A. K. Hait, A. Patinge, Abinandhan Kapoor, H. N. Suresh Kumar, Neeraj Satya, Gaurav Saxena and Kalpana Arvind
- 53 **Alpha Particle X-ray Spectrometer onboard Chandrayaan-2 Rover**
M. Shanmugam, S. V. Vadawale, Arpit R. Patel, N. P. S. Mithun, Hitesh Kumar Adalaja, Tinkal Ladiya, Shiv Kumar Goyal, Neeraj K. Tiwari, Nishant Singh, Sushil Kumar, Deepak Kumar Pankra, A. K. Hait, A. Patinge, Abhishek Kumar, Saleem Basha, Vivek R. Subramanian, R. G. Venkatesh, D. B. Prashant, Sonal Navic, Y. B. Acharya, S. V. S. Murty and Anil Bhardwaj
- 62 **Effect of community structures in protein-protein interaction network in cancer protein identification**
Sminu Izudheen, Eljose S. Sajan, Ivan George, Jeevan John and Chris Shaju Attipetty
- 70 **Calibration of accelerated corrosion protocol for reinforced concrete columns**
Aditya Singh Rajput and Umesh Kumar Sharma
- 79 **Occurrence of Aflatoxin M1 in raw, pasteurized and UHT milk from Punjab, India**
Anil Patyal, Jatinder Paul Singh Gill, Jasbir Singh Bedi and Rabinder Singh Aulakh
- 87 **Study the effect of star anise extract and the pulp of kiwifruit on mice infected with cancer**
Dalia I. Hemdan and Nabila Y. Mahmoud Abdulmaguid
- 94 **Environmental influence on the euglenoid species diversity and their abundance in Museum Lake, Thiruvananthapuram, India**
Anila P. Ajayan, Jan W. Rijstenbil and K. G. Ajit Kumar
-
- RESEARCH COMMUNICATIONS
- 103 **Effects of projected climate change on quantity and quality of soybean yield under different emission scenarios**
Hamidreza Ahmadzadeh Araj, Amirun Wayayok, Jahanfar Daneshian, Majid Mirzoei, Ali Reza Massah Bavani, C. B. S. Teh, Ahmad Fikri Abdullah and Parisa Ahmadi
- 108 **Is rubber monoculture banishing agrobiodiversity and happiness? evidences from shifting cultivation landscape of Tripura, northeast India**
D. K. Pandey, P. Adhiguru, Uma Sah, N. Devachandra, S. K. Dubey and Chandra Deo
- 114 **Optimization of process variables for preparation of pomegranate juice-fortified aonla candy**
Vijay Singh Meena, Kirti Jalgaonkar, Manoj Kumar Mahawar, Bharat Bhushan, Bhushan Bibwe and Poonam Kashyap
- 118 **Potential application of yellow gypsum from LD slag as a soil conditioner**
Shrenivas Ashrit, Ravikrishna V. Chatti, S. Sarkar, R. Venugopal and G. Udayabhanu
- 123 **Prediction of rock load emphasizing excavation damage of *in situ* rocks caused by blasting in coal mines**
Avinash Paul, Venavarapu Mallika Sita Ramachandra Murthy, Amar Prakash and Ajoy Kumar Singh
- 132 **An early case of lithic recycling in India: evidence from the Acheulian site at Dandongri, Madhya Pradesh**
S. B. Ota, Niharika Srivastava and Suman Pandey



LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Current Science Vol. 118 No. 1, 10 January, 2020

BOOK REVIEWS

- 140 **Dust in the Atmosphere of Mars and its Impact on Human Exploration.** Joel S. Levine, Daniel Winterhalter and Russell L. Kerschmann; *reviewed by* Prakash Chauhan
- 142 **Annual Review of Genetics, 2018.** Nancy M. Botini, Andrew G. Clark and Michael Lichten; *reviewed by* G. Subrahmanyam, M. Chutia and K. P. Arunkumar
- 143 **Annual Review of Physiology, 2019.** Mark T. Nelson and Kenneth Walsh; *reviewed by* Mario Vaz

PERSONAL NEWS

- 145 **Nanjundappa Rudraiah (1932–2019)**
M. Venkatasubbalaxmi, I. S. Shivakumara and P. Kandaswamy

HISTORICAL NOTES

- 147 **The spark that fired the Great Trigonometrical Survey of India: the triangulation survey made between Fort St. George (13°08'N) and Mangalore (12°01'N) by William Lambton in the early 1800s**
Anantanarayanan Raman and Vancheeswar Balakrishnan
-

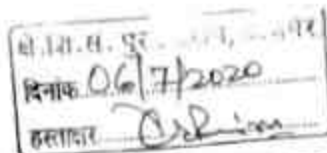


- ◀ COVER. Pomegranate tree (Source: Google). See page 114 for an article on optimization of process variables for preparation of pomegranate juice-fortified aonla candy.

Indexed in CURRENT CONTENTS/SOBI/SCOPUS/CHEMICAL ABSTRACTS/BIOMED/SCOPUS/
WEB OF SCIENCE

Current Science Vol. 118 No. 2, 25 January, 2020

Founded 1892



ISSN 0011-3891

CURRENT SCIENCE

Volume 118 Number 2

25 January 2020

-
- 174 **In this issue**
- GUEST EDITORIAL**
- 175 **The Saha equation turns hundred**
Rajaram Nityananda
-
- NEWS**
- 177 **Science Last Fortnight**
- 181 **Science education for the visually impaired**
Raka Ray Mondal
- 182 **Luminescence dating**
Sheikh Nawaz Ali and Shubhra Sharma
-
- OPINION**
- 184 **Punitive provision to tackle predatory journals**
Koushik Sau
-
- COMMENTARY**
- 186 **The Department of Geology, Institute of Science, Banaras Hindu University, Varanasi: A success story of 100 years**
N. V. Chalapathi Rao
- 189 **Emergence and burden of antibiotic drug resistance: an endogenous cycle**
Bhawna Malik and Samit Bhattacharyya
-
- SCIENTIFIC CORRESPONDENCE**
- 192 **Treeline migration and settlement recorded by Himalayan pencil cedar tree-rings in the highest alpine zone of western Himalaya, India**
Krishna G. Misra, Vikram Singh, Akhilesh K. Yadava, Sandhya Misra and Ram R. Yadav
- 195 ***In vitro* rearing and gallery tunnelling pattern of Island pinhole borer, *Xyleborus perforans* (Wollaston), a scolytid associated with pomegranate wilt complex**
P. D. Kamala Jayanthi, T. Raghava, T. Nagaraja and K. Sreedevi
-
- GENERAL ARTICLE**
- 199 **Policy matrix for sustainable soil management and climate-resilient agriculture**
P. Dey
-
- RESEARCH ARTICLES**
- 202 **CHandra's Atmospheric Composition Explorer-2 onboard Chandrayaan-2 to study the lunar neutral exosphere**
Tirtha Pratim Das, Smitha V. Thampi, M. B. Dhanya, Neha Naik, P. Sreelatha, P. Pradeepkumar, G. Padma Padmanabhan, B. Sundar, Dinakar Prasad Vajja, Amarnath Nandi, R. Sathesh Thampi, Vipin K. Yadav, J. K. Abhishek, Md. Nazeer, P. T. Lali, Rosmy John, A. V. Aliyas, Vijay Kumar Sen, M. Ramprabhu and A. Ajay Krishna

Current Science Vol. 118 No. 2, 25 January, 2020



- 210 **Dual Frequency Radio Science experiment onboard Chandrayaan-2: a radio occultation technique to study temporal and spatial variations in the surface-bound ionosphere of the Moon**
R. K. Choudhary, K. R. Hindu, Kumar Harshit, Rahul Karkara, K. M. Ambili, T. K. Pant, Devidas Shenoy, Chandrakanta Kumar, N. Hemant Kumar Reddy, T. K. Rajendran, M. Nazer and M. Shajahan

- 219 **Chandrayaan-2 Large Area Soft X-ray Spectrometer**
V. Radhakrishna, A. Tyagi, S. Narendranath, Koushal Vadodariya, Reena Yadav, Brajpal Singh, G. Balaji, Neeraj Satya, Akash Shetty, H. N. Suresha Kumar, Kumar, S. Vaishali, Netra S. Pillai, S. Tadepalli, Venkata Raghavendra, P. Sree Kumar, Anil Agarwal and N. Valarmathi

- 226 **L- and S-band Polarimetric Synthetic Aperture Radar on Chandrayaan-2 mission**
Deepak Putrevu, Sanjay Trivedi, Anup Das, Dharmendra Pandey, Priyanka Melrotra, S. K. Garg, Venkata Reddy, Shalini Gangele, Himanshu Patel, Devendra Sharma, R. Sijwali, Nikhil Pandya, Amit Shukla, Gaurav Seth, V. M. Ramasujam and Raj Kumar

- 234 **Evaluation on physico-chemical and corrosion properties of anodized aluminium surface using sodium oxalate-sodium silicate bath at room temperature**
M. Mubarak Ali and S. Sathya

- 243 **Occupational accidents: a comparative study of construction and manufacturing industries**
Shabir Hussain Khahro, Tauha Hussain Ali, Nafees Ahmed Memon and Zubair Ahmed Memon



- 249 **Performance enhancement of hexagonal-patch dual-band array antenna with omega-shaped DGS for dual Band RADAR Applications**
Kanchan Wagh and S. S. Shriramwar

- 255 **Field experience of Fluoride Nilogon: a method of fluoride removal from groundwater**
Rajkamal Mohan, Sweety Gogoi, Anup J. Bora, Gautam Baruah, Shreemoyee Bordoloi, Asadulla A. Ali, Hridip R. Sarma and Robin K. Dutta

- 264 **Ecological determinants of occupancy and abundance of chinkara (*Gazella bennettii*) in Yadahalli Wildlife Sanctuary, Karnataka, India**
Dinesh Kumar, Avadhoot D. Velankar, Nitin Venkatesh Ranga Rao, Honnavalli N. Kumara, Partha Sarathi Mishra, Prodyut Bhattacharya and Vijay Mohan Raj

RESEARCH COMMUNICATIONS

- 271 **Linguistic resources to facilitate science education**
Uma Maheswari Viswanathan, A. Shulin Sultana and Suhasini Shankar

- 273 **Design and development of a low-cost GNSS drifter for rip currents**
Suresetty V. V. Arun Kumar, Rakesh Kumar Luhar, Rashmi Sharma and Raj Kumar

- 280 **Bioprocess development for enhanced production of probiotic *Bifidobacterium bifidum***
Suhail Mohammed Hussain, Manali Naik, L. Arbaz Ahmed, Minal Udipi and Sunil Kumar Sukumaran



- 285 **Pigment analysis of palm leaf manuscripts of India**
Deepakshi Sharma, Manjagar Singh, Gabriela Krist and M. Velayudhan Nair

- 292 **Mtb-HiD: a unified database of host-pathogen interaction for various *Mycobacterium tuberculosis* strains**
Kunind Pant, Devvret, Neema Tufchi, Ajay Pandaya and Ashish Thapliyal

- 297 **Effect of storage conditions on vermicompost quality**
Prakash Kumar, Pawan Sharma, Tilak Ranjan Kumar, H. C. Sharma and R. C. Dubey

Current Science Vol. 118 No. 2, 25 January, 2020

- 300 **A comparative study of antioxidant activity and total phenolic content of fresh juices of some common Indian fruits with their commercial counterparts**
Binita Roy, Jyoti Singh and Tanya Dewan

BOOK REVIEWS

- 305 **Annual Review of Medicine, 2019**, Mary J. Klotman, Michael S. Parmacek and Howard A. Rockman (eds); *reviewed by* C. C. Kartha

- 307 **Ultrafast Optics and Spectroscopy in Physical Chemistry**, Atanu Bhattacharya; *reviewed by* Sivaram Krishnan

PERSONAL NEWS

- 309 **M. V. George (1928–2019)**
Suresh Das, H. Ha (nee Ha Bhattacharya) and S. Sivaram

HISTORICAL NOTES

- 312 **Bhagwati Charan Guha and discovery of the molecular magnet**
Rajarnali Ghosh
-

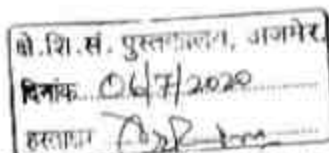


◀ COVER. The Chinkara of Yadahalli. (Photo: Mr. H. B. Doni). See page 264.

Indexed in CURRENT CONTENTS/GEODATABASE/CHEMICAL ABSTRACTS/ISI/SCOPUS/
WEB OF SCIENCE.

Current Science Vol. 118 No. 3, 10 February, 2020

Founded: 1932



ISSN: 0011-2519

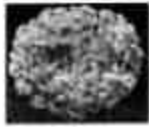

CURRENT SCIENCE

Volume 118 Number 3

10 February 2020

- 330 **In this issue**
-
- GUEST EDITORIAL**
- 331 **100 Years of Biochemistry at the Indian Institute of Science**
Pandi N. Ranganjan
-
- NEWS**
- 333 **Science Last Fortnight**
- 337 **Towards a sustainable water future**
Pratik M. Pawar and S. Priya
-
- IN CONVERSATION**
- 339 **Ken Ono**
Tirthankar Bhattacharyya
-
- RESEARCH NEWS**
- 345 **Exploring North East India's non-mulberry silk based bioinks for three dimensional bioprinting**
Rocktupal Konwarh
-
- COMMENTARY**
- 348 **Science and innovation in the 21st century: new paradigms and challenges for policy design**
Sujit Bhattacharya
-
- SCIENTIFIC CORRESPONDENCE**
- 350 **Uraninite-bearing leucosomes from migmatites of Chhotanagpur Granite Gneiss Complex, Karke area, Garhwa district, Jharkhand, India**
A. P. Kushwaha, S. P. Upadhyay, Kuldeep Nautiyal, B. V. S. N. Raju and D. K. Sinha
-
- GENERAL ARTICLES**
- 352 **Eleven years of Dr D. S. Kothari Postdoctoral Fellowship scheme of the University Grants Commission**
Rohit A. Kale, Subodh S. Khire, Sunil K. Hode, Dilip S. Joag and Shridhar R. Gadre
- 356 **Professional competence of teachers in Indian higher agricultural education**
P. Ramesh and P. Krishnan
-
- REVIEW ARTICLE**
- 362 **The forests and elephants of Wayanad: challenges for future conservation**
N. R. Anoop and T. Ganesh
-
- RESEARCH ARTICLES**
- 368 **Imaging Infrared Spectrometer onboard Chandrayaan-2 Orbiter**
Arup Roy Chowdhury, Arup Banerjee, S. R. Joshi, Moumita Dutta, Ankuash Kumar, Satadru Bhattacharya, Amitabh, Sami Ur Rehman, Sunil Bhati, J. C. Karelia, Amiya Biswas, Anish R. Saxena, Satish Sharma, Sandip R. Somani, H. V. Bhagat, Jitendra Sharma, D. N. Ghonia, B. B. Bokarwadia and Ajay Parasar

Current Science Vol. 118 No. 3, 10 February, 2020

- 376 **Instrument for Lunar Seismic Activity Studies on Chandrayaan-2 Lander**
J. John, V. Thamarai, M. M. Mehra, Teena Choudhary, M. S. Giridhar, Ashwin Jambhalikar, Gogulapati Supriya, Gaurav Saxena, K. V. Shila, B. Ramesh, T. K. Pratheek, Deepak Kumar Sharma, R. Islam, P. Selvaraj, A. Kalpana, S. Ajith Kumar, K. V. Sritam and A. S. Lakshminasad
- 383 **Lunar near surface plasma environment from Chandrayaan-2 Lander platform: RAMBHA-LP payload**
G. Manju, Tarun K. Pant, P. Sreejatha, Santhosh J. Nalluveetil, P. Pradeep Kumar, Nirbhay Kumar Upadhyay, Md. Mosarraf Hossain, Neha Naik, Vipin Kumar Yadav, Rosmy John, R. Sajeev, Jothi Ramalingam, Philip George, Amarnath Nandi, N. Mridula, Aswathy R. P. Janmejay Jaiswal Rana, Snehil Srivastava and Satheesh Thampi
- 392 **Analysing impact of major solar flares on ionospheric total electron content using NavIC signals**
Sonal Parmar, Upena Dalal and Kamlesh Pathak
- 401 **Simulating reinforcement corrosion-induced strain in concrete using expansive grout**
Prasanna Kumar Behera, K. Mondal and Sudhir Mishra
- 411 **Assessment of sedimentation and useful life of Tehri reservoir using integrated approaches of hydrodynamic modelling, satellite remote sensing and empirical curves**
Ayan Anil Garg, Alemayehu A. Shawul and Sumedha Chakma
- 421 **Electrical signature of the October 2013 very severe cyclonic storm *Phailin***
Adarsh Dube, Ajeet K. Maurya and Rajesh Singh
- 428 **Identifying critical links on disruption-prone road networks: an approach that obviates scenario enumeration**
Gopal R. Patil and B. K. Bhavathrathan
-
- RESEARCH COMMUNICATIONS**
- 439 **Development of artificial neural network-based model for prediction of temperature field in host rock of a geological disposal facility for radioactive waste**
Vrinda Brajesh Gupta, T. K. Pal and R. K. Bajpai
- 444 **Climate change smart option and doubling farmer's income through *Melia dubia*-based agri-silviculture system**
P. Chandana, A. Madhavi Lata, M. A. Aariff Khan and A. Krishna
- 448 **Energy use pattern in wheat crop production system among different farmer groups of the Himalayan Tarai region**
Rajat Kumar Sharma, T. K. Bhattacharya, Akanksha Kumari, Priyanka Chand, Sandip Mandal and Deepshikha Azad
-  455 **Iron and zinc bioavailability from Madhukar x Swarna derived biofortified rice lines**
Raghu Pullakhandam, Surekha Agarwal, V. G. N. Tripura Venkata, C. V. Ratnavathi, K. Madhavan Nair and Sarla Neelamraju
- 461 **A significant shift in particulate organic matter characteristics during flooding of River Krishna, eastern peninsular India**
C. Prakash Bobu, V. Ramaswamy, P. S. Rao, V. V. S. S. Sarma and P. Praveen Kumar
-  467 **Unique breeding activity and oviposition in Annandale's high-altitude tree frog, *Kurixalus naya* (Annandale, 1912) in Meghalaya, North East India**
P. W. Shangpliang, R. N. K. Hooroo and S. K. Dutta

Current Science Vol. 118 No. 3, 10 February, 2020

- 473 **Small hydropower using pump as turbine: an alternative for energy generation in Southern Africa**
Jinfeng Zhang, Daniel Ada, Mao Jinyin, Samuel Joe Acquah and Stephen Yitru Asomani

BOOK REVIEWS

- 479 **Pillars of Life: Magnificent Trees of the Western Ghats**, Divya Mudappa and T. R. Shankar Raman with Botanical Illustrations by Nirupa Rao and sketches by Sartaj Ghuman, reviewed by M. Sanjappa and P. Venu
- 480 **Annual Review of Immunology, 2018**, Dan R. Littman and Wayne M. Yokoyama (eds), reviewed by Beneeta Kalra, Ruchi Sachdeva, Anjali Bose, Moumita Sarkar, Hritika Sharma, Monika Malik and Rahul Pal

PERSONAL NEWS

- 486 **Kailasam Venkatesan (1932–2019)**
T. N. Gurn Row
- 488 **R. Jayaraman (1937–2019)**
M. Hussain Munavar and K. Dharmalingam

ACADEMY NEWS

- 490 **Indian Academy of Sciences announces new Fellows and Honorary Fellow for 2020**

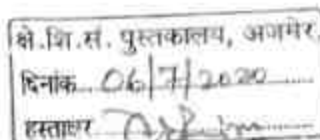


- ◀ **COVER.** A pencil sketch of the old building of the Biochemistry Department, Indian Institute of Science, Bangalore. See page 331.

Indexed in CURRENT CONTENTS/GEOTitles/CHEMICAL ABSTRACTS/InMED/SCOPUS/
WEB OF SCIENCE

Current Science Vol. 118 No. 4, 25 February, 2020

Founded: 1932



ISSN: 0011-2591

CURRENT SCIENCE

Volume 118 Number 4

25 February 2020

510 In this issue

GUEST EDITORIAL

- 511 **Is ambient space a determinant of human health?**
A. Anandkumar and C. C. Kartha

CORRESPONDENCE

- 513 **Bacteria-on-a-chip: emergence of digital medicine**
Partha Pratim Ray and Poulami Majumder
- 513 **Research performance in India during the 2011–2015 window**
Gangan Prathap

NEWS

- 515 **Science Last Fortnight**

IN CONVERSATION

- 519 **Jay Yagnik**
Pratik Pawar

COMMENTARY

- 522 **India needs a comprehensive space policy**
Munakrishnappa Anilkumar and Chetan Singal

SCIENTIFIC CORRESPONDENCE

- 524 ***Aquarius cardifolius* (L.) Christenh. & Byng (Alismataceae), an invasive alien species: its introduction, colonization and plausible threats in India**
Anant Kumar and W. Arisdason

GENERAL ARTICLES

- 526 **Work environment in the wheat mills of Punjab, India**
Indu Rawat and Nilesh Gaikwad
- 532 **Global research landscape of high-level studies in geosciences based on highly cited papers**
Yanlin Cui

REVIEW ARTICLES

- 543 **Current status of thermionic conversion of solar energy**
O. C. Olawole, D. K. De, S. O. Oyedepo, O. F. Olawole and E. S. Joel
- 553 **Compound feed production for livestock**
D. J. Shrinivasa and S. M. Mathur

RESEARCH ARTICLES

- 560 **Orbiter High Resolution Camera onboard Chandrayaan-2 Orbiter**
Arup Roy Chowdhury, Manish Saxena, Ankuash Kumar, S. R. Joshi, Amitabh, Aditya Dagar, Manish Mittal, Shweta Kirkire, Jalshri Desai, Dhruvesh Shah, J. C. Karelia, Anand Kumar, Kailash Jha, Prasanta Das, H. V. Bhagat, Jitendra Sharma, D. N. Ghonia, Meghal Desai, Gaurav Bansal and Ashutosh Gupta



Current Science Vol. 118 No. 4, 25 February, 2020

- 566 **Terrain Mapping Camera-2 onboard Chandrayaan-2 Orbiter**
Arup Roy Chowdhury, Vishnukumar D. Patel, S. R. Joshi, A. S. Arya, P. G. K. Kumar, Sukamal Paul, Dhropesh Shah, Pradeep Soni, J. C. Karelia, Minal Jaiswal, Jyoti Sharma, Sandip Soman, H. V. Bhagat, Itendra Sharma, Amitabh, K. Sainath, P. P. Rajasekhar, D. B. Bokaewadia, Mukesh Kumar and D. N. Ghonia
- 573 **Laser Induced Breakdown Spectroscopy on Chandrayaan-2 Rover: a miniaturized mid-UV to visible active spectrometer for lunar surface chemistry studies**
A. S. Laxmiprasad, R. V. L. N. Sridhar, Adwaita Goswami, K. A. Lohar, M. V. H. Rao, K. V. Shila, Monika Mahajan, Bijoy Raha, T. S. Smaran and B. Krishnamurthy
- 582 **Nuclear Hulthén potential and the scattering phase shifts for $l=3$**
U. Laha
- 587 **Effect of long-term nutrient management on soil organic carbon sequestration in rice-rice-fallow rotation**
Umme Aminun Nuber, M. B. Hossain, M. M. Haque, M. Maniruzzaman, A. K. Choudhury and J. C. Biswas
- 593 **Exploitation of mica deposits at Nellore mica belt, Andhra Pradesh, India**
Subhashish Tewari, Vivek Kumar Homanshu, John Loui Parathur, Rana Bhattacharjee, Arka Jyoti Das and Prabhat Kumar Mandal
- 603 **Fungal biotransformation of clobazam – induction, inhibition and kinetic studies**
M. Keerthana and M. Vidyavathi
- 612 **Evaluating the effect of music intervention on hypertension**
Vijay Mani Shankar, B. Geethanjali, Mahesh Veezhinathan, Jayaram Hariharakrishnan, Nikhil Balakrishnan and L. Lakshmi
-
- RESEARCH COMMUNICATIONS**
- 621 **Purification and partial characterization of a haemagglutinin from *Ulva fasciata***
Sudhir Kumar and Urmila Barros
- 625 **Marker validation and sequencing in aromatic landrace Mushk Budji**
Aafreen Sakina and Amjad M. Husaini
- 630 **Palaeo and present channel of Assi river, Uttar Pradesh, India**
Mallikarjun Mishra, K. N. Prudhvi Raju and P. V. Raju
- 639 **Influence of different sources and methods of potassium application on the quality of grapes cv. Sharad Seedless (*Vitis vinifera* L.)**
Y. Pushpavathi, J. Satisha, G. C. Satisha, K. S. Shivashankara, M. Lakshminarasayana Reddy and S. Sriram
- 644 **Glucose uptake rate of microorganisms living in hot springs above 70°C temperature: a study of Panamik and Puga hot springs in the Ladakh region, Jammu and Kashmir, India**
A. H. Ansari, Mukund Sharma, S. Ahmad, Veeru Kant Singh, S. K. Pandey and Yogesh Kumar
- 648 **Some aspects of seed dispersal by Asian elephants (*Elephas maximus*) in Kaudulla National Park, Sri Lanka**
Perera Mahesha and Vandercone Rajnish
- 654 **Reliability modelling on drivers' decision during the yellow phase of a signal intersection**
Sabyasachi Biswas and Indrajit Ghosh
-
- BOOK REVIEWS**
- 662 **Atlas of Hematopathology: Morphology, Immunophenotype, Cytogenetics, and Molecular Approaches, 2nd Edition. Faramarz Naeim, P. Nagesh Rao, Sophie X. Song and Ryan T. Phan; reviewed by Swati Pai and Roshini Shekhar**



LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Current Science Vol. 118 No. 4, 25 February, 2020

- 662 **Philosophy of Science (At the end of the twentieth century), Revised Edition.** B. V. Sreekantan; *reviewed by* Varun S. Bhatta
-

HISTORICAL NOTES

- 664 **Historical methodology and expert opinion in the Aryan Debate**

T. R. S. Prasanna

- 671 **Publications received – 2019**
-



- ◀ COVER. Patch of a colony of *Aquarius cordifolius* (L.) Christenh. & Byng, an invasive alien species (inset, Flower). See page 524.

Indexed in CURRENT CONTENTS/SOBIAS/CHEMICAL ABSTRACTS/ISI/SCOPUS/
WEB OF SCIENCE

Current Science Vol. 118 No. 5, 10 March, 2020



771. **Pre-transfer functions for saturated hydraulic conductivity of cultivated soils in the mid hills of Sikkim**
G. T. Patle and P. C. Vaidalmunchhali
778. **Role of meteorology and local orography on a flood event in the Lower Subansiri Basin and post-flood changes to land use and land cover**
Partha Pratim Gogoi, V. Vinay and Parag Phukan

RESEARCH COMMUNICATIONS

786. **Analysis of various factors responsible for hair loss and awareness level in Delhi and the National Capital Region of India**
Archana Aggarwal, Rakhi Gupta, Navdha Thakral, Gargi Nandi and Garima Bora
791. **A comparative study of physical properties of yarns and fabrics produced from fresh and recycled fibres**
Neelam Saini, Saroj Yadav and Neelam M. Rose
796. **Anticandidal efficiency of *Cinnamomum zeylanicum* extracts against vulvovaginal candidiasis**
Mohamed Taha Yassin, Ashraf Abdel-Fattah Mostafa and Abdulaziz Abdulrahman Al-Aaskar
801. **First record of circa 970 Ma post-collisional A-type magmatism in the Sendra Granitoid Suite, central Aravalli orogen, northwest India**
Jaideep K. Tiwana, Parumpreet Kaur, Naveen Choudhri and Manisha
809. **Occurrence of liddicoatite-bearing LCT pegmatites in Sirohi region, northwest India and their rare metal potentiality**
Manideepa Roy Choudhury, Nikhil Agarwal and Suresh Chander
819. **Studies on butterfly (Insecta: Lepidoptera) diversity across different urban landscapes of Delhi, India**
Monalisa Paul and Aisha Sultana
827. **Functional response of three species of predatory pirate bugs to different densities of blossom thrips, *Frankliniella schultzei* Trybom (Thysanoptera: Thripidae)**
Richa Varshney, Neeraj Budhikoti and Chandish R. Balla



BOOK REVIEWS

834. **Retrovirus-Cell Interactions**, Leslie J. Parent (ed.); reviewed by Matto Rohini
835. **Space and Human Development, Revised Edition**, Mohan Sundara Rajan; reviewed by Ranganath Navalgund
836. **Sambhu Nath De: The Discovery of Cholera Toxin**, M. S. S. Murthy; reviewed by Anisha Maria Fernandes and Sanjay A. Pai

PERSONAL NEWS

837. **M. K. Bhan (1947-2020)**, Renu Swarup

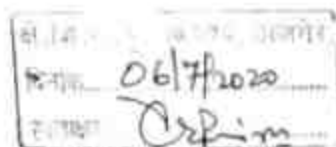


- ◀ COVER. Oriental Lemon Emigrant *Catopsilia pomona* F. at Aravalli Biodiversity Park, New Delhi (Photo credit Dr Aisha Sultana). See page 819.

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

Current Science Vol. 118 No. 6, 25 March, 2020

Founded, 1932



ISSN: 0011-2541

CURRENT SCIENCE

Volume 118 Number 6

25 March 2020

- 854 **In this issue**
-
- GUEST EDITORIAL**
- 855 **Will Coronavirus Pandemic eventually evolve as Pan-endemic?**
T. Jacob John
-
- CORRESPONDENCE**
- 857 **International Year of Plant Health 2020 to focus on threat of pests on food security**, H. R. Gautam and M. L. Bhardwaj
-
- NEWS**
- 858 **2020 King Faisal International Prize for Science and Medicine**
Sameen Ahmed Khan
- 859 **Science Last Fortnight**
-
- COMMENTARY**
- 863 **Preaching objectivity – practicing obfuscation**, Deepak Pental; *A reply by Gutierrez et al.*
- 869 **A century of biochemistry at IISc**, K. Muniyappa
-
- GENERAL ARTICLES**
- 872 **Low cost drinking water technology – rainwater harvesting with solar purification**
Shivam D. Patange, Nandini Nimbkar and Anil K. Rajvanshi
- 877 **Challenges in geospatial documentation of unprotected built heritage sites in India**
Kunli Suganya
-
- REVIEW ARTICLE**
- 883 **Sources and leaching of nitrate contamination in groundwater**
Saurabh Shukla and Abhishek Saxena
-
- RESEARCH ARTICLES**
- 892 **Anti-tumour and immune enhancing activities of MLAA-22₃₇₆₋₄₂₅ on acute myeloid leukemia**
Jing Li, Wanggang Zhang, Ju Bai, Bo Zhong, Huiyuan Wang, Yan Geng, Qiaoyan Jin, Juanjuan Hao and Yang Zhang
- 901 **Blasting technique for stabilizing accident-prone slope for sustainable railway route**
N. K. Bhagat, A. K. Mishra, M. M. Singh, Aditya Rana, S. Tewari and P. K. Singh
- 910 **Petrogenesis of the Palaeoarchean Keonjhar Granite, Singhbhum Craton, India: product of crustal reworking or subduction?**
Ajay Dev Asokan, Kumar Krishna, R. Elangovan and M. Ram Mohan
- 920 **Aqueous extract of *Cleistanthus collinus* induces activity of peroxidase and catalase in the seedlings of cucumber and chilli**
Monal R. Kadoo and Rupesh S. Badere



Current Science Vol. 118 No. 6, 25 March, 2020



- 931 *Averrhoa bilimbi* in organic transformation: a highly efficient and green biosurfactant for the synthesis of multi-functional chromenes and xanthenes
Dhagyashree M. Patil, Snehali R. Mali, Bhimrao M. Patil and Suresh S. Patil

- 946 Stigmasterol-3-O-glucoside, an allelopathic molecule responsible for pest resistance of Thenkaali (AAB), a *Musa* cultivar against *Odoiporus longicollis* [Olivier]
K. J. Kavitha, J. Anil John and D. A. Evans

RESEARCH COMMUNICATIONS

- 954 Efficient and improved edge detection via a hysteresis thresholding method
Sajid Khan, Dong-Ho Lee, Muhammad Asif Khan, Abdul Rehman Gilal, Junaid Iqbal and Ahmad Waqas

- 961 Fractionalization of *h*-index for multiple authorship – an impact-based interpretation conserving counts
Gangan Prathap

- 966 Effect of extractive content on fuelwood characteristics of certain woody and non-woody biomass
Ritesh Kumar, N. Chandrashekar, N. R. R. Prasad and Ritesh Tailor

- 969 Smart automatic irrigation controller
Faruk Poyeu, Sayan Hazra, Nabarun Sengupta, Apurba Ghosh and Palash Kundu



- 977 Ingestion of unusual items by wetland birds in urban landscapes
Abey Francis, B. Anjan Kumar Prusty and P. A. Azeez

- 983 Tunnel wells, the traditional water harvesting structures of Kasaragod, Kerala: re-visited
E. Shaji, K. V. Sarath, Pranav Prakash, Adithya Pazhoor Abraham, V. Deepchand, V. Kunhambu and A. P. Pradeepkumar

BOOK REVIEWS

- 988 *Clay, Craft, Music and Science: Purnima Sinha's Life*. Rajinder Singh and Suprakash C. Roy; reviewed by Hardev Singh Virk

- 989 *Voyage to Antarctica: An Odyssey to the Past, Present and Future of the Gelid Mysterious Continent*. Felix Bast; reviewed by Rahul Mohan

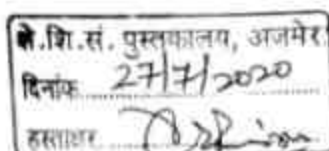
PERSONAL NEWS

- 992 Sambasiva Swaminathan (1923–2020), S. Chandrasekaran and K. Nagarajan



- ◀ COVER. Temple in ruins at Arasibidi in North Karnataka, India. See page 877.

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



CURRENT SCIENCE

1010 In this issue

GUEST EDITORIAL

- 1011 Academic and post-academic research, and national development
R. B. Grover

NEWS

- 1013 Science Last Fortnight

OPINION

- 1017 Revamping of doctoral education in agricultural sciences in India
Aditya Sinha, Roshan Nayak and Raj Narain Singh

SCIENTIFIC CORRESPONDENCE

- 1019 Development of analytical hierarchy process based dairy index for assessment of the dairy sector in different states of India
Ashish Kumar, Bakul Rao and Rahi Jain

- 1021 Selfing in *Buxus wallichiana* Baill.: a trait or strategy?
Eshan Sharma, Uma Bharti, Urvan Bhushan and Namrata Sharma

- 1023 Model-based retrospective estimates for COVID-19 or coronavirus in India: continued efforts required to contain the virus spread
Arni S. R. Srinivasa Rao, Steven G. Krantz, Thomas Kurien, Ramesh Bhat and Sudhakar Kurupati

GENERAL ARTICLE

- 1026 Suggestions for a National Framework for Publication of and Access to Literature in Science and Technology in India
S. Chakraborty, J. Gowrishankar, A. Joshi, P. Kannan, R. K. Kohli, S. C. Lakhotia, G. Misra, C. M. Nautiyal, K. Ramasubramanian, N. Sathyamurthy and A. K. Singhvi

RESEARCH ARTICLES

- 1035 Macrocycles of axially chiral and racemic *N*-heterocyclic carbene silver(I), gold(I) and palladium(II) complexes: synthesis, characterization and computational structures
Sonali Rangopal Mahule

- 1042 Microbial diversity analysis in the oxygen minimum zones of the Arabian Sea using metagenomics approach
Mandar S. Paingankar, Kedar Ahir, Pawan Mishra, Shriram Rajpathak and Deepti D. Deobagkar

- 1052 Effect of charring on rice grain morphology and carbon isotopic composition
Arpita Biswas, Ritika Kaushal and Prosenjit Ghosh

- 1060 Engineering properties of bacterially induced calcite formations
Sangeeta Shougrakpam and Ashutosh Trivedi



Current Science Vol. 118 No. 7, 10 April, 2020

- 1069 **Source of unusual monochromatic wave packets recorded globally in the seismograms of 11 November 2018**

S. N. Bhattacharya, V. K. Gahalaut, Narendra Pandey, Shankar Pal, Rajeev Manhas and G. Suresh

- 1077 **Effect of hotel beams on response reduction factor of RC-infilled frames**

Mangeshkumar R. Shendkar, Sumanasekhar Mandal and Ramacharla Pradeep Kumar

- 1087 **Molecular docking analysis of selected natural products from plants for inhibition of SARS-CoV-2 main protease**

Megha Hasantam Sampangi-Ramaiah, Ram Vishwakarma and R. Uma Shaanker



RESEARCH COMMUNICATIONS

- 1093 **Evaluating risk factors in patients with severe asthma: a cross-sectional study**

Ali Alavi Foumani, Alireza Jafari, Ehsan Kazem Nejad Leili, Elnaz Daraei, Negar Sheikhli, Shima Idari and Reyhaneh Shabani

- 1098 **Soil organic carbon pools under *Terminalia chebula* Retz. based agroforestry system in Himalayan foothills, India**

Amit Kumar, G. K. Dwivedi, Satil Tewari, Jaipaul, V. K. Sah, Hakum Singh, Parmanand Kumar, Narendra Kumar and Rajesh Kaushal

- 1104 **GPR data interpretation using continuous wavelet transform: a different approach**

Sarvesh Kumar, Sanjit Kumar Pal, Soma Rani and Saurabh

- 1112 **Detection of atmospheric lightning activity with ground-based radiofrequency receivers – establishment and initial results**

Alok Taori, Arun Suryavanshi, R. Goenka, B. Gharai, M. K. Madhav Haridas, M. V. R. Seshasai, D. Dutta, Uday Raj and Chitranjivi Jayaram

- 1118 **Morphology of the two unnamed seamounts in the Arabian Basin and their probable tectonic implications**

C. M. Bijesh and P. John Kurian

- 1123 **Characteristics of Mesoproterozoic felsic meta-volcanics from the Shillong Group of rocks, Meghalaya, North East India**

R. R. Naik, K. Theunoo, T. K. Goswami, M. A. Khonglah, T. Pal and S. K. Tripathy

BOOK REVIEWS

- 1129 **Vedic Mathematics and Science in Vedas**. S. Balachandra Rao; reviewed by B. S. Shylaja

- 1130 **The Scientific Temper**. V. Rajagopal; reviewed by Amruta Nair

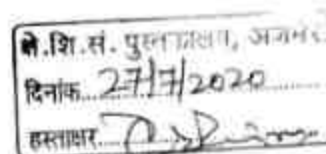


- ◀ **COVER**. Pictorial representation of SARS-CoV-2 virus (background) depicting the visualization of binding of the active site residues of the viral Main Protease (blue ribbon) with hederagenin, a natural product ligand (green). For further details see page 1087. Photocredit: SARS-CoV-2 virus cartoon: (<http://www.pngall.com/coronavirus-png/download/40779>) 3D model of viral protease and ligand: Developed in the current study. Cover design: Megha H Sampangi-Ramaiah.

Indexed in CURRENT CONTENTS/GEOTitles/CHEMICAL ABSTRACTS/medMED/SCOPUS/
WEB OF SCIENCE

Current Science Vol. 118 No. 8, 25 April, 2020

Founded: 1932



ISSN: 0011-3897

CURRENT SCIENCE

Volume 118 Number 8

25 April 2020

-
- 1146 **In this issue**
- EDITORIAL**
- 1147 **Pandemics and climate change**
J. Srinivasan
-
- CORRESPONDENCE**
- 1149 **Novel coronavirus epidemic: new dimension for disaster management and health resilience**, Atisha Sood, Anjali Barwal, Anil K. Gupta and Jugal Kishore ■ 1150 **Coronavirus: a novel threat and ICT-based mitigation**, Partha Pratim Ray and Poulami Majumder ■ 1152 **Litchi is safe and harmless in normal individuals**, T. Jacob John, Mukul Das and Abhirup Sarkar
-
- NEWS**
- 1153 **Science Last Fortnight**
-
- OPINION**
- 1157 **Membrane cholesterol and SARS-CoV-2 infection: a possible connection**
Hirak Chakraborty
-
- COMMENTARY**
- 1158 **Ayurveda rasayana in prophylaxis of COVID-19**
Bhushan Patwardhan, Preeti Chavan-Gautam, Manish Gautam, Girish Tillu, Arvind Chopra, Sumil Gairola and Suresh Jadhav
-
- SCIENTIFIC CORRESPONDENCE**
- 1161 **Structure and genetic variability of new populations of *Amentotaxus assamica* in the Eastern Himalaya, India**
N. Lyngdoh, S. Chakraborty, G. Ravikanth, A. A. Mao and A. K. Pandey
-
- GENERAL ARTICLES**
- 1163 **Micro-irrigation development in India: challenges and strategies**
A. Suresh and Manoj P. Samuel
- 1169 **Field dependence of citation data validation of premier peer-review decisions in India**
Gangan Prathap
-
- SPECIAL SECTION: VIKRAM SARABHAI BIRTH CENTENARY**
- 1173 **Foreword**
K. Kasturirangan
- 1177 **Scientist, businessman, visionary institution builder**
E. V. Chitnis
- 1180 **There is nobody to be ruled**
Praful D. Bhavsar
- 1182 **Tribute to Vikram Sarabhai**
C. N. R. Rao

Current Science Vol. 118 No. 8, 25 April, 2020

- 1183 **Vikram Sarabhai – A scientist's scientist**
M. S. Swaminathan
- 1184 **Vikram Sarabhai – Visionary motivator**
Prمود Kale
- 1188 **My reminisces of interaction with Vikram Sarabhai**
Govind Swarup
- 1190 **The man with big ears, and big dreams that took India to the moon**
Amrita Shah
- 1191 **Vikram Sarabhai: his vision for the development of atomic energy in India**
R. B. Grover and M. R. Srinivasan
- 1196 **Sowing the seeds of an Indian fusion programme – an untold legacy of Vikram Sarabhai**
Abhijit Sen
- 1199 **Vikram Sarabhai: his vision of India as a space power and its fulfilment**
R. Aravamudan
- 1203 **Vikram Sarabhai: science in developing countries**
Kartikeya V. Sarabhai and Padmanabh Joshi
- 1207 **Propagating and practising 'horizontal control': Vikram Sarabhai, management and American social science**
Joseph Francombe
- 1213 **Vikram A Sarabhai Community Science Centre**
Dilip Surkar
- 1215 **Photo Gallery**
-
- RESEARCH ARTICLES**
- 1219 **Nitrous oxide emissions from turfgrass lawns as a result of fertilizer application: a meta-analysis of available literature**
Neesha Dutt and Tushar Tanwar
- 1227 **Parameter uncertainty in HEC-RAS 1D CSU scour model**
Praveen Rathod and V. L. Manekar
- 1235 **Impact of climate variability and change on crop production in Maharashtra, India**
Saurabh M. Kelkar, Ashwini Kulkarni and K. Koteswara Rao
- 1246 **Site-suitability analysis for turmeric in Jaintia Hills of Meghalaya, India, using analytical hierarchical process and weighted overlay analysis: a comparative approach**
Ashu Negi, Tapan Adhikari, Chandan Goswami, B. K. Handique and P. L. N. Raju
- 1255 **Control of an irrigation branch canal using model predictive controller**
Jailakshmi Menon, B. V. Mudgal, M. Guruprasath and S. Sivalingam
- 1265 **Performance evaluation of anaerobic baffled biodigester for treatment of black water**
Ligy Philip, K. Kalaivani, Praveen Rosario, Vamsi Krishna and S. SriShalini
-
- RESEARCH COMMUNICATIONS**
- 1275 **Detection and mapping of seagrass meadows at Ritchie's archipelago using Sentinel 2A satellite imagery**
Sharad Bayyana, Satish Pawar, Swapnali Gole, Sohini Dudhat, Anant Pande, Debashis Mitra, Jeyaraj Antony Johnson and Kuppusamy Sivakumar

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Current Science Vol. 118 No. 8, 25 April, 2020

- 1282 **Development of wind speed retrieval model using RISAT-1 SAR cross-polarized observations**
Jagdish Prajapati, Abhinav Chakraborty, Dipanjan Paul Shukla and Raj Kumar
- 1286 **Correlation between Earth tides and the 2008 M_w 8.0 Wenchuan earthquake sequence**
Ruiyu Yan, Chaodi Xie, Xinglin Lu, Han Zhang, Bao Jia and Jianping Liao
- 1292 **Geochemical pathways of fluoride and boron in the alluvial aquifer of the Dwarka river basin, India**
Raju Thapa, Srimanta Gupta and Harjeet Kaur
- 1296 **Financialization and its impact on the nature of knowledge production in bioeconomy**
P. Omkar Nudh
- 1304 **Finding clues in cities: nest site selection by house sparrows across a varied habitat matrix in Delhi, India**
Shikha Choudhary, N. P. S. Chauhan and Rajiv Kalsi
-
- BOOK REVIEWS**
- 1310 **Annual Review of Earth and Planetary Sciences, 2019.** Raymond Jeanloz and Katherine H. Froeman (eds); reviewed by C. P. Rajendran
- 1311 **An Autobiography of the Moon.** Ramesh Shishu; reviewed by Ranganath Navalgund
-
- HISTORICAL NOTES**
- 1313 **On the 200th anniversary of the Madras Eye Infirmary, the first ophthalmic hospital in Asia**
Ramya Raman and Anantanarayanan Raman

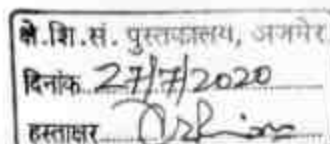


◀ COVER. Vikram Sarabhai: A visionary scientist. See special section.

Indexed in CURRENT CONTENTS/GEOTitles/CHEMICAL ABSTRACTS/InMED/SCOPUS/
WEB OF SCIENCE

Current Science Vol. 118 No. 9, 10 May, 2020

Founded 1932



ISSN: 0011-3891

CURRENT SCIENCE

Volume 118 Number 9

10 May 2020

1330 In this issue

GUEST EDITORIAL

- 1331 **On interdisciplinarity**
Sushanta Dattagupta

CORRESPONDENCE

- 1333 **Bioinformatics: genomics to phenomics and beyond**, Rajiv Angrish and Sarita Devi
■ 1333 **Deciphering asymptomatic malaria – the missing link in India's fight against the disease?**, Saurav Jyoti Patgiri, Dibya Ranjan Bhattacharyya, Ipsita Pal Bhownick and Md Atique Ahmed

OPINION

- 1335 **Obesity and COVID-19 outcomes: a risk factor that needs attention**
Anurag Bhargava and Madhavi Bhargava
- 1337 **Soil health cards: limitations and ways to fix the loopholes**
Ankita Trivedi and Asik Dutta

SCIENTIFIC CORRESPONDENCE

- 1339 **Are traditional bamboo products green?**
Rajashree Ray, Karabi Pathak, Arun Jyoti Nath and Ashesh Kumar Das

GENERAL ARTICLES

- 1343 **India's potential to develop particle accelerators for societal, industrial and environmental applications**
R. K. Bhandari
- 1349 **Thirsty crops and virtual water flows – making sense of the economically invisible water flows**
Gurudas Nulkar
- 1354 **The spatial model of the classroom and its immediate surroundings: a variety of learning spaces**
Milan Tanić, Vojislav Nikolić and Željko Žugić

REVIEW ARTICLES

- 1365 **Plurality of wave-particle duality**
Varun S. Bhatta
- 1375 **Cow milk protein allergy and lactose intolerance**
Rajendra Prasad and Yashbir Singh Shivay

RESEARCH ACCOUNT

- 1379 **Insights into riverscape dynamics with the hydrological, ecological and social dimensions for water sustenance**
T. V. Ramachandra, S. Vinay, S. Bharath, M. D. Subash Chandran and Bharath H. Aithal

RESEARCH ARTICLES

- 1394 **Chia seed-based nutri bar: optimization, analysis and shelf life**
Jyoti Singh, Bhavna Sharma, Mokshi Madaan, Pooja Sharma, Tarandeep Kaur, Navjot Kaur, Inderdeep Kaur Bhamra, Sawinder Kaur and Prasad Rasane



1278

CURRENT SCIENCE, VOL. 118, NO. 9, 10 MAY 2020

Current Science Vol. 118 No. 9, 10 May, 2020

- 1401 **Mechanisms underlying dormancy escape of winter wheat in the jointing stage.**
Yinghao Liu, Huafei Shen, Qianjin Peng, Xiaohua Zhang, Xiangdong Chen
- 1407 **A method for the identification and evaluation of drought tolerance in variety**
Huiyan Wang, Shugong Wang, Zhenhua Tang, Lianping Wu, Yuesong Wang and
Daichen Sun
- 1415 **A socio-economic survey of the Singhaing Bujura Village Community Reserve,
Arunachal Pradesh, India**
Binod Borah, Nandini Velho and Umesh Srivastava
- 1420 **Mapping of greenstone belts using aeromagnetic data in Eastern Dharwar Craton,
India**
M. Prasanthi Lakshmi, S. Parveen Begum, A. Manglik and D. Sesha

RESEARCH COMMUNICATIONS

- 1432 **A tournament metaphor for dominance hierarchy**
Gangan Prathap
- 1436 **Molecular association and gelling characteristics of curdlan**
Jagadeeshwar Kodavaty, Gayathri Venkat, Abhijit P. Deshpande and Satyanarayana N.
Gummadi
- 1442 **Source change of lead materials for mirror-making industry in Western Han,
China: evidence from Nanyang bronze mirrors**
Dian Chen, Qingshuo Zeng, Beixun Cui and Wugan Luo
- 1448 **Endophytic fungi of salt adapted *Ipomea pes-caprae* L. R. Br: their possible role in
inducing salinity tolerance in paddy (*Oryza sativa* L.)**
K. M. Manasa, M. M. Vasanthakumari, K. N. Nataraja and R. Uma Shaanker
- 1454 **Incipient infestations and threat of pink bollworm *Pectinophora gossypiella*
(Saunders) on Bollgard-II cotton in the northern cotton-growing zone of India**
Rishi Kumar, D. Monga, V. Chinnu Babu Naik, Paramjit Singh and V. N. Waghmare
- 1456 **Identification of Indian butterflies and moths with deep convolutional neural
networks**
V. Sagar, R. Sachin, K. Chandrashekara and K. N. Ganeshatah



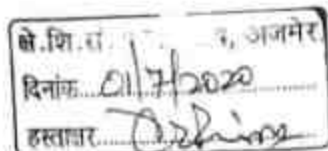
BOOK REVIEWS

- 1463 **Zhuangzi: The Way of Nature.** Adapted and Illustrated by C. C. Tsai; *reviewed by*
Rajan Gurukkal
- 1464 **Why Trust Science?** Naomi Oreskes; *reviewed by* Raghavendra Gadagkar



- ◀ COVER. Perennial stream amidst sacred grove at Vibuthi, Near Yana, Uttara
Kannada District, Central Western Ghats. See page 1379.

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



CURRENT SCIENCE

1482 In this issue

EDITORIAL

- 1483 A tale of two views: why are scientists polarized?
R. Uma Shaanker

NEWS

- 1485 Brainstorming on the future of the highly threatened medicinal plants of the Western Himalaya, India
Manisha Mathela, Himanshu Bargali, Monika Sharma, Rupali Sharma and Amit Kumar

OPINION

- 1487 Critical zone: an emerging research area for sustainability
Paras R. Pujari, V. Jain, V. Singh, K. Sreelash, S. Dhyani, M. Nema, P. Verma, R. Kumar, S. Jain and M. Sekhar

COMMENTARY

- 1489 Hydroxychloroquine: A relatively obscure antimalarial takes centre stage in COVID-19
Govindarajan Padmanaban and Viswanathan Arun Nagaraj

SCIENTIFIC CORRESPONDENCE

- 1492 Presence of air cavities in pods of an endemic legume *Crotalaria pusilla* DC. (Leguminosae, Papilionoideae)
Shweta Subramaniam, Shabir A. Rather, Shagun Danda and Arun K. Pandey
- 1494 Cry toxin expression in *Bt*-cotton hybrid seeds: impact on 'refuge-in-bag' strategy for managing resistance in bollworms
K. Muralimohan and H. M. Mahesh

GENERAL ARTICLES

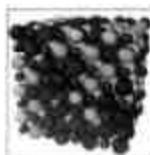
- 1496 Who should certify the sustainability of our fisheries? A property rights perspective on ecolabelling
C. Ramachandran and Shinoj Parappurathu
- 1500 Rare diseases in India: time for cure-driven policy initiatives and action
Anjali Taneja, L. S. Shashidhara and Alok Bhattacharya

REVIEW ARTICLES

- 1507 $\text{Na}_{1-x}\text{Bi}_x\text{TiO}_3$ -based lead-free piezoceramics: a review of structure-property correlation
Rajeev Ranjan
- 1520 High-entropy materials: critical review and way forward
Nilesh P. Gurao and Krishanu Biswas
- 1540 Biopolymer based hydrogels for arsenic removal
Shabnam Pathan and Suryasarathi Bose

RESEARCH ARTICLES

- 1547 Critical analysis of process cycle by numerical modelling for faster development of drives in hard-rock underground mine - a case study
K. K. Rao, B. S. Choudhary, Ajay Ghade and Chandrabas



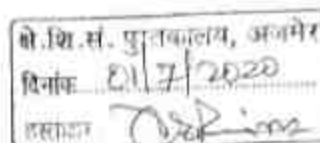
Current Science Vol. 118 No. 10, 25 May, 2020

- 1557 **Co-authorship network in cardiology research studies: case study of Iranian output**
Eskrootchi Rogheyeh, Ashoori Mhrazgani Forouzan, Shahrabi Farahani Helia and Mayank Yuvraj
- 1563 **Mapping spatial relationship of Van Panchayats and Forest Fire of 2019 in Almora district, Uttarakhand**
Stutee Gupta, Shikha Anand, Vishesh Mathur, K. M. Reddy and T. Ravisankar
- 1569 **Geometric characteristics of slope toppling failure and its interpretation**
Jiayuan Cao, Fengshan Ma, Jiamo Xu, Jie Guo and Rong Lu
- 1575 **The impact of crop diversification towards high-value crops on economic welfare of agricultural households in eastern India**
A. R. Anuja, Anjani Kumar, Sunil Saroj and K. N. Singh
- 1583 **Nanoformulated CPMSN biomaterial regulates proinflammatory cytokines to heal wounds and kills drug-resistant bacteria**
Chandran Murugan, Manickam Rajkumar, Nagarajan Kanipandian, Ramasundaram Thangaraj, Karuppaiya Vimala and Soundarapandian Kannan
-
- RESEARCH COMMUNICATIONS**
- 1592 **An appraisal of recent earthquake activity in Palghar region, Maharashtra, India**
D. Seinagesh, Dhiraj Kumar Singh, G. Vikas, B. Nareni, Sunil Roy, Y. V. V. B. S. N. Murthy, P. Solomon Raju, G. Suresh, Prantik Mandal, A. N. S. Sharma, M. Shekar and V. M. Tiwari
- 1598 **Inheritance of fruiting habit traits in chilli (*Capsicum annuum* L.)**
C. Anilkumar, A. Mohan Rao, S. Ramesh, B. Bhavani and Pranesh
- 1602 **Ladybird, *Menochilus sexmaculatus* (Fabricius) can survive on oophagy but with altered fitness than aphidophagy**
Shashwat Singh, Geetanjali Mishra and Omkar
- 1609 **Antimicrobial activity of Indian meal moth silk, *Plodia interpunctella***
Olga Stefanović, Filip Vukajlović, Tamara Mladenović, Dragana Predojević, Ljiljana Čomić and Snežana B. Pešić
- 1615 ***In situ* observation of scorpionfish in seagrass meadows of the Gulf of Mannar, India**
R. Jayabaskaran, S. Lavanya, Shelton Padua and V. Kripa
-
- BOOK REVIEWS**
- 1621 **Applied Evaluative Informetrics**, Henk F. Moed; reviewed by Subbiah Arunachalam
- 1622 **Annual Review of Entomology, 2019**, A. E. Douglas, J. Trumble and M. P. Zalucki (eds); reviewed by S. Ignacimuthu
-
- PERSONAL NEWS**
- 1624 **P. W. Anderson (1923–2020)**
G. Baskaran, V. N. Muthukumar, K. A. Mutalib and T. V. Ramakrishnan
- 1628 **M. C. Wani (1925–2020)**
Nisheeth Desai and Anamik K. Shah



◀ COVER. Colour changes in blackband scorpionfish: Presence of pale yellowish with black spots in the axial of pectoral fins. See page 1615.

Indexed in CURRENT CONTENTS/GEORBASE/CHEMICAL ABSTRACTS/InMED/SCOPUS/
WEB OF SCIENCE



CURRENT SCIENCE

1638 In this issue

GUEST EDITORIAL

- 1639 Assessment and implementation of environmental flows
Shatad K. Jain


CORRESPONDENCE

- 1641 COVID-19 imposed lockdown might be a boon for aquatic ecosystem, Sumit Mandal ■ 1641 Beehive charcoal briquettes: clean cooking fuel for rural households, Sandip Mandal

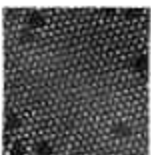
COMMENTARY

- 1643 The sugarcane variety Co 0238 – a reward to farmers and elixir to India's sugar sector
Bakshi Ram and G. Hemaprabha
- 1646 Imported superfood quinoa versus Indian nutriceereal millets
Anvi Dhaka and Manoj Prasad

SCIENTIFIC CORRESPONDENCE

- 
- 1650 Elevated CO₂ causes earlier flowering in an alpine medicinal herb *Aconitum heterophyllum* Wall.
Sudeep Chandra, Vaishali Chandola, M. C. Nautiyal and V. K. Purohit


GENERAL ARTICLE

- 
- 1652 Light harvesting using solar cells and luminescent solar concentrators
Renju Rajan, P. Ramesh Babu and K. Senthilnathan

REVIEW ARTICLES

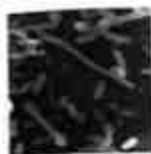
- 1656 Something more than graphene – futuristic two-dimensional nanomaterials
Inderdeep Singh Bhatia and Deep Kamal Kaur Roodhawa
- 1672 Optimization of superplasticizer dosage for cementitious suspension involved in high shear applications
P. V. P. Moorthi and Prakash Nanthagopalan

SPECIAL SECTION: SUSTAINABLE OCEAN TECHNOLOGIES

- 
- 1679 Preface
Shailesh Nayak
- 1681 Unmanned underwater vehicles: Design considerations and outcome of scientific expeditions
G. A. Ramadas, S. Ramesh, N. Vedachalam, AN. Subramanian, D. Sathianarayanan, R. Ramesh, G. Harikrishnan, T. Chowdhury, V. B. N. Jyothi, S. B. Pranesh, V. Doss Prakash and M. A. Atmanand
- 1687 Challenges in developing deep-water human occupied vehicles
G. A. Ramadas, N. Vedachalam, S. Ramesh, D. Sathianarayanan, AN. Subramanian, R. Ramesh, T. Chowdhury, S. B. Pranesh and M. A. Atmanand

Current Science Vol. 118 No. 11, 10 June, 2020

- 1694 **Studies on nonlinear behaviour of floating components for offshore desalination plants**
Ashwani Vishwanath, Purnima Jalihal and Abhijeet Sajjan
- 1702 **Development of wide band underwater acoustic transducers**
Dhishu Rajapan, P. M. Rajeshwari and Shijo Zacharia
- 1707 **Source localization in shallow waters using an acoustic vector sensor array**
G. Latha, A. Malakkodi, M. Ashokan and A. Thirunavukkarasu
- 1712 **Performance evaluation of power module during demonstration of wave-powered navigational buoy**
Biren Pattanaik, Ashwani Vishwanath, Purnima Jalihal, Y. V. N. Rao, A. Karthikeyan, K. S. Sajreev and V. P. Shipin
- 1718 **Influence of non-condensable gases on performance of the low temperature thermal desalination plants**
G. Venkatesan, L. S. S. Prakash Kumar and Purnima Jalihal
- 1725 **Production and characterization of antimicrobial peptides from *Bacillus subtilis* isolated from deep-sea core samples**
A. Ganesh Kumar, G. Dharani, R. Kirubakaran and M. A. Atmanand
- 1731 **Mass culture of marine microalgae *Chlorella vulgaris* (NIOT-74) and production of biodiesel**
G. Dharani, D. Magesh Peter, J. T. Mary Leema, T. S. Kumar, K. Thirupathi, A. Josephine, R. Kirubakaran and M. A. Atmanand
- 1739 **Surface circulation off the Andaman Islands from HF radar observations**
B. K. Jena, K. S. Arunraj, V. Suseetharan and M. V. Ramanamurthy
- 1746 **Simulated wave climate and variability over the North Indian Ocean**
Basanta Kumar Jena, J. Rajkumar, Aruna Kumar Avula, K. Jossia Joseph and M. V. Ramana Murthy
- 1753 **Are we ready for a major tsunami in the Indian Ocean?**
S. S. C. Shenoik, P. L. N. Murty, Ch. Patanjali Kumar, B. Ajay Kumar, M. V. Sunanda, K. Siva Srinivas, J. Padmanabham, Dipankar Saikia, E. Pattabhi Rama Rao and Shailesh Nayak
- 1760 **Differential upper ocean response depicted in moored buoy observations during the pre-monsoon cyclone *Vijaru***
R. Venkatesan, K. Jossia Joseph, C. Anoop Prasad, M. Arul Muthiah, S. Ramasundaram and P. Muruges
- 1768 **Shore protection measures along Indian Coast – Design to implementation based on two case studies**
M. V. Ramana Murthy, Vijaya Ravichandran, Mullai Vendhan, A. S. Kiran, Satya Kiran Raju, Aruna Kumar Avula, Shyamala Varthini and T. Abhishek
- 1774 **Offshore wind projects for the Indian Coast – Experiences and challenges for its realization**
Satya Kiran Raju Alluri, Devender Gujjula, G. Dhinesh, S. V. S. Phani Kumar and M. V. Ramana Murthy
- 1778 **Ocean current mapping with indigenous drifting buoys**
R. Srinivasan, Shijo Zacharia, V. Gowthaman, Tata Sudhakar and M. A. Atmanand
- 1782 **Reliability assessment and system performance improvement of ORV *Sagar Nidhi* propulsion system**
D. Rajasekhar, P. S. Deepak Sankar, Anantha Krishna Rao, D. Narendrakumar and K. Ramasundaram



Current Science Vol. 118 No. 11, 10 June, 2020

RESEARCH ARTICLES

- 1786 **Genomics of Indian SARS-CoV-2: Implications in genetic diversity, possible origin and spread of virus**
Minak Mondal, Ankita Lawande and Kumaravel Somasundaram
- 1792 **Fault detection for scraper chain using an observer-based tension distribution estimation algorithm**
Xing Zhang, Wei Li, Zhencai Zhu and Fan Jiang
- 1803 **Evaluation of PM_{2.5} forecast using chemical data assimilation in the WRF-Chem model: a novel initiative under the Ministry of Earth Sciences Air Quality Early Warning System for Delhi, India**
Sachin D. Ghode, Rajesh Kumar, Chinmay Jena, Seeyathi Debnath, Rachana G. Kulkarni, Stefano Alessandrini, Mrinal Biswas, Santosh Kulkarni, Prakash Pithani, Saurabh Kelkar, Veeresh Sajjan, D. M. Chate, V. K. Soni, Siddhartha Singh, Ravi S. Nanjundiah and M. Rajeevan
- 1816 **Seasonal variations in indoor air quality of urban and rural Asian households**
Amtul Bari Tabinda, Ruby Safdar, Abdullah Yasar, Rizwan Rasheed, Adeel Mahmood and Anam Iqbal
- 1822 **Forging technology of high-tin bronzes in ancient Bengal**
Pranab K. Chattopadhyay, Prasanta Kumar Datta and Barnali Maji
- 1832 **Assessing the costs of droughts in rural India: a comparison of economic and non-economic loss and damage**
Chandra Sekhar Bahinipati
-
- BOOK REVIEWS
- 1842 **Soil Basics, Management and Rhizosphere Engineering for Sustainable Agriculture.** Channarayappa and D. P. Biradar; reviewed by K. P. Viswanatha
- 1843 **Darwin Comes to Town: How the Urban Jungle Drives Evolution.** Menno Schilthuizen; reviewed by K. S. Chetan Nag
-
- PERSONAL NEWS
- 1845 **Sharad S. Shrikhande (1917–2020)**, N. M. Singhi and K. S. Vijayan
- 1847 **Virender Lal Chopra (1936–2020)**, P. C. Kesavan and M. S. Swaminathan



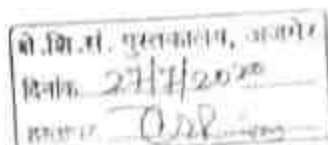
◀ COVER. Quarter century of sustainable ocean technologies. See special section.

The editor thanks Dr Shailesh Nayak (National Institute of Advanced Studies, Bengaluru, India) for agreeing to be Guest Editor for special section.

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

Current Science Vol. 118 No. 12, 25 June, 2020

Founded 1932



ISSN 0011-2591

CURRENT SCIENCE

Volume 118 Number 12

25 June 2020

1862 In this issue

EDITORIAL

- 1863 Low dose lung radiotherapy – an alternative route to treat pneumonia linked to COVID-19
P. C. Kesavani

CORRESPONDENCE

- 1865 Mission-oriented higher education institution: some concerns
Rangan Banerjee
- 1865 Researchable issues in livestock and fodder sector under COVID-19 pandemic and beyond
D. R. Paisaniya

NEWS

- 1867 2019 UNESCO Sultan Qaboos Prize for Environmental Preservation awarded to Ashoka Trust, Bengaluru, India
Sameen Ahmed Khan

OPINION

- 1868 Higher education: *quo vadis?*
H. A. Ranganath

COMMENTARY

- 1869 Assessing research: the slippery slope
Bhushan Patwardhan and Gautam R. Desiraju
- 1870 Reconciling biodiversity conservation with agricultural intensification: challenges and opportunities for India
Vikram Aditya, P. S. Sumashini, N. A. Aravind, G. Ravikanth, Chandrashekara Krishnappa and R. Uma Shaanker

SCIENTIFIC CORRESPONDENCE

- 1874 Monitoring of volcanic eruption (Barren Island) using EO satellites
Gautham Krishna Teja Gunda, P. K. Champatiray, Mamta Chauhan and Prakash Chauhan
- 1876 Occurrence of Nuclear Polyhedrosis Virus of invasive fall armyworm, *Spodoptera frugiperda* (J. E. Smith) in Meghalaya, North East India
D. M. Firake, S. K. Sharma and G. T. Behere

GENERAL ARTICLES

- 1878 Communication and management of public risks (with specific reference to the COVID-19 global pandemic)
V. S. Ramamurthy and D. K. Srivastava



Current Science Vol. 118 No. 12, 25 June, 2020

- 1885 **Freedom for research, and national development**
R. B. Govver
-
- REVIEW ARTICLE
- 1893 **Observations of trace gases in the earth's lower atmosphere: instrumentation and platform**
L. K. Sahu, Nilhi Tripathi and Ravi Yadav
-
- RESEARCH ARTICLES
- 1903 **Different anisotropic silver nanocrystals show different antibacterial activities – an effect of different prominent crystallographic orientations in different shapes**
Sumit Sarkar, Biraj Sarkar, Sukhendu Mandal and Ratan Das
- 1911 **Modelling of flexural response of simply supported RC skew slab**
Madhu Sharma, Naveen Kwatra and Harvinder Singh
- 1922 **Characterization of eddy scales over tandem obstacles for surface wave-dominated flow**
Krishnendu Baeman, Sayahnya Roy and Koustuv Debnath
- 1930 **Increase in spatial spread of extreme warm day temperature events: regional to national perspective for India (1951–2014)**
Debasiah Chakraborty, Vinay Kumar Selgal, Rajkumar Dhakar, Eldho Varghese and Deb Kumar Das
- 1939 **Wheat production functions under irrigated saline environment and foliar potassium fertigation**
Mukesh Kumar, A. Sarangi, D. K. Singh, S. Sudhishri and A. R. Rao
- 1946 **Prevalence and spread of potato cyst nematodes, *Globodera* spp. in northern hilly areas of India**
Y. S. Chandel, Surendra Singh Bhada, Rajan Salafia, Sharmishtha Thakur, Satya Kumar, Vishal Singh Somvanshi, Abhishek Mukherjee and R. K. Walia
- 1953 **Non-destructive selection of genotypes with better wood properties from morphologically superior genotypes of *Eucalyptus pellita***
A. N. Arunkumar and S. S. Chauhan
- 1959 **Characteristic properties of pine needle biochar blocks with distinctive binders**
Hemant Kumar Sharma, Akanksha Kumari and T. K. Bhattacharya
- 1968 **Chennai extreme rainfall event of 2015 under future climate projections using the pseudo global warming dynamic downscaling method**
P. Jyoteeshkumar, P. V. Kiran and C. Balaji
-
- RESEARCH COMMUNICATIONS
- 1980 **Remote sensing for the detection of bio- and non-bioaerosols for defence applications**
Mohit Mann, Subodh Kumar, A. S. Rao and Ramesh C. Sharma
- 1984 **Line-source field dripper for the measurement of *in situ* unsaturated hydraulic conductivity function**
Rohit Pratap Ojha, Chhedi Lal Verma, Derrick M. Denis and Sanjay Arora
-
- PERSONAL REMINISCENCES
- 1991 **Seventy years in scientific research**
C. N. R. Rao
-
- BOOK REVIEWS
- 1997 **M. Vijayan: A Life Among Men, Women and Molecules, Memoirs of an Indian Scientist. Edited and Coordinated by A. K. Singhvi; reviewed by P. Balaram**



LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Current Science Vol. 118 No. 12, 25 June, 2020

1998 **Einstein Rediscovered: Interactions with Indian Academies.** Rajinder Singh;
reviewed by Banibrata Mukhopadhyay

2000 **Annual Reviews of Biochemistry, 2019.** Roger D. Kornberg, James E. Rothman,
JoAnne Stubbs and Jeremy W. Thorner (eds); *reviewed by Prasanna K. Santhakadur*

PERSONAL NEWS

2002 **S. K. Joshi (1935–2020)**
T. V. Ramakrishnan

2003 **Melkote K. Ramaswamy (1931–2020)**
Rajesh Melkote

2004 **Tangirala Ramasarma (1932–2020)**
R. Manjunath

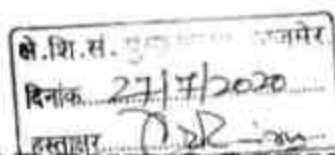


◀ COVER. Active cinder cone of Barren Island erupting ash and surrounded by caldera (small ridges) and pyroclasts (dark-coloured fragmented material). See page 1874.

Indexed in CURRENT CONTENTS/GEORASE/CHEMICAL ABSTRACTS/INMED/SCOPUS/
WEB OF SCIENCE

Current Science Vol. 119 No. 1, 10 July, 2020

Founded 1932



ISSN: 0011-3991

CURRENT SCIENCE

Volume 119 Number 1

10 July 2020

- 6 **In this issue**
- EDITORIAL**
- 7 **Breaking all the rules, at lightning speed**
Gayatri Saberwal
- CORRESPONDENCE**
- 9 **Vikram Sarabhai and his dream projects**, M. H. Mehta ■ **9 Video journals for science communication**, V. Saroj Kumar, N. P. Sooraj, C. R. Sajeev, K. Athira, D. Lijamol, M. Vishnu and R. Jaishanker
- NEWS**
- 10 **Current Science Reports**
- IN CONVERSATION**
- 14 **Reconciling biodiversity conservation with agricultural intensification**
N. A. Aravind and G. Ravikanth
- OPINION**
- 15 **Managing production-demand mismatch in thermal power plants**
D. K. Srivastava and V. S. Ramamurthy
- COMMENTARY**
- 17 **Payback for M Techs**, Gangan Pralhad
- GENERAL ARTICLES**
- 19 **Anomalous weather events in central Himalaya: real-world observations and some questions**
K. S. Valdiya
- 26 **How practicing science teachers amalgamate their beliefs with science**
Rohini Karandikar and Aniket Sule
- REVIEW ARTICLES**
- 32 **Assessment of saturation flow at signalized intersections: a synthesis of global perspective and future directions**
Satyajit Mondal and Ankit Gupta
- 44 **Invasion of fall armyworm (*Spodoptera frugiperda*) in India: nature, distribution, management and potential impact**
S. B. Suby, P. Lakshmi Soujanya, Pranjal Yadava, Jagadeesh Patil, K. Subaharan, G. Shyam Prasad, K. Srinivasa Babu, S. L. Jat, K. R. Yathish, Jyothilakshmi Vadassery, Vinay K. Kalia, N. Bakthavatsalam, J. C. Shekhar and Sujay Rakshit
- RESEARCH ARTICLES**
- 52 **Post-lockdown spread of COVID-19 from cities to vulnerable forest-fringe villages in Central India**
Ruth DeFries, Meghna Agarwala, Sandra Boque, Pooja Choksi, Nitish Dogra, G. S. Preethi, Sarika Khanwilkar, Pinki Mondal, Harini Nagendra and Johannes Urpelainen
- 59 **Experimental study of a pre-compressed self-centering brace**
Akbar Shahiditabar and Hamid Moharrami



- 88 Spatio-temporal variations in the macrobenthos of Paradip port, east coast of India
Noyel, V. and Dattesh V. Desai
- 83 Species diversity and regeneration status of community-managed hill sal (*Shorea robusta*) forest in Central Nepal
Krislino Prasad Sharma, Suresh Prashad Bhutta and Sanjosh Kumar Lamsal
- 93 Urban ecosystem-based planning and design strategy of an urban river, Tabakhane stream, Aydın, Turkey
Bülent Dooaz
- 103 DDT-modulated behavioural profile in terms of longevity, fecundity fertility and fitness in subsequent generations of DDT-resistant *Phlebotomus argentipes* (Diptera: Phlebotomidae)
Aarti Rama, Pradeep Das and Vijay Kumar
- 112 Assessment of the road characteristics of selected north-south and east-west aligned roads within Agartala Municipal Corporation, Tripura, India
Bijoy Das and Eshita Boral

RESEARCH COMMUNICATIONS

- 119 Composition of magnetic tunnel junction-based magnetoresistive random access memory for Field-Programmable Gate Array
S. Hamsa, N. Thangadurai and A. G. Ananth
- 123 Sterically hindered amine functionalized zeolites prepared from fly ash for effective carbon dioxide adsorption
Arni Valechha, Sunil Kumar Singh, Ahmed Sadeq Al-Fatesh, Sadhana Rayala and Nitin Labhsetwar
- 128 Landsat 8-based surface temperature anomaly and hydrocarbon prospectivity: a study in part of Assam-Arakan Fold Belt, North East India
Santosh Garain, Debashis Mitra and Pranab Das

BOOK REVIEWS

- 134 *Relativity: The Special and the General Theory, 100th Anniversary Edition*, Albert Einstein, with commentaries and background material by Hans Reichenberg and Jürgen Renn; reviewed by Bala Iyer ■ 135 *Abundant Earth: Towards an Ecological Civilization*, Eileen Crist; reviewed by Sudhiredar Sharma

PERSONAL NEWS

- 137 Yukio Ohashi (1955-2019), B. S. Shylaja
- 138 Sundaresan Narayan (1930-2019), Venil N. Sumantran

HISTORICAL NOTES

- 140 *Clinical Manual for India – an internally published handbook for medical students of the Madras Medical College in the late 19th century*
Ramya Raman and Anantanarayanan Raman



- ◀ COVER. Photograph showing the Lesser Himalayan province, the narrow belt where the 2600-3000 m Lesser Himalayan ranges abruptly rise to 6000 m high to 7500 m high formidable Great Himalaya, and the ever-snowy Great Himalaya. See page 19.

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

EDUTRACKS

April, 2020 Vol. 19 No. 8

Publisher
Suresh Chandra Sharma

Editor
G S Reddy

Asst. Editor
Payal Sharma

Consultant Editor
K S Sharma, IAS (Retd.)
Former Chairman, ICSSR
Former CEO, Prasar Bharati.

Editorial Board

Sri Chukka Ramaiah
IT Coaching Centre, Hyderabad

Prof. Ghanta Ramesh
Senior Professor of Education, Maulana
Azad National Urdu University, Hyd.

Prof. R S Srivastava
Chevalier dans l'Ordre des Palmes
Academiques Former Dean (Academic),
NCERT, New Delhi.

Prof. C L Koundu
Advisor, Rehabilitation Council of India,
New Delhi.

Dr. L. Govinda Rao
Former Director, National Institute for the
Mentally Handicapped, Secunderabad.

Prof. Marlow Ediger
Professor Emeritus of Education,
Truman State University, USA.

Dr. S K Mangal
Eminent Educationist, Rohtak.

Prof. V Sudhakar
Prof. of Education, Dept. of Education,
EFLU, Hyderabad.

Prof. D Kumaran
Professor & Head, Dept. of Education,
University of Madras, Chennai.

© Neelkamal Publications Pvt. Ltd.
All rights reserved. Reproduction in
any manner is prohibited.

Printed & Published by
Suresh Chandra Sharma
Managing Director,
Neelkamal Publications Pvt. Ltd.,
on behalf of
Neelkamal Publications Pvt. Ltd.,
Kali, Hyderabad - 500 085, India.
☎ : 91-40-24757140, 24757197,
24757951, ☎1 80199 18192
e-mail : edutracksneelkamal@gmail.com
website: www.edutracks.neelkamalbooks.com
Delhi Office: 4784/1, 23, Ansari Road,
Daryaganj, New Delhi-110 002, India.
☎ : 91-11-23244237, ☎1 98119-28953

The views expressed in the articles inside are
the individual opinions of the authors and they
do not represent or reflect the opinion of
EDUTRACKS nor does EDUTRACKS subscribe
to these views in any way. All disputes are
subject to the jurisdiction of Hyderabad courts
only.

Inside

श्री. सि. सं. पुस्तकालय, जयपुर
दिनांक 01/04/2020
Dr. Durga Prasad Mishra

Articles

05 .. Coronavirus and Children with Special Needs
Dr. Durga Prasad Mishra

07 .. Teachers' Fading Glory: A Serious Concern
Dr. Amit Sharma

**17 .. Curriculum Framework for
Interdisciplinary Disability Studies**
Dr. R. Ramar, Lalithalakshmi

23 .. Autodidacticism
Dr. N.N. Prahallada

Research

**26 .. Discourse of Teachers on Strategies used to
Teach Students with Special Educational Needs (SWSEN)
in Inclusive Classrooms**
Poornima Rajendran, Elavarasi, D.

36 .. Effective Use of ICT among High School Children
Dr. A. Marreddy

**40 .. Association of Psychosocial Problems with Socioeconomic
Status in the Contextual Frame of Kashmiri Youth**
Irshad Ali Dar

**45 .. Initiate Research in Thrust Areas of
Education for Advancement of Society**
K. Jagadeesh, Dr. A. Subramanian

49 .. Health Track

53 .. News Track



June, 2020 Vol. 19 No. 10

Publisher
Suresh Chandra Sharma

Editor
G S Reddy

Asst. Editor
Payal Sharma

Consultant Editor
K S Sharma, IAS (Retd.)
Former Chairman, ICSSR
Former CEO, Pnsa (Bharati).

Editorial Board

Sri Chukka Ramaiah
IT Coaching Centre, Hyderabad

Prof. Ghania Ramesh
Senior Professor of Education, Maulana Azad National Urdu University, Hvt.

Prof. H S Srivastava
Chaireur dans l'Ordre des Palmes Academiques, Former Dean (Academic), NCERT, New Delhi.

Prof. C L Koundu
Advisor, Rehabilitation Council of India, New Delhi.

Dr. L. Govinda Rao
Former Director, National Institute for the Mentally Handicapped, Secunderabad.

Prof. Marlene Ediger
Professor Emerita of Education, Truman State University, USA.

Dr. S K Mangal
Eminent Educationist, Raichak.

Prof. Y Sudhakar
Prof. of Education, Dept. of Education, EFLU, Hyderabad.

Prof. D Kumarize
Professor & Head, Dept. of Education, University of Madras, Chennai.

© Neelkamal Publications Pvt. Ltd.
All rights reserved. Reproduction in any manner is prohibited.

Printed & Published by
Suresh Chandra Sharma
Managing Director,
Neelkamal Publications Pvt. Ltd.,
on behalf of
Neelkamal Publications Pvt.Ltd.,
Koti, Hyderabad - 500 095, India.
☎ : 91-40-24757140, 24757197,
24757851, +91 90199-18192
e-mail : edutracksneelkamal@gmail.com
website: www.edutracks.neelkamalbooks.com
DWH Office: 4784/1, 23, Ansari Road,
Daryaganj, New Delhi-110 002, India.
☎ : 91-11-23244237, +91 98118-28853

The views expressed in the articles herein are the individual opinions of the authors and they in no way represent or reflect the opinion of EDUTRACKS or does EDUTRACKS subscribe to these views in any way. All disputes are subject to the jurisdiction of Hyderabad courts only.



वे.शि.सं. / ए.के.ए. / ए.एम.ए.
दि. - 01/7/2020

Inside

Articles

05 .. On Making Schools a Lovable Place for Students
Dr. Amit Sharma, Pavitra Chauhan

12 .. Meeting the Challenge of Inclusion Strategic Implementation
Dr. Vibha Devpura

15 .. Translating Visionary Policies into Practice
Dr. Divya Sharma

17 .. Teacher Identity Construction Exploring the Nature of Becoming a Teacher
Dr. Ismail Thumarusseri

25 .. Four-Year Integrated B Ed Course A Decision in Haste
Muhammad Qamar Saleem, Aziz Fatema

Research

33 .. Psychological Wellbeing of Schoolteachers
Dr. C. Shankar, Sri V. Sharmila Sunitha

37 .. Attitude of B Ed Trainees towards Science in Kumaon Region of Uttarakhand State
Dr. Devendra Singh Chamyal, Dr. Rajendra Singh Pathani

43 .. Adjustment Problems of Gifted Students in Bijapur District, Karnataka
Asma Parveen M. Janbagi

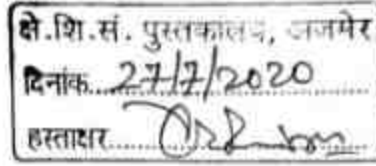
47 .. Effectiveness of Multimedia eBook Instructional System for Teaching Geography to Secondary Level Students
Dr. Vilas B. Bandgar

50 .. Health Track

53 .. News Track

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.315 January-February, 2020



Contents

IMPRESSIONS, EXPRESSIONS...	7
IN MEMORIAM	
<i>K. Satchidanandan</i>	
Āttoor Ravivarma: Towards a Counter-Aesthetics	13
<i>A. Anwar Ali</i>	19
<i>Anitha Thampi</i>	34
<i>P. Ahilan</i>	41
<i>Āttoor Ravivarma</i>	43
21 ST CENTURY ODIA POETRY	
Compilers' Note	59
<i>Monalisa Jena</i>	
Contemporary Odia Poetry	61
<i>Durga Prasad Panda</i>	
Bearing Witness: 21 st Century Odia Poetry	67
POETRY	
<i>Ajay Pradhan</i>	75
<i>Akhila Nayak</i>	77
<i>Amarendra Khatusa</i>	80
<i>Aparna Mohanty</i>	81

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.315 January-February, 2020

4	
Indian Literature: 315	
<i>Aywin Kumar Mishra</i>	82
<i>Basanta Muduli</i>	84
<i>Bazudev Sunari</i>	85
<i>Bharat Majhi</i>	87
<i>Bijaylaxmi Parida</i>	88
<i>Biraja Bal</i>	90
<i>Bishnu Mohapatra</i>	92
<i>Chandra Mitra</i>	94
<i>Durga Prasad Panda</i>	95
<i>Debendra Lal</i>	98
<i>Geyatrihala Panda</i>	100
<i>Girjakumar Baliarsingh</i>	102
<i>Hemanta Dalpati</i>	105
<i>Ipita Sarangi</i>	108
<i>Jayadratha Sana</i>	110
<i>Kedar Mishra</i>	111
<i>Krushna Kumar Mohanty</i>	114
<i>Madhuri Panda</i>	116
<i>Manoj Kumar Meher</i>	118
<i>Monalisa Jena</i>	120
<i>Pabitra Mohan Dash</i>	122
<i>Pitambara Tarai</i>	125
<i>Pradeep Biswal</i>	127
<i>Prahallad Satapathy</i>	128
<i>Pritidhara Samal</i>	130
<i>Rabi Satapathy</i>	131
<i>Ratnamala Swain</i>	133
<i>Ranu Mohanty</i>	135
<i>Sali Majhi</i>	137
<i>Samir Ranjan</i>	143
<i>Samarendranath Malapatra</i>	145
<i>Saqui Mohanty</i>	147
<i>Saroj Bal</i>	149
<i>Saroj Mohanty</i>	152
<i>Senapati Pradyumna Keshari</i>	153
<i>Sharmistha Sahu</i>	155
<i>K. Shyambabu Dora</i>	157
<i>Sitanru Lenka</i>	158
<i>Subrat Jena</i>	159

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.315 January-February, 2020

	§ Contents
<i>Sucheta Mishra</i>	161
<i>Sunil Kumar Prusty</i>	162
<i>Surya Mishra</i>	164
<i>Suryasnata Tripathy</i>	166
<i>Swapna Mishra</i>	168
POETRY	
<i>Devendra Choubey</i>	171
<i>Rachna Joshi</i>	175
<i>Shimanta Bhattacharyya</i>	180
<i>Mandira Ghosh</i>	183
<i>Natan Sakhardande</i>	185
<i>Medha Singh</i>	188
<i>Anjali Bhatvan</i>	192
STORYTIME	
<i>Gauri Shankar Raina</i> Boarding Card	196
LITERARY CRITICISM	
<i>Chhandita Das and Priyanka Tripathi</i> Recontextualizing the Lives of Courtesans in Neelam Saran Gour's <i>Requiem in Raga Janki</i> and Vikram Sampath's <i>My Name is Gauhar Jaan</i>	204
PREVIEW	
<i>Jaipur Journals</i> By Namita Gokhale	216
REVIEWS	
<i>B.R. Nagpal</i> <i>Gems of Hindi Poetry</i> By Kuldip Salil	222

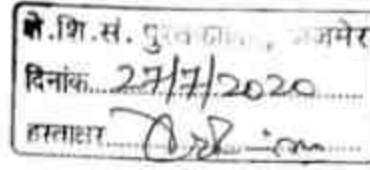
LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.315 January-February, 2020

6		
<i>Indian Literature: 313</i>		
<i>Vetrikkeel Raghavan</i>		
<i>Practical Literary Criticism: An Indian Take</i>		
By D.S. Rao	225	
<i>R. Raj Rao</i>		
<i>Invisible Men: Inside India's Transmasculine Networks</i>		
By Nandini Krishnan	229	
<i>K. Vinod Chandran</i>		
<i>XXL—Collection of Poems</i>		
By Aditya Shankar	234	
<i>Rami Malik</i>		
<i>A Brief History of Silence</i>		
By Manu Dash	239	
OUR CONTRIBUTORS	241	

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.316 March-April, 2020



Contents

IMPRESSIONS, EXPRESSIONS...	6	
IN MEMORIAM		
<i>Antara Dev Sen</i> Our Very Own Nabaneeta	12	
<i>Obituary</i>		
<i>Nirmalkanti Bhattacharjee</i> All Right, Come on, Fight! Come on, Fight! Nabaneeta Dev Sen: A Study in Indomitable Spirit	22	
<i>Anita Agnihotri</i> Our Enigmatic Neighbour, Nabaneeta Dev Sen	29	
<i>Sayantini Dasgupta</i> Celebrating Nabaneeta Dev Sen: Of Time Travel and Teleportation	32	
<i>Poetry</i>		
<i>Nabaneeta Dev Sen</i>	40	
POETRY		
<i>Divik Ramesh</i>	Hindi	53
<i>K. Srijata</i>	English	57
<i>Ashutosh Parida</i>	Odia	60
<i>Ashwani Kumar</i>	English	66
<i>Kumar Vikram</i>	English	71
<i>Nishi Chawla</i>	English	75
<i>Somnath Chakrabarti</i>	English	84

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.316 March-April, 2020

4

Indian Literature: 116

Anil Bairwal	English	91
Parsh Narendra Kamat	Konkani	97

STORYTIME

Damodar Mauzo		
Gentleman Thief		102
Carlos Tamilavan		
The Bodhi Tree		110
V. Vinayakumar		
Eclipse		115
Sarwati Nandy		
The Song of Light		120

DALIT AUTOBIOGRAPHIES

P.S. Krishnan		
A Saga of Personal Struggle and a Valuable Social Document: The Autobiography of Sheoraj Singh Bechain		127

LITERARY CRITICISM

Krishna Manavalli		
Alternate Visions: Writing and Staging Chandrasekhar Kambar's Mahmood Gawan		145
C.S.H.N. Murthy		
A Biographical Sketch of Bellamkonda Ramaraya Kavi (1875-1914)— An Unexplored Telugu-Sanskrit Scholar and Yogi		153
Keivlenao Tepe		
The Many Layers of Silencing Women in Tribal Societies: A Critical Reading of Easterine Kiro's A Terrible Matriarchy		168

REVIEWS

K. Satchidanandan		
Colours of Loneliness and Other Stories By Paramita Satpathy		177

LIBRARY, RIE, AJMER
CURRENT CONTENT ALERT SERVICES

Indian Literature, Vol. 64 No.316 March-April, 2020

	5
	Contents
C.S. Venkiteswaran <i>One Hill of a Lover</i> By Unni R.	183
Mini Chandran <i>Invisible Walls</i> By Chandrika Balan	187
Jatwanti Dimet <i>The Unseeing Idol of Light</i> By K.R. Meera	189
Kamalakar Bhat <i>In Other Words: Selected Poems 1973-2006</i> By H.S. Shivaprakash	192
Nithya Mariam John <i>Ecdysis</i> By Medha Singh	196
Gigy Alex <i>I Cook My Own Feast</i> By Babitha Marina Justin	198
Jayshree Misra Tripathi <i>Fragments from a Musing Mind</i> By K.J. Francis	203
OUR CONTRIBUTORS	206

Journal of Cell and Tissue Research Vol. 20(1) 2020

CONTENTS

1. Age related histological and histochemical studies on the crop of chickens Mehra, A. and Kumar, P.	6833-6837
2. Anti ulcer activity of Indian medicinal plants: A review Vimal, S.K. and Bhatnagar, M.	6839-6846
3. Cancer management through epigenetics: A review Gupta, P. D. and Pushkala, K.	6847-6852
4. Development of immune system from new born to adult: A new insight Gupta, P.D. and Tyagi, S.	6853-6860
5. Effect of soil amendments on biochemical and micronutrient status of mulberry (<i>Morus alba</i> L.) under alkali soils Sathyanarayana, K. and Sangannavar, P. A.	6861-6867
6. Fluoride toxicity myth or fact?: A review Mishra, R., Jain, S., Bhatnagar, M. and Shukla, S.D.	6869-6882
7. <i>In vitro</i> micropropagation of <i>Asparagus racemosus</i> by using of nodal explants Sulava, S., Andia, S.P., Bhol, R. and Jena, S.	6883-6888
8. Green synthesis of silver nanoparticles by using <i>Mangifera indica</i> and <i>Aegle marmelos</i> leaf extract (Optimization of the process and anti-microbial activity against bacterial pathogens causing urinary tract infections) Priyadarshini, S., Bhol, R., Sulava, S. and Jena, S.	6889-6896

Indexed in: Chemical Abstracts, USA; ProQuest Database Abstract, USA (ProQuest Science Journals; ProQuest Biology Journals; ProQuest Health and Medical Complete); Medical Journal Links, USA; EBSCO Database, USA; Indian Science Abstracts (IAS, New Delhi); Medical and Aromatic Plant Abstracts, New Delhi.

Printed by: Amity Solutions, Rajahmundry, India. For: CTR Associates (www.amitycelltiss.com)

Journal of Chemical Education, Vol. 97 No.3 March 2020

JOURNAL OF CHEMICAL EDUCATION

के.शि.सं. पुस्तकालय, अजमेर
दिनांक 09/3/2020
हस्ताक्षर

MARCH 2020

VOLUME 97 ISSUE 3

JCECJAE 97(3) 595-980 (2020)

ISSN 0021-9584

Registered in the U.S. Patent and Trademark Office
© 2020 by the American Chemical Society and the
Division of Chemical Education, Inc.

ON THE COVER: Photonic crystals are materials that form their color by diffraction rather than by electronic transition. In "Emulsion Polymerization, Size Determination, and Self-Assembly of Monodispersed Poly(methyl methacrylate) Nanospheres for Photonics" (DOI: 10.1021/acs.jchemed.9b00621), George Lisensky, Fabian Daurvardis, Jiaqi Luo, Jacob Hoeger, and Emma Koenig present a laboratory experiment in which students create their own synthetic opal (microfuge tubes) to template an inverse opal (background SEM image) while using two forms of polymerisation. During the experiment, students synthesize ~250 nm poly(methyl methacrylate) (PMMA) spheres. The spheres are self-assembled by sedimentation and capillary evaporation, and these close-packed structures exhibit opalescence because the repeat distance is similar to the wavelength of light. Students gain exposure to polymers, nanochemistry, photonics, and self-assembly to measure the size of the PMMA nanospheres by four different methods. This experiment provides students with opportunities to collaborate and work on multiple related experiments at once.

Editorial

595

The Emerging Role of Prepublication in Chemistry Education
Thomas A. Holme*

DOI: 10.1021/acs.jchemed.0c00169

Commentary

597

Analysis of Two Definitions of the Mole That Are in Simultaneous Use, and Their Surprising Consequences
Klaus Schmidt-Rohr*

DOI: 10.1021/acs.jchemed.9b00467

Articles

603

Impact of Representations in Assessments on Student Performance and Equity
Vanessa R. Ralph and Scott E. Lewis*

DOI: 10.1021/acs.jchemed.9b01058

616

Assessing Differences between Three Virtual General Chemistry Experiments and Similar Hands-On Experiments
Cory Hensen, Gosia Glinowiecka-Cox, and Jack Barbera*










DOI: 10.1021/acs.jchemed.9b00748

626

Constructing Explanations in an Active Learning Preparatory Chemistry Course
Molly B. Atkinson,* Sandhya Krishnan, LaShawn A. McNeil, Julie A. Luft, and Norbert J. Pienta

DOI: 10.1021/acs.jchemed.9b00901


Journal of Chemical Education, Vol. 97 No.3 March 2020

- 655  DOI: 10.1021/acs.jchemed.9b00568
Homing In on the Capabilities That Are Most Predictive of Student Success in the First Semester of Organic Chemistry
Rosa Betancourt-Pérez,* Julio Rodriguez, and Lorell Muñoz-Hernández
- 643  DOI: 10.1021/acs.jchemed.9b00611
Student-Led Climate Assessment Promotes a Healthier Graduate School Environment
Madeleine S. Beasley, Margaret A. Lumley, Teresa D. Janicki, Rebecca L. Fernandez, Lydia H. Manger, Trisha Tuchaoki,
Nicole C. Thomas, Lauren D. Whitmire, Andrea Lawson, and Andrew R. Buller*
- 651  DOI: 10.1021/acs.jchemed.9b00950
Restructuring a General College Chemistry Sequence Using the ACS Anchoring Concepts Content Map
Scott A. Reid*
- 659  DOI: 10.1021/acs.jchemed.9b00465
Innovative Food Laboratory for a Chemistry of Food and Cooking Course
Stephen C. Cheng,* Vincent E. Zifile, and Ryan C. King
- 668  DOI: 10.1021/acs.jchemed.9b00634
The Southern Illinois Well Water Quality Project: A Service-Learning Project in Environmental Chemistry
Logan Dameris, Hannah Fretker, and H. Darrell Iler*
- 675  DOI: 10.1021/acs.jchemed.9b00703
Prioritizing the Development of Experimental Skills and Scientific Reasoning: A Model for Authentic Evaluation of Laboratory Performance in Large Organic Chemistry Classes
Clinton G.L. Veale,* Vineet Jeena, and Siphamandla Sithebe
- 681  DOI: 10.1021/acs.jchemed.9b00904
Guided Heads-Up: A Collaborative Game that Promotes Metacognition and Synthesis of Material While Emphasizing Higher-Order Thinking
Jennifer Fishovitz,* Garland L. Crawford, and Kathryn D. Kloepper
- 689  DOI: 10.1021/acs.jchemed.9b00603
Team-Based Learning for Scientific Computing and Automated Experimentation: Visualization of Colored Reactions
Santiago Vargas, Siavash Zamirpour, Shreya Menon, Arielle Rothman, Florian Häse, Teresa Tamsayo-Mendoza,
Jonathan Romero, Sukin Sim,* Tim Menke,* and Alán Aspuru-Guzik*
- 695  DOI: 10.1021/acs.jchemed.9b00777
Using Image Recognition and Processing Technology to Measure the Gas Volume in a Miniature Water Electrolysis Device Constructed with Simple Materials
Yizhou Ling,* Pengwen Chen, Juan Li, Junyao Zhang, and Kai Chen*

703  DOI: 10.1021/acs.jchemed.9b00775

The Sound of Chemistry: Translating Infrared Wavenumbers into Musical Notes

Neil Garrido, Anaís Pitto-Barry, Joan J. Soldevilla-Barreda, Alexandru Lupan, Louise Comerford Boyes,* William H. C. Martin,* and Nicolas P. E. Barry*

710  DOI: 10.1021/acs.jchemed.9b00789

Invisibility Cloaks and Hot Reactions: Applying Infrared Thermography in the Chemistry Education Laboratory

Travis C. Green, Rebekkah H. Gresh, Desirée A. Cochran, Kaitlyn A. Crobar, Peter M. Blass, Alexis D. Ostrowski, Dean J. Campbell, Charles Xie, and Andrew T. Torelli*

719  DOI: 10.1021/acs.jchemed.9b00805

That's Pretty Cool, Using Work to Freeze Water. The Vapor-Compression Refrigerator and How It Works

Arthur M. Halpern* and Robert J. Noll

726  DOI: 10.1021/acs.jchemed.9b00806

That's So Cool, Using a Flame to Freeze Water. The Vapor-Absorption Refrigerator and How It Works

Arthur M. Halpern* and Robert J. Noll

736 DOI: 10.1021/acs.jchemed.9b00742

Teaching Thermodynamics with the Quantum Volume

Ted H. Yu*

741 DOI: 10.1021/acs.jchemed.9b00807

Using Elementary Calculus and Dimensional Analysis to Prepare Students for Physical Chemistry

Marc Frodyma*

Activities

749  DOI: 10.1021/acs.jchemed.9b01020

Reactions: An Innovative and Fun Hybrid Game to Engage the Students Reviewing Organic Reactions in the Classroom

José Nunes da Silva Júnior,* Mary Anne Sousa Lima, Ulisses Silva de Sousa, David Macedo do Nascimento, Antonio José Melo Leite Junior, Kimberly Benedetti Vega, Beatrice Roy, and Jean-Yves Winum

754  DOI: 10.1021/acs.jchemed.9b00934

Computational Activity to Visualize Stereoisomers in Molecules with an Axis of Chirality

Michael W. Peltor,* Mitchell T. Howell, Cassandra Anderson, and Aryana Sayeed

760  DOI: 10.1021/acs.jchemed.9b00592

Computer-Aided Drug Design for the Organic Chemistry Laboratory Using Accessible Molecular Modeling Tools

Valeria V. Acunx, Rachel M. Hopper, and Ryan J. Yoder*

Laboratory Experiments

764  DOI: 10.1021/acs.jchemed.9b00657

Rolling the Dice: Modeling First- and Second-Order Reactions via Collision Theory Simulations in an Undergraduate Laboratory

Jessica Iribé, Terianne Hamada, Hyesoo Kim, Matt Voegtli, and Christina A. Bauer*

772  DOI: 10.1021/acs.jchemed.9b00436

Chemistry of Autumn Colors: Quantitative Spectrophotometric Analysis of Anthocyanins and Carotenoids and Qualitative Analysis of Anthocyanins by Ultra-performance Liquid Chromatography–Tandem Mass Spectrometry

Marianna Manninen,* Veli-Matti Vesterinen, and Juha-Pekka Salminen

778  DOI: 10.1021/acs.jchemed.9b00541

Separation and Analysis of Ginsenoside Rg1: An Experiment for the Separation and Analysis of Natural Products

Rong Yang, Yang Y. Hu, Si Huang, Zheng F. Fang, Ming Ma, and Bo Chen*

786  DOI: 10.1021/acs.jchemed.9b00433

Paper Millifluidics Lab: Using a Library of Color Tests to Find Adulterated Antibiotics

Sarah L. Bliese, Deanna O'Donnell,* Abigail A. Weaver, and Marya Lieberman

793  DOI: 10.1021/acs.jchemed.9b00872


Asymmetric Synthesis and Absolute Configuration Determination of an Enantioenriched Alcohol: A Discovery-Based Undergraduate Laboratory Experiment

Ryan P. King, Alexander J. Wagner, Alexander Burtea, and Susan M. King*

801  DOI: 10.1021/acs.jchemed.9b00631

Synthesis of *cis*-Cu(gly)₂·H₂O, *trans*-Cu(gly)₂, and *cis*-Ni(gly)₂(H₂O)₂ and their Characterization Using Thermal and Spectroscopic Techniques—A Capstone Inorganic Laboratory

Ethan C. Cagle, Victoria L. Stanford, Jacqueline A. Nikles, and Gary M. Gray*

806  DOI: 10.1021/acs.jchemed.9b00642

Synthesis and Analysis of Zinc Copper Indium Sulfide Quantum Dot Nanoparticles


George Lisensky,* Ross McFarland-Porter, Weltha Paquin, and Kangying Liu


813  DOI: 10.1021/acs.jchemed.9b00621

Emulsion Polymerization, Size Determination, and Self-Assembly of Monodispersed Poly(methyl methacrylate) Nanospheres for Photonics

George Lisensky,* Fabian Dauzvardis, Jiaqi Luo, Jacob Horger, and Emma Koenig


Journal of Chemical Education, Vol. 97 No.3 March 2020

820  DOI: 10.1021/acs.jchemed.9b00625
Using NMR Spectroscopy To Measure Protein Binding Capacity on Gold Nanoparticles
Y. Randika Perera, Taylor M. South, Alex C. Hughes, Ashlyn N. Parkhurst, Olivia C. Williams, Mackenzie B. Davidson,
Chloe A. Wilks, Debra A. Misra,* and Nicholas C. Fitzkee*

825  DOI: 10.1021/acs.jchemed.9b00737
Keto–Enol Tautomerization of Acetylacetone in Mixed Solvents by NMR Spectroscopy, A Physical Chemistry Experiment on the Application of the Onsager-Kirkwood Model for Solvation Thermodynamics
Candice H. Courtney and V. V. Kishnan*

831  DOI: 10.1021/acs.jchemed.9b00651
Use of NMR for the Analysis and Quantification of the Sugar Composition in Fresh and Store-Bought Fruit Juices
Yolanda Navarro, Raquel Soengas,* Maria José Iglesias, and Fernando López Ortiz

Technology Reports

838  DOI: 10.1021/acs.jchemed.9b00744
AIRduino: On-Demand Atmospheric Secondary Organic Aerosol Measurements with a Mobile Arduino Multisensor
Kelly A. Rodriguez-Vasquez, Aaron M. Cole, Desilava Yordanova, Rachel Smith, and Nathanael M. Kidwell*

845  DOI: 10.1021/acs.jchemed.9b01099
Three-Dimensional Printing of a Model Atomic Force Microscope to Measure Force–Distance Profiles
Daniel M. Gruber, Tynan Perez, Bege Q. Layug, Margaret Ohama, Lydia Tran, Luis Angel Flores Rojas, A. Xavier Garcia,
Gang-yu Liu,* and William J. W. Miller*

850  DOI: 10.1021/acs.jchemed.9b00802
Simple Visual-Aided Automated Titration Using the Python Programming Language
Song Wei Benjamin Tan,* Pavan Kumar Naraharisetti, Siew Kian Chin, and Lai Yeng Lee

855  DOI: 10.1021/acs.jchemed.9b00498
CASE (Computer-Assisted Structure Elucidation) Study for an Undergraduate Organic Chemistry Class
Ronald Soong,* Brent G. Pautler, Arvin Moser, Amy Jenne, Daniel H. Lysak, Antonio Adamo, and Andre J. Simpson

Communications

861  DOI: 10.1021/acs.jchemed.9b00757
Offering an Online Chemistry Tournament to Engage High School Students: A 10 Year Experience in Brazil
Victor T. C. Paiva, Eduardo Parma, and Regina Buffon*

Journal of Chemical Education, Vol. 97 No.3 March 2020

866



DOI: 10.1021/acs.jchemed.9b00615

Integrating Lecture and Laboratory Work for a Materials Chemistry Course to Engage and Motivate Students through Highly Visual and Intriguing Syntheses

Karine Molvinger,* Rose-Marie Ayrat, and Jean-Sébastien Filhol

873



DOI: 10.1021/acs.jchemed.9b00746

Fermentation Chemistry: A Study Abroad Course

Suzanne Carpenter* and Jason Beck

Letters

878

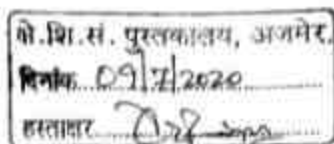
DOI: 10.1021/acs.jchemed.9b00837

Comment on "Synthesizing Gold Nanoparticles Using Honey in Basic Solution under Leidenfrost Conditions To Aid Students in Reliably Reproducing Observable Color Changes"

Mady Elbahr*

* Supporting Information available via online article

Contents



REGULAR FEATURES



186 The Area Model: Building Mathematical Connections

Area models can enhance learning across the K-12 grade levels and encourage student sense making.
Alyson E. Lischka and D. Christopher Stephens

FEATURES



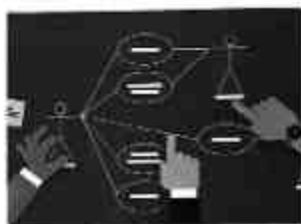
196 Supporting Teacher Learning through "Sketching Standards"

Elementary school teachers use Common Core content standards through collaborative drawing activities during professional development workshops.
Krista L. Strand and Katie Bailey



201 Engaging Latino Families as Mathematicians

Capitalize on students' rich, culturally diverse home experiences to expand their understanding.
Geraldo Tobon and Marie Tejero Hughes



209 Sorting Out Definitions

Authors design a sorting activity to refine the definition of linear function.
Erin E. Baldinger, Matthew P. Campbell, and Foster Graif

216 Linking Factors and Multiples to Algebraic Reasoning

This task is rooted in number and can give students rich explorations by aligning numerical procedures with conceptual underpinnings.
George J. Roy, Jessica S. Allen, and Kelly Thacker

223 Students' Understanding of Counterexamples

Authors suggest how classroom teachers can support student reasoning and promote productive struggle.
Rebecca Vinsonhaler and Allison G. Lynch

CONTENTS DEPARTMENTS

229 Funky Protractors for Exploring Angle Measure
Involve unconventional tools to stimulate and reveal students' ways of reasoning about angle measure.
Hamilton L. Hardison and Hwa Young Lee

233 Modeling a Bouncing Ball with Exponential Functions and Infinite Series
Students can explore exponential functions by modeling the time between a ball's bounces and then can model the total bounce time using geometric series.
Tim Erickson

237 Triangle Center Technology
Web-based apps and dynamic geometry software can help students generalize about and master circumcenters, incenters, orthocenters, and centroids.
Anne Quinn

- e1 **Ear to the Ground**
(online only)
- 182 **From the Editor**
- 244 **Asked and Answered**
- 247 **Centennial**
- 253 **Problems to Ponder**
- 257 **Growing Problem Solvers**
- 260 **For the ♥ of Mathematics**



Using the space of two dimensions to exhibit pi



NATIONAL COUNCIL OF
TEACHERS OF MATHEMATICS

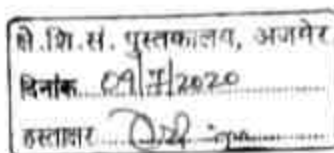
Mission Statement: The National Council of Teachers of Mathematics supports and advocates for the highest-quality mathematics teaching and learning for each and every student.

Mathematics Teacher: Learning and Teaching PK-12 is devoted to supporting the enhancement and improvement of mathematics teaching and learning for each and every learner both inside and outside of the classroom.

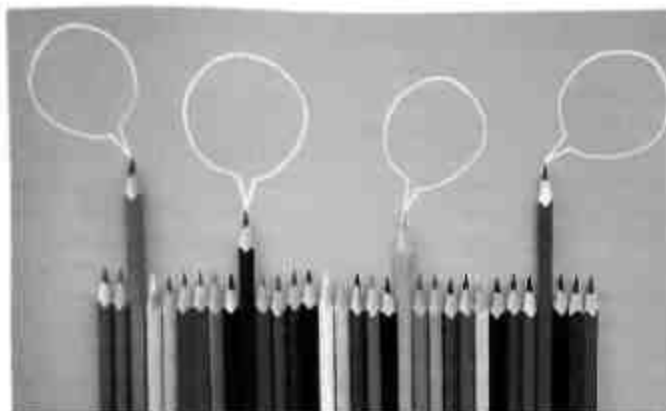
Mathematics Teacher: Learning and Teaching PK-12 solicits submissions from mathematics teachers, university mathematicians, and mathematics educators and strongly encourages manuscripts in which ideas relate to classroom practice. Manuscripts previously published in other journals or books are not acceptable. NCTM publications present a variety of viewpoints.

The views expressed or implied in this journal, unless otherwise noted, should not be interpreted as official NCTM positions. The appearance of advertising in NCTM's publications and on its websites in no way implies endorsement or approval by NCTM of any advertising claims or of the advertiser, its product, or its services. NCTM disclaims any liability whatsoever in connection with advertising appearing in NCTM's publications and on its websites.

Contents



FRONT MATTER



266 Discourse Actions to Promote Student Access

Following up on students' responses has the potential to support students as they engage in cognitively challenging mathematical work and thinking.
Amber G. Candela, Melissa D. Boston, and Juli K. Dixon

FEATURES



278 Unit Fractions as Superheroes for Instruction

Teachers can use this continuum to interpret children's strategies and recognize milestones in the development of their understanding.
Suzan Baker Emmon, Victoria R. Jacobs, Naomi A. Jessup, Amy Hewitt, D'Anna Pynes, and Gladys Krause

301 Envelope Curves Unify Sinusoidal Graphing

The authors describe a simplified mindset for these functions and their graphs that transcends coordinate systems.
Christopher Harrow and Nurfatimah Merchant



287 Giving Birth to Inferential Reasoning

Building mathematical models to simulate events can help students see the relationship among the concepts that help us make statistical inferences.
Ryan Seth Jones, Zhigang Jia, and Joel Bessire

310 Noticing before Responding

Teachers can improve their instructional practice by using this framework to professionally notice students' thinking.
Julie M. Amador, David Glassmeyer, and Aaron Brakoniecki



293 Using Scratch Programming to Explore Coordinates

A Scratch task is designed and implemented for teaching and learning coordinates in an engaging, dynamic manner.
Brell Germa and Nicole Panorkou

TITLE	COMMENTARY
<p>317 Leveraging Read Alouds for Mathematical Connections By using stories, process-oriented questioning, and a learning cycle framework, early childhood educators can engage youngsters on a daily basis and expand their thinking. <i>Sandra M. Linder and Amanda Bennett</i></p>	<p>e3 Ear to the Ground <i>(online only)</i></p>
<p>322 Practices for Mathematics and Science Integration Incorporate mathematics and science into a curriculum through practices that both disciplines share. <i>Zandra de Araujo, Deborah Hanuscin, and Samuel Otten</i></p>	<p>262 From the Editor</p>
<p>327 Planning Questions to Help Surface Understanding Read about the benefits of purposeful questioning in a mathematical activity. <i>Micah S. Stohlmann</i></p>	<p>330 Asked and Answered</p>
	<p>334 Centennial (Then)</p>
	<p>336 Centennial (Now)</p>
	<p>340 Problems to Ponder</p>
	<p>344 Growing Problem Solvers</p>
	<p>348 For the ♥ of Mathematics</p>

CORRECTIONS

The Problems to Ponder article in the January 2020 issue contained an error. In the first graphic of problem 14, the inner number of the third triangle should be 0.65.

The Problems to Ponder article in the February 2020 issue also contained an error. Problem 28 should read: For which values of x and y is $\ln(xy) = \ln(x/y)$?

In the February 2020 issue, there was an error in figure 3 in the "Probabilities of Sickle Cell Disease" article. The correct version of figure 3 can be seen here.

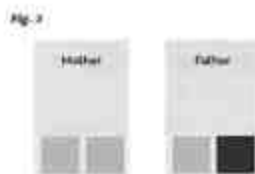
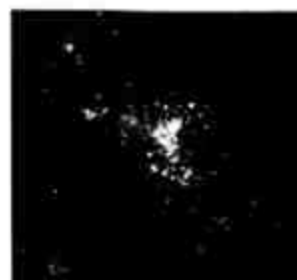


Figure 3(a) was used to conduct the study for *Journal of Genetic Counseling*.



With Reason: A Portrait of Sophia Kovalevsky (1850-1891)

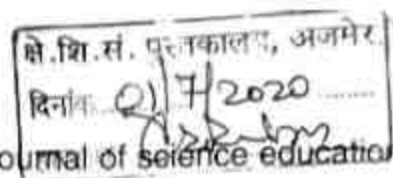


Mission Statement: The National Council of Teachers of Mathematics supports and advocates for the highest-quality mathematics teaching and learning for each and every student.

Mathematics Teacher: Learning and Teaching PK-12 is devoted to supporting the enhancement and improvement of mathematics teaching and learning for each and every learner both inside and outside of the classroom.

Mathematics Teacher: Learning and Teaching PK-12 solicits submissions from mathematics teachers, university mathematicians, and mathematics educators and strongly encourages manuscripts in which ideas relate to classroom practice. Manuscripts previously published in other journals or books are not acceptable. NCTM publications present a variety of viewpoints.

The views expressed or implied in this journal, unless otherwise noted, should not be interpreted as official NCTM positions. The appearance of advertising in NCTM's publications and on its websites in no way implies endorsement or approval by NCTM of any advertising claims or of the advertiser, its product, or its services. NCTM disclaims any liability whatsoever in connection with advertising appearing in NCTM's publications and on its websites.



GENERAL ARTICLES

33



15 **Deep Learning Without Tears**

A Simple Introduction

Divyasheel Sharma

33 **Artificial Intelligence**

The Age-old Quest for Thinking Machines

Deepak Khemani

43 **Artificial Intelligence**

The Big Picture

Deepak Khemani

93



59 **Machine Learning in Chemical Dynamics**

Rupayan Biswas, Richa Rashmi and

Upakarasamy Lourderaj

77 **A Remarkable Use of Conformal Mapping**

A New Method of Finding the Capacitance of a

Thin Conducting Disc

M M R Akhtar and R B Singh

111



93 **The Sixth Mass Extinction Crisis and its Impact on Biodiversity and Human Welfare**

K R Shivanna

SERIES ARTICLES




111 **How to Design Experiments in Animal Behaviour**

10. Why Do Wasps Fight? Part 2


Raghavendra Gadagkar




Resonance, Vol. 25 No.1 January 2020

	Classroom Ramanujan-type Numbers Kapil Hari Paranjape	133
	Face to Face From Education to E-governance V Rajaraman talks to Madhavan Mukund	141
	Information & Announcements Admission to PhD Programme in Science Education-2020	153

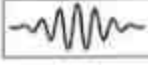

Front Cover



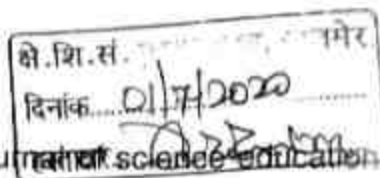
The goal of artificial intelligence (AI) is to understand human intelligence and reproduce it in a machine. Machine learning (ML) is a subarea of AI that builds systems that learn how to perform complex tasks by analysing large volumes of training data. Currently, the most successful ML models are deep neural networks whose architecture is inspired by the way our neurons are wired.



Herbert A Simon (1916–2001)
Illustration: Subhankar Biswas

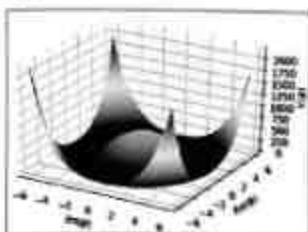
DEPARTMENTS	
	General Editorial 1
	Editorial 5 <i>N Sathyamurthy</i>
	Science Smiles 9 <i>Ayan Guha</i>
	Article-in-a-Box 13 <i>Madhavan Mukund</i>
	Inside Back Cover
	Night Life <i>By Sindhu Radhakrishna</i> <i>Photo credit: Kalyan Varma</i>

Follow us on Facebook
Resonance, Journal of
Science Education
@Resonance.IASc.Bng



GENERAL ARTICLES

191



169 The Life and Work of John Tate

Jean-Pierre Serre

177 Remembering John Tate

Dinesh S Thakur

191 The Added Mass Effect and the Higgs Mechanism

How Accelerated Bodies and Elementary Particles Can Gain Inertia

Govind S Krishnaswami and Sachin Phatak

215 Liquid Drop Model Explaining Melting Point Depression of Nanoparticles

Abhinaba Das

215



233 What Makes an Individual a Male or a Female?

Rajiva Raman

249 Carbon Hybridization to Tight-Binding to Dirac Solid

The Wonder Laboratory of Graphene

Sushanta Datta Gupta

SERIES ARTICLES



269 How to Design Experiments in Animal Behaviour

11. Fighting Fish—Does Experience Matter?

Raghavendra Gadagkar



Resonance, Vol. 25 No.2 February 2020

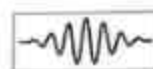
	Classroom	
	Creating Math Problems	297
	Tejaswi Navilarekallu	
	Classics	
	Problem 9: The General Reciprocity Law	313
	J. Tate	

269



Front Cover	
	The cover image features the painting on an easter egg made by Alexander Grothendieck. The GRR theorem and Tate isogeny theorem are stated on the egg. Grothendieck gifted it to Tate on the easter day of 1964.
Back Cover	
	John Torrence Tate Jr. (1925–2019) Illustration: Subhankar Biswas

DEPARTMENTS



Editorial 155
B Sury



Science Smiles 162
Ayan Guha

Article-in-a-Box

On Tate and His 163
Mathematics – A Glossary
B Sury

Reflections 309

The Privilege of Creating
Resonance
N Mukunda

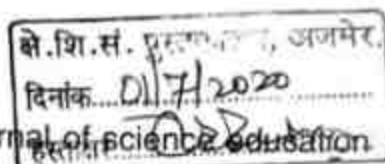
Inside Back Cover

Birds in the Backyard
By T N C Vidya
Photo Credit:
Pratiksha Buragohain

Follow us on Facebook

Resonance, Journal of
Science Education
@Resonance.IASc.Bng

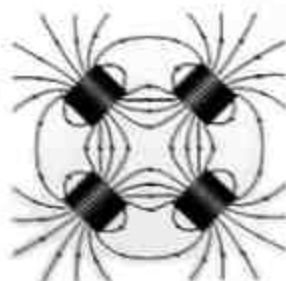




333



363



431





GENERAL ARTICLES

- 333 **Chien-Shiung Wu: The First Lady of Physics**
D Indumathi
- 353 **The Lekking Puzzle**
The Evolution of Costly Mating Behaviour
Kavita Isvaran
- 363 **Earth's Magnetic Field and its Wandering Magnetic Poles**
Nandini Nagarajan
- 381 **Non-linear Chemical Reactions**
A Comparison Between an Experiment and a Theoretical Model
Abiya Rajans, Neelima Gupte, P C Deshmukh
- 397 **What are Operads**
Anita Naolekar
- 419 **Sticking and Signalling at the Synapse**
Two Sides of the Same Coin?
Kavita Babu
- 431 **Topological Materials**
New Quantum Phases of Matter
Vishal Bhardwaj and Ratnamala Chatterjee



Resonance, Vol. 25 No.3 March 2020

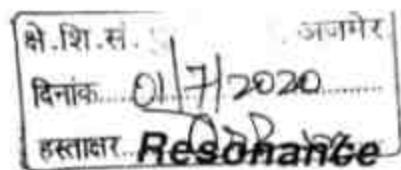
	Face to Face K Indulekha talks to Fabiola Gianotti	443
	Information & Announcements	
	Summer School on Machine Learning for Molecular Science	449
	The Academy Trust: Indian Academy of Sciences	450

DEPARTMENTS	
	Editorial 327 <i>Arti Kashyap and Varsha Singh</i>
	Science Smiles 332 <i>Ayan Guha</i>
Inside Back Cover	
Night Life By Sindhu Radhakrishna Photo Credit: Kaiyan Verma	
Errata	451

Front Cover	
	The cover image illustrates parity violation in sari wearing – positive helicity wins!
Back Cover	
	Chien-Shiung Wu (1912–1997) Illustration: Subhankar Biswas

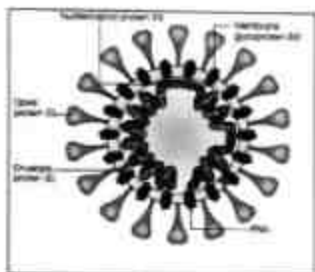
<p>Follow us on Facebook Resonance, Journal of Science Education @Resonance.IASc.Bng</p>

Resonance, Vol. 25 No.4 April 2020



477

GENERAL ARTICLES



- 477 **A New Bug on the Block**
Shahid Jameel

- 485 **Lockdown Maths**
Part 1: Why We Must Comply
Partha P. Majumder

- 491 **Lockdown Maths**
Part 2: Relaxation of Lockdown—Perilous
Partha P. Majumder

- 495 **The Price Equation and the Mathematics of Selection**
Amitabh Joshi

- 513 **The Central Force Problem in n Dimensions**
V Balakrishnan, Suresh Govindarajan and
S Lakshmi bala

- 539 **Fundamental Concepts of Synchronization**
An Introduction: From Classical to Modern
Nitu Kumari and Shubhangi Dwivedi



- 567 **Permissible Synthetic Food Dyes in India**
Jyoti Mittal

539




595




	Classroom A Single Measurement Method to Find Refractive Index 579 Joseph Anil Nathan
	Reflections The Marvel and the Mystery of Quantum Mechanics – Some Reflections 585 N Mukunda
	Face to Face Deciphering the Gene Machine 595 Venki Ramakrishnan talks to Padmanabhan Balaram

Front Cover





An artist's view of the Corona virus.

Back Cover



George Robert Price (1922–1975)
Illustration: Subhankar Biswas

DEPARTMENTS	
	Editorial 453 <i>N Sathyamurthy</i>
	Science Smiles 458 <i>Ayan Guha</i>
	Article-in-a-Box George Robert Price 459 (16 October 1922– 5 January 1975) <i>Amitabh Joshi</i>
	Inside Back Cover Birds in the Backyard By T N C Vidya Photo Credit: Satyajit Ganguly, Gurgaon

Follow us on Facebook
Resonance, Journal of
Science Education
[@Resonance.IASc.Bng](https://www.facebook.com/Resonance.IASc.Bng)

शे.शि.सं. पुस्तकालय, जजमेर
दिनांक 03/07/2020
पुस्तकालय

Resonance Journal of Science Education

May 2020 Volume 25 Number 5

GENERAL ARTICLES

647



617 Glimpses of Greatness
A Personal View of P W Anderson (1923-2020)
G Baskaran

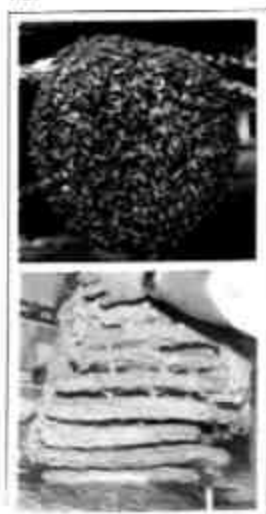
629 The Anderson Effects
T V Ramakrishnan

647 Novel Coronavirus Disease (COVID-19)
Anand Kumar Sharma

669 Social Distancing in Infection Control
A Lattice Model Demonstration
Ananda Mukherjee

677 Anthropogenic Disturbances
Impacts on Ecological Functions of Animals
Kim McConkey

727







691 The Quantum SI
The New System of Units
Indulekha K





677

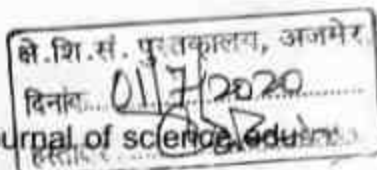
Resonance, Vol. 25 No.5 May 2020

	Classroom Group Laws Satisfying $1+1=11$ and $2+2=22$ 717 R. Padmanabhan
	Reflections Half a Century of Worship at "Tata's Temple of Science" 727 Raghavendra Gadagkar
	Classics More is Different 735 P W Anderson

DEPARTMENTS	
	Editorial 609 <i>N Sathyamurthy</i>
	Science Smiles 614 <i>Ayan Guha</i>
	Article-in-a-Box 615 P W Anderson (1923–2020): A Tribute <i>C N R Rao</i>
	Inside Back Cover Night Life Invisible Cleaners By Manjari Jain Photo Credit: Randeep Singh

Front Cover 	Anderson's varied contributions to Science – in the eyes of a colleague in 1983 (name unknown). Credit: G. Baskaran
Back Cover 	P. W Anderson (1923–2020) Illustration: Subhankar Biswas

Follow us on Facebook
Resonance, Journal of
Science Education
@Resonance.IASc.Bng



GENERAL ARTICLES

751 **Estimating a Genius – Louis Nirenberg**
Vamsi Pritham Pingali

757 **The Maximum Principle and the Moving Plane Method**
Mousomi Bhakta

765 **Physics with Coffee and Doughnuts**
Understanding the Physics Behind Topological Insulators Through Su-Schrieffer-Heeger Model
Navketan Batra and Goutam Sheet

787 **Thermodynamic and Kinetic Aspects of the Stability of Sir P. C. Ray's Mercurous Nitrite Compound**
Asim K Das

801 **Rewriting the Genome of the Model Eukaryote *Saccharomyces cerevisiae***
Vijayan Sambasivam, Desirazu N Rao and Srinivasan Chandrasegaran

SERIES ARTICLES

817 **How to Design Experiments in Animal Behaviour**
12 Male Frogs Sing for Sex but Why Don't They Do Their Best?
Raghavendra Gadagkar

765



801





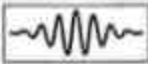

Scramblotypes



817



Resonance, Vol. 25 No.6 June 2020

Research News		
	A Window into the World of Nucleon-nucleon Interactions Indulekha K	839
	Face to Face A Versatile Ace at Bridge Building M.S. Narasimhan in Conversation with Sudhir Rao	843
	Information & Announcements Congratulations to the Newly Elected Members	885

	Editorial B Sury	741
	Science Smiles Ayan Guha	748
	Article-in-a-Box Louis Nirenberg (1925–2020) Kaushal Verma	749
	Inside Back Cover Birds in the Backyard By T N C Vidya Photo Credit: Nandagopal SA, IISER-Mohali Satyajit Ganguly, Gurgaon	

Front Cover		The red-eyed tree frog <i>Agalychnis callidryas</i> . Source: https://commons.wikimedia.org/wiki/File:Red_eyed_tree_frog_edit2.jpg
Back Cover		Louis Nirenberg (1925–2020) Illustration: Subhankar Biswas

Follow us on Facebook
Resonance, Journal of
Science Education
@Resonance.IASc.Bng