March 2023

EMPOWERING TIMES

THINKING ALOUD

Calling all Communicators

Jay

PODIUM

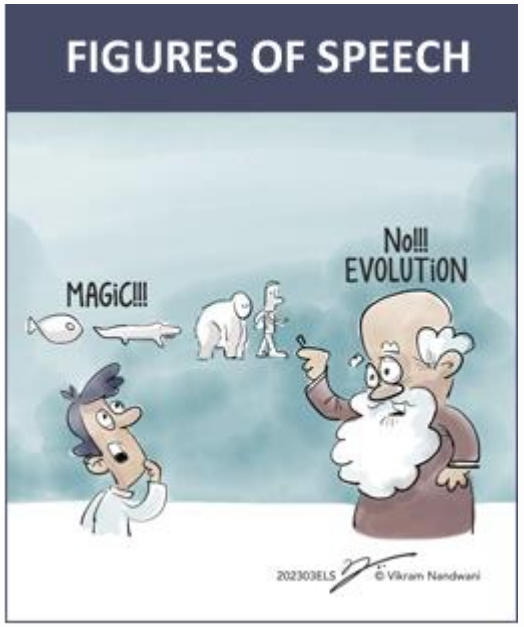
Hari Pulakkat

Editor – Shaastra, IIT Madras

WE RECOMMEND

Space. Life. Matter.
Hari Pulakkat
Reviewed by Ramona Parsani

Dear Reader,



The India International Science Festival (IISF), in its 8th year, had the theme "Marching Towards Amrit Kaal with Science, Technology and Innovation," and aimed to showcase its role in building a self-reliant and sustainable India. Held in Bhopal from January 21-24, 2023, it included 15 events covering topics such as science education, research and development, industry-academia collaboration, and scientific social responsibility. The festival also provided a platform for scientists, researchers, students, industry professionals, and the general public to exchange ideas and discuss the latest advancements in science and technology.

Science festivals are important for communicating scientific theories and facts to the general population, building scientific interest and for exchanging ideas between scientists and non-scientists. This is crucial especially in a country where science journalism plays an important role in translating complex scientific concepts into understandable language for the wider population to foster greater interest and understanding. It is events of this scale that also promote the country's achievements and contributions to science and technology, both nationally and globally, and in attracting young talent to pursue careers in STEM fields.

ET looks at ***'Science and Scientists: Spreading the Message to the Lay Public.'***

In the **Thinking Aloud** section, **Jay** highlights the lack of support for popular scientific communication in India and how the scientific community has failed to make science accessible and interesting to the common man, resulting in a gap in the market for popular scientific writing and the rise of ignorance in society. On the **Podium**, **Hari Pulakkat** – Editor of Shaastra, a science and technology magazine at IIT Madras, offers his thoughts on the lack of awareness of modern science in India and its scientists among the general public. In the **We Recommend** section, Vice President - Alliances at Ignite Life Science Foundation, **Ramona Parsani** reviews Hari Pulakkat's book - Space. Life. Matter. The read explores the current science eco-system in India, as well as its potential for future growth and innovation.

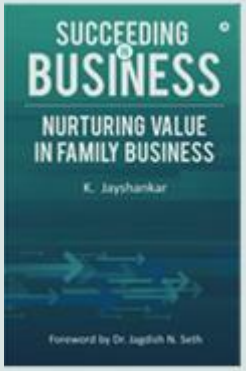
In **Figures of Speech**, **Vikram's** toons exchange scientific facts!

Please also **Click Here** to check out our Special issue of ET, which is a collation of selected themes that were featured over the years highlighting the changing landscape of the business world. This special edition has been well received and can be **Downloaded Here** for easy reading and is a collector's item.

As always, we value your opinion, so do let us know how you liked this issue. To read our previous issues, do visit the Resources section on the website or simply **Click Here**. You can also follow us on **Facebook**, **Twitter** & **LinkedIn** - where you can join our community to continue the dialogue with us!

Succeeding in Business: Nurturing Value in Family Business

Out Now!



What makes some family businesses grow from strength to strength? How do you ensure that value is created and not destroyed when a business passes hands from one generation to the next in the Indian context? How can old families incorporate new ideas to revitalize themselves? Is there a role for professional management in Indian family business?

This book offers answers to the vexatious issues that families face in their growth journey. The pointers provided can be used as a guide for nurturing the business and to leverage the traditional strengths that family businesses possess. As a counsellor and trusted advisor, the author, ***K. Jayshankar (Jay)****, has had a ring-side view of how family businesses have functioned. The practical insights drawn from his experience of four decades has been combined with conceptual elements to become a valuable primer for a family that wishes to succeed in the competitive marketplace that is India.*

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THINKING ALOUD

Calling all Communicators

Jay

Demystifying science for the curious young is an exciting mission, as any good teacher of science at school knows. Done right, the mind is inflamed for ever. Done poorly, the child turns away from the magic of the universe and lives a life of superstition, perpetually in darkness.

Does that sound cruel? Or, am I making it onerous for the teacher who is rushing against the clock to cram the child with formulas and theories so that she can regurgitate in an exam? The challenge is immense, I agree, at a time when the metric to measure a good school at the end of the year is the number of students who qualify for IIT or medical college from it. The tragedy is more severe when one considers that quality formal education is still the privilege of a small proportion of the population as a vast number of primary and secondary schools lack basic laboratories that is the playground for the curious child to experiment in.

The unfairness is real when you recognise that the door to the world of science should not be shut merely because a student chooses humanities or management as her port of call after completing formal school education. Thus untutored in the scientific approach to problem solving, we find that society is populated by the minds that gobble tripe (both traditional and recycled new-age) and fall victim to charlatans and hoaxers who peddle myths and fears to control people.

Part of the problem lies with the scientific community, I believe. They have failed to make science come alive to the common man. Speak to people who have grown up with the work of science fiction writers like Isaac Asimov, Ray Bradbury, Phillip Dick, Arthur Clarke, and their ilk, and you find people who grew up with Science Today - a defunct magazine from the stable of Times of India. Despite immense fan-following and a very large circulation, the magazine succumbed to the test of commercial success. What remains today is the work of the National Institute of Science Communication and Information Resources (a wing of the CSIR) - with its magazines, Science Reporter, Vigyan Pragati, and Science ki Duniya - and foreign magazines (some with Indian edition). What we witness, therefore, is a yawning gap in the Indian market for popular scientific writing, be it in English, Hindi or other regional languages. While the Science Reporter has been published since 1964, thanks to the government's

support, even the most vociferous afficionados of the government would hesitate to qualify it as a marketing success, gauged by popularity and recall.

Why is this lack of support for popular scientific communication? Tributes to the memory of Surendra Jha (the first editor of Science Today) and Rex D'Rozario (another pioneering voice in popularising science) recount that these forerunners ploughed a lonely furrow as they were on a mission to make science 'for everyman' (as recalled by Mohan Sivanand, former editor of Readers' Digest) but these voices have not reverberated loud enough to leave lasting impact. Was it the advent of computer technology - that gave birth to magazines like Digit, Dataquest, CHIP, Computerworld, et al - and rode the wave of Information Technology, or was it the lack of a powerful raconteur in the age of television? Let's face it, we have never had an anchor like Carl Sagan or David Attenborough or even Neil deGrasse Tyson to spin a story and present it slickly to the masses. Perhaps the closet Indian avatars at television story telling in science were Prof Yash Pal and Girish Karnad in the popular Doordarshan series of the 90s, Turning Point. But in today's competitive era, perhaps we need a Sharukh or Aamir to bring alive the magic of science to the masses all over again.

It is not that India does not have good science or great grass-roots work in science. But a relatively small number are familiar with the work of Eklavya in Madhya Pradesh or the powerful lessons in simplifying science that Arvind Gupta has done with his toys. We need to make science and the scientists the new hero in shaping a society where instead of harking back to the past for glory, we speak about the good work around us of those who are actively involved in creating a new India by tackling and winning against the challenges that have held us back for generations. After all, in the words of Abdul Kalam, 'a nation with a strong base in science and technology is a nation with a strong backbone.'

This mission needs powerful communicators who can harness modern media technology and spread the word - on digital screens and in print - that there are new heroes in laboratories and scientific test sites who need our encouragement, and support (financial and emotional). Failure to spread the message leads to many challenges, chiefly the rise of ignorance. It is important to heed Asimov's words in this context, 'the saddest aspect of life right now is that science gathers knowledge faster than society gathers wisdom.'

The search for such powerful media shapers is urgent and is still on.

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Podium

Hari Pulakkat

Editor – Shaastra, IIT Madras

Hari Pulakkat has been a science journalist for three decades, covering science and technology from an Indian point of view. He has worked primarily for two publications, Businessworld and The Economic Times. He writes about how science and technology shapes Indian economy and society, and on how major global trends in science shape India's future. He is now the Editor of Shaastra, a new science and technology magazine from IIT Madras. In 2020, he was the winner of the Indira Gandhi Prize for Science Popularisation. His book Space Life Matter was published in 2021.

ET: Science isn't finished till it is communicated, it is said. It is widely accepted that the general public is unaware of the state of modern science in India and the current scientific heroes. In your opinion, why is this so, and what is out state?

HP: Barring a few Nobel Prize winners, administrators or controversial figures, scientists are generally not in the public sphere anywhere. Part of this is due to the increasing sophistication of science. It is hard for the public to understand what scientists really do. This was not always so. People could easily relate to Newton's Laws or Darwin's Theory of Evolution when they were discovered. It was much harder to understand the Theory of Relativity or the structure of DNA, and the lay public largely knew Einstein or James Watson as scientists who had achieved something extraordinary without quite understanding their precise contribution. From the twentieth century onwards, many scientists who have contributed to the advancement of science are not known to the public at all. Who knows the scientist who worked out the structure of haemoglobin? Who detected the remnant of the big bang? Who discovered high temperature superconductivity? These are major discoveries in science and yet these scientists are not known to the wider public even in their own countries. Indian scientists have not made contributions at this level, barring probably a few like Raman, Saha, Ramachandran and S N De. So it is not surprising that the general public does not know much about Indian science or scientists. For the public to know about scientists, science itself has to come to the centre-stage of public consciousness.

ET: How can we communicate the message of Indian science to a wider community rather than labour under the thought that best scientists are the ones who are abroad?

HP: We have to distinguish between those who are intrinsically good and those who did the best work. Those who do the best work are usually, although not always, blessed with very good facilities. Indian institutions have not had such facilities till recently. Even now, there is a difference between the facilities available in Indian institutions and the best western or Chinese institutions. Scientists in these countries are still at an advantage but the gap has narrowed recently between them and Indian institutions. The quality of science done in India has also gone up with the availability of infrastructure. Till the 1990s, it was rare to see a paper in Nature - to mention one example - from India. Now it is a regular phenomenon. But such science, although good, is generally hidden from the public view in all countries. The public will notice when Indian scientists begin to make Nobel-class discoveries with regularity. That has not happened yet, but will happen at some stage in the future.

ET: What is the role of government and non-government organisations in promoting literacy and education in India?

HP: The bulk of primary and secondary education happens through public institutions in almost all countries. So the government has a responsibility. India has made big improvements in this regard since independence, when the literacy rate was 12%. It now stands at 75%. However, India still spends only 3% of its GDP on education, while the recommended rate in the 1968 Education Policy was 6%. India is still a lower middle income country, but to become an upper middle income country it needs to invest in education.

ET: Your book is a documentation of the paths that visionaries in science took to build and establish India as a knowledge centre and wonderful anecdotes that make for great reading. What comes out are the human interest stories that also have enough detail of the actual science undertaken, to let a reader stay interested. Could you let us know about the research that went into the book.

HP: The research for the book was largely through interviews. I was mainly interested in how science was built in India. Specifically, I wanted to understand what motivated some people to do science in an atmosphere of deprivation when they could easily have done much better science elsewhere. There was no good documentation for all this, and so I relied a lot on interviews. I was lucky that I could meet most of the important figures in post-independent Indian science although some of them were very old. Some scientists had died but I could talk to their close relatives or close colleagues to reconstruct their stories.

ET: Could you please share what brought you into science journalism and the role Shaastra plays in spreading the message of science.

HP: I had been a voracious reader all my life and I had read several good science books while in college. Some of these books were written by outstanding science writers. I noticed a significant difference between those books and the books I had to read in school and college. Although what I read were not textbooks, there was a depth and charm in them that spoke to me more deeply than the textbooks. I became a journalist by accident, but I chose my specialisation fairly quickly. Indian science was much smaller when I started, and it was good to see it growing to thrice its size in three decades.

Shaastra is in its early stages. As a science and technology magazine, we are trying to get people understand what impacts their life and work over the next decade. We are not popularising science but telling the readers what is happening in contemporary research. This has implications for how we live and work, and for how we make critical decisions.

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We Recommend

SPACE. LIFE. MATTER.: The Coming of Age of Indian Science

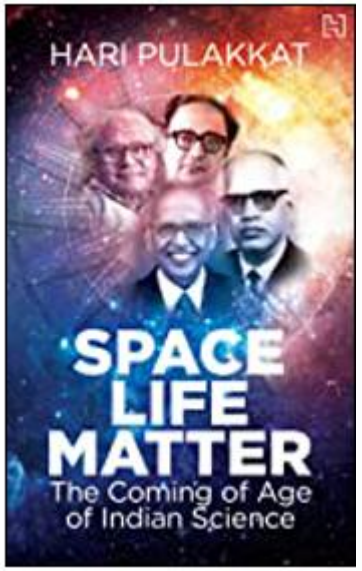
Hari Pulakkat

- Reviewed by Ramona Parsani

Our reviewer this month is Ramona Parsani who is a postgraduate from S.P. Jain Institute of Management and Research and has a plethora of experience in the service industry and the social sector. She has developed e-commerce business verticals in education and fashion for Vishwakarma Group. Her roles at NGOs such as Ekansh Trust, advocates for equal access for People with Disabilities, and Katalyst, an organization that provides mentorship for women in professional programs, had earned her a place as the external member of the POSH committee for RiseSmart at Kalyani Nagar, Pune.

Ramona is an avid reader and is a co-founder of a book club in Pune that has been running for the last 17 years.

A Fascinating Insight into India's Science Story



It is disheartening to hear and read that funding from our government for research and innovation in science is dismal. It is a mere 0.6% of our GDP! Statistics like this has no meaning unless put into perspective. The global average is 1.8% of GDP, most developed countries spend 2.5% of GDP and in some countries like Israel and South Korea it is as high as 4.0% Then along comes the book 'Space Life Matter' written by Hari Pulakkat. Hari is a journalist by profession and is the Editor of Shaastra, a national science and technology magazine published by IIT Madras. His book 'Space Life Matter' is a breath of fresh air and raises hopes for science in India. One begins to believe that despite and in spite of all that is India, India will make it happen. It's the people of India that will make it happen. Reading Hari's work, one believes that India is not a country that can be taken for granted.

At the turn of independence, Homi Bhabha realizing that it was of great importance to build institutions for the growth of science and technology, returned to India from the UK. Coming from an influential family, one can argue that it was easy for him to make this happen. The political establishment at time also realized the importance of economic development through science, and that helped.

The challenges of setting up of Tata Institute of Fundamental Research (TIFR), and other institutes around that time, lays the ground for much of what follows. Hari did well when he divided his book in to three distinct parts devoting most of the chapters to Space, and the rest of the book to Life and to Matter.

What makes the book a delight to read is that Hari charts the lives of those that built these institutions with fascinating human interest stories. We are given an insight into the motivations of every scientist who gave up a brilliant future in the West to return to India to build India's science. The book opens with Govind Swarup, a scientist in the field of radio astronomy. Homi Bhabha convinced him to come back and be a part of India's science story. He left Stanford and all its resources to come back to India and found that he had to work under severe challenges of lack of money and technology. India was at that time going through a foreign exchange crunch and importing equipment necessary for research, was quite out of the question. But the inspiring story of Govind Swarup and how he was instrumental in starting the space programme is just one in this book. If today India is counted amongst the foremost in this field it is because of him and all those who followed him.

Possibly because the Space programme was so successfully built in India and that one expects the same kind of breakthroughs that for the following chapters on Life and of Matter, and one doesn't read with so much wonder. Or maybe by then, one has come to know that Indian scientists in the fields of Chemistry and Biology are cut from the same cloth as Govind Swarup and others and will triumph despite the odds. We read also of C. N. R. Rao and R. A. Mashelkar. It is evident that Hari has conducted intensive research with countless first-person interviews. And so, we are given an insight into the early life of Mashelkar and the role his mother plays in making him who he is today. These little snippets make these larger-than-life personalities, very human. And so, when reading about the management styles of some scientists, sometimes very aggressive and uncompromising of high quality in work, we forgive them. And know they could not have achieved what they did, had they not been so exacting.

Testimony to the extent of research and the power of good story telling, Hari sets up for the reader the background to later discoveries in science. For example, he traces back the time when the telescope was made by Galileo Galilei in 1609. Although Galileo was not the first to make the telescope, his was certainly superior. Thus, astronomy was born. Then Newton made a different telescope using curved mirrors. Then came techniques that allowed astronomers to discover or rather suspect that the universe was bathed in radiation other than light. Hari traces the ensuing discoveries till the reader meets Irving Harold, a PhD student whose project was to detect neutral hydrogen signals from far away. The result of completion of this project was what Govind Swarup spent a lot of his career delving in - to the interesting stories of neutral hydrogen in the early universe.

He does this with equal aplomb for many of the scientists. So, the reader doesn't just read about the challenges and hardships of science in India, but Hari goes into considerable, though not difficult to understand, detail with the science itself.

In one of my conversations with Hari I asked him why did he not use the images of Homi Bhabha, or Vikram Sarabhai or C V Raman - instead, we have physicists like B. V. Sreekantan, G. N. Ramachandran, and Govind Swarup, the astronomer and C. N. R. Rao, a chemist gracing the cover. To which he responded and I paraphrase, most know Homi Bhabha and Vikram Sarabhai, but few know that of the stalwarts that came post-independence. It worked for me! Reading through the stories of the scientists on the cover and their individual quirks, I found myself flipping back to the front cover closely inspecting the face, the smile, the intelligence writ on their foreheads. They have become personal to me.

Hari has documented the history of science in India post-independence, brought to life the scientists with the interesting anecdotes whilst letting us in into the wonders of science. A winning combination, I'd say.

'Space Life Matter' is a very well written, easy to read book. It is an inspiring narrative of Indian Science and well worth the time spent reading it. The book became my go to Christmas gift for my immediate and extended circle, most of whom are not scientists. The perfect audience I would say.

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THROUGH THE LENS

Rupesh Balsara spots the common ringed plover that is a winter visitor to India and is known to make long journeys of up to 10,000 kms to reach their wintering grounds in India. They are usually seen from September to March, and in small groups foraging for insects and crustaceans in the sand. Conservation efforts are needed for their declining population due to habitat loss.

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