

The Science of Day-dreaming, or How We Forgot How to Fly

The Needle's Eye



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The question is: if India had such a dazzling history of discovery and invention, how come we are now so abysmal in producing original research, and why do our brightest minds choose to flee to better climes?

"There are two kinds of people—Greeks, and everyone else who wish they was Greek." Gus Portokalos in 'My Big Fat Greek Wedding'

I couldn't stop laughing every time the father of the bride in this comedy, which I watched (not for the first time) with my family a few days ago, claims every word in any language had a Greek root.

I did stop laughing when I learnt that the Greeks owed it all to the Indians. Minister of Science and Technology Harsh Vardhan told the weekend that Indians had discovered the Pythagoras theorem but in a typically magnanimous gesture credited it to the Greeks. The minister, one of the few lucky members of Prime Minister Narendra Modi's cabinet to have his portfolio changed from Health and Family Welfare after he said some rather odd things about condoms, also told his scientist audience that Indians had discovered 'beej ganit' but gave the credit for algebra to the Arabs. Coming so soon after we were educated about the origins of the Taj Mahal—some 'right-thinking' scholars said it had originally been a Hindu building called Tejo Mahalaya before it was usurped by the Mughals—I was ready to face more sobering facts.

I knew at the back of my mind that Indian mathematicians had invented the concept of 'shunya' (zero). I had also read a bit about Aryabhata,

the fifth-century mathematician and astronomer whose work in geometry and trigonometry was breathtaking in its sophistication. Indeed, the Encyclopaedia Britannica says that his second, long-lost work, *Aryabhatasiddhanta*, may have formed the basis for Islamic astronomy.

I'm willing to accept that ancient civilisations and men and women who lived centuries ago possessed knowledge and vision that makes phrases like 'cutting edge' and 'state of the art' sound trite in our world. The Aztecs had not one but two calendars in their rich kingdom between the 12th and 15th centuries CE. Mohenjo-daro had planned streets, public baths and a central granary 26 centuries BCE. You have to stand at the foot of the Great Pyramid at Giza in Egypt to understand the size and scale conceived by those architects and workers who put it together 4,600 years ago. I remember standing high up in the special building constructed next to the pyramid to house the Ship of Khufu, a 143-foot long wooden vessel that was meant to transport the pharaoh in his afterlife, and marveling at the precision engineering that brought it about.

Many of us will remember hearing at our grandmothers' knees about Hindu gods who flew about in vimanas (flying chariots), and anecdotes from the Mahabharata about blazing arrows that sounded like missiles and lethal spinning wheels

of light, chakras, that could sever the head of an opponent miles away.

So, although the authors of last Sunday's presentation at the Indian Science Congress who made a presentation that Indians had perfected huge aircraft 7,000 years ago that were powered by 40 engines, had flexible exhaust systems, could hover in mid-air, perform interplanetary flights, and be seen on Indian-invented radar have apparently

WEAK NUMBERS

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refused to share their paper with nosy reporters, it is tempting to heed our prime minister, who told us back in October that ancient Indians must have been adept at plastic surgery and reproductive genetics to create the elephant-headed god Ganesha.

The question is: if India had such a dazzling history of discovery and invention, how come we are now so abysmal in producing original research, and why do our brightest minds choose to flee to better climes?

Modi delivered an inspiring speech at the Science Congress on Saturday and said all the right things. "Our universities must be freed from the clutches of excessive regulation and cumbersome procedures. They must have a higher degree of academic freedom and autonomy; and, there should be as much emphasis on research as on teaching. In turn,

the universities must also subscribe to the highest academic and research standards and accountability," he said.

The reality is quite different. Around seven years ago Professor C.N.R. Rao, who was awarded India's highest civilian honour, the Bharat Ratna in November 2013, wrote an essay for Purdue University, his alma mater, on the dismal state of research in India. He noted that science and technology got just about one per cent of India's GDP. India contributed only about three per cent of global scientific research, produced only about 4,000 PhDs a year, a fourth of China's output, and "If one takes the top 1 per cent of the research papers in the world, the percentage of Indian contribution is less than 1%."

I have spoken with several Indians working in universities and corporate research laboratories abroad and they have similar tales to tell, about the funding they receive and of a research atmosphere that nurtures discovery and innovation. Far from being a meritocracy that produces quality work that can stand up to peer review, Indian research is sloppy and marred by rampant plagiarism. China, on the other hand, has been steadily and relentlessly building up its research institutions. Its universities now house thousands of committed world-class scientists, mathematicians and scholars. The Chinese are also

single-minded about wooing the best of their diaspora back to the motherland by dangling very good incentives and rewards before them. It is increasingly common for the best Chinese researchers to spend half the year on an American campus and the other half in China, likely in heavily-funded research universities. True, those universities have the heavy shadow of the Communist Party looming over them, but serious work is being done.

Modi has said ambitiously that the new NITI Aayog, the successor to the Planning Commission, will also tap into non-resident Indians 'beyond just their financial support' as his government strives for the 'Bharatiya approach to development'. What does that mean, and how is it going to work practically? NITI Aayog will be headed by market economist Arvind Panagariya and at the top of the think-tank, besides fellow economist and Sanskrit scholar Bibek Debroy, will be former missile scientist V.K. Saraswat. It is really not rocket science: Modi told the scientists in Mumbai that research also needs to move away from government control to a greater degree of autonomy and excellence. To get there, we need to stop daydreaming about our Vedic breakthroughs and get hard-nosed about the long haul ahead.

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