INDIA'S TRIUMPH AND TRAGEDY IN SPACE

BROKEN BRITAIN AND THE DEATH OF DEMOCRACY

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OPEN

23 SEPTEMBER 2019 / ₹50

WHO ARE WE?

New Indus Valley findings solve the mystery of our origins

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Cover by
Rohit Chawla

Cover image
A teracotta female figurine from c 2700-2000 BCE discovered at a Harrapan site

OPEN MAIL

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LETTER OF THE WEEK

Except nihilists, no one could disagree with Ashok Desai's appraisal of the Indian economy that sometimes what goes down must come up ('Better Days Are Ahead', September 16th, 2019). As the author pointed out, the business cycle is different in different sectors. To make a blanket statement about the whole economy would be inaccurate and misleading. The devil, as they say, is in the details. Moreover, trend consumption growth is still high historically speaking. The current slowdown should not be used to spread unnecessary panic. As the Reserve Bank of India recently said, this downturn is cyclical, the economy is in good shape even though it might still do with some bold reforms. Investment growth has been subpar for some time but this is not insurmountable. Policies and their effects work with lags. While politicians might like to take undue credit when the going is good and shift blame to others wrongfully when the going is bad, it is extremely difficult to correlate political decisions with economic effects. As the author said, irrespective of who rules, better times are coming.

CP Kurien

ALERT SARKAR

In the public mind, there is confusion about whether the Indian economy is doing well or not ('How Bad Is the Economy?', September 16th, 2019). However, I do not think there is a need to panic. Fluctuations are part of the business cycle: bad times are followed by good times which are followed by bad times and so on. What we do need to be worried about though is the trade deficit, which will make Prime Minister Narendra Modi's dream of making India a $5-trillion economy by 2024 difficult. We might not be the fastest growing large economy anymore but we are by no indicator anywhere in the doldrums if compared with our past. The trade war between the US and China is also affecting us adversely. Consumption growth could do with some help from the Government by re-orienting and reducing the Goods and Services Tax and introducing reforms in direct taxation and the land and labour markets. Several measures recently announced by Finance Minister Nirmala Sitharaman are certainly going to boost demand and investment but we also need to figure out what is wrong in the labour-intensive sectors to solve the problem of rising unemployment.

MY Shariff

There is a sudden interest in trash-talking the Indian economy. Though the opposition parties thought they could the Government with their facts and figures, Finance Minister Nirmala Sitharaman took the wind out of their sails by announcing a comprehensive economic package to allay the fears—real or imagined—of the public. Moreover, this gives the lie to those who had been arguing that this Government is ignoring the real data as the economic package clearly shows that Prime Minister Narendra Modi is always alert to the common man's concerns, who might not be able the grasp theoretical explanations for the current downturn. If anyone could be blamed of being in denial mode, it was the previous Congress-led Manmohan Singh Government. Apart from the package, the Government should also try to reduce tax rates and give concessions and incentives to manufacturing sectors, if that could lead to job creation, thus increasing disposable incomes. That would not only solve the current economic problems but also reverse the cycle. One can be sure that the strong will for which Modi has become famous will bring the desired results on the economic front too in the coming months. The Government's rally is certainly going to continue for much more than 100 days.

Jaideep Mittra

Volume 11 Issue 38
For the week 17-23 September 2019
Total No. of pages 68

By S PRASANNARAJAN

THE FEAR OF CHANGE

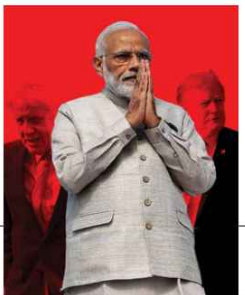
WE ALL KNOW this: the politics of the cosy present resists change, and even goes to the extent of exaggerating it in apocalyptic terms. When cracks appear on the placid terrain of the world that sheltered, and nurtured, our entitlements and our ideological superstitions, we all see that familiar devil in power—narcissistic, exhibitionist and authoritarian. His dance transfixes the liberals, establishment Brahmins, and professional alarmists in London, Washington and New Delhi. Three great democracies of the world are, if we buy the text of apocalypse junkies, trampled upon by this tradition-defying colossus made of vanity and fear.

In London the exorcism is underway. The Brexit vote three years ago was a people's unambiguous yes for freedom from a supranational bureaucracy. It was their urge to regain the nation, its vanishing familiarities. It was their definitive way of asking the same question that first rose from the wreckage of an apparatus larger than the EU thirty years ago: Who are we? People tend to ask this question when they lose their language, their neighbourhood, their social habits, their shared cultural gestures... their street. To see the Brexit vote as a rejection of Europe or its values—no more Thomas Mann—was political idiocy. It was just about being English in the world without external supervision. It was not the natives declaring war on cosmopolitanism. They were set to pay the price. What is being played out in Britain is the theatre of the ridiculous, in which the parliament is what subverts democracy—and the popular instinct for change.

In Washington, the theatre is more Falstaffian than the English. The legitimacy of the elected president is challenged mostly because of his personal aesthetic system, which is built on half-truths, braggadocio, bluster, disregard for institutions, showmanship, and absolute anti-intellectualism. As the television critic James Poniewozik would say, Trump is the ultimate reality television in the ultimate TV Nation. Increasingly, in spite of the ungainly sight of power, Trumpism seems to have acquired a life that may last longer than Trump the Vulgarian. Trump floats in his Twitter-built make-believe; Trumpism is rooted in social realism the liberal media elite refuses to accept. It owes its solidity to instinct's triumph over expertise, and we still don't know how the sociology of it will transform the traditional Left and the Right. The America that elected him, and still continues to indulge him, defies the red-and-blue predictability of bipolarity. Trump is not the name of the change; he is a jarring prologue.

In Delhi, India is being reimagined by those—the same displaced legion of liberals and the last mourners of a lost establishment—who are repelled by the Narendra Modi regime as a land without mercies, a place where institutions are being vandalised and individual liberties are being curtailed by Hindu neo-nationalists. We have been warned: we are hurtling towards hell, and in the process losing our last decencies and civilities as a secular people. In this piece of political gothic, the man at the centre is the autocrat busy building his own cult, inflated by his sense of infallibility. It is a frightening piece of work, and it is being sold by artists shaken by the prospects of redundancy in an India where the old idols and pieties, and all those reassuring certainties, of a state that indulged the establishment prophets are no longer sustainable. I'm ready to admit here: the aggression of the newly empowered cultural right is unacceptable in any civilised society, and its moral system is incompatible with the world most of us inhabit. That said, India too has turned its gaze inward, and become sceptical of enforced social behavioural codes. A sense of the nation and a civilisational awareness about being a Hindu need not be a repudiation of modernity, though we don't have a writer with the depth and lucidity of a Tom Holland who, in his new book, *Dominion: The Making of the Western Mind*, tells the story of how the Western intellectual identity is indebted to Christianity. To tell the story of Hinduism, on the Right we have only mythomaniacs. The rising popularity of Modi is a political expression of a cultural change that remains untapped by the cultural historian. We make too much noise about our lost little worlds.

The rising popularity of Modi is a political expression of a cultural change that remains untapped by the cultural historian



We are frustrated by the popularity of the insurgent, who comes from the deepest recesses of resentment. We are still unaware that our arguments have been outpaced by the sighs, sorrows and ecstasies of people who lived their lives in worlds untouched by our arguments. When the Leader of Deliverance propped up by ideological straitjackets fails, countries seek their redeemers. The impulses of democracy today favour their methods, even as we recoil from their manners. Change unsettles those of us who are left with no new words to describe our remoteness. ■

OPEN DIARY

Swapan Dasgupta

THE ENGLISH LANGUAGE—or at least in the days before political correctness banished the more colourful expressions—had a very definite sense of geography when describing remoteness. An interminably long time was equated with a 'slow boat to China'. Strange and forbidden lands where normal people didn't venture began with Timbuctoo and weirdness was equated with the mythical Bongo Bongo Land—an expression whose unfortunate usage, which, if my memory serves me right, once led to a British minister losing his job. Somewhere in between was Outer Mongolia which, like Siberia, was a fit place for banishment.

Outer Mongolia is now plain Mongolia, encompassing much of the Gobi Desert, because Inner Mongolia is just another province of China. To Indians, it is certainly remote. It took me nearly 18 hours, including an eight-hour layover in Seoul, to reach Ulaanbaatar—the capital city where more than half the population of Mongolia reside. It would have taken less time via Hong Kong but the possibility of the present troubles there spilling over into the airport made travel agents wary of recommending that route. What added to the sense of unknown was the fact that my mobile operator didn't have any dedicated arrangements with their Mongolian counterparts. The alternative to prohibitive roaming charges was, therefore, wi-fi for communicating with India. And although the quality of public wi-fi was remarkably good, the respite from calls from India added to the adventure.

The feeling of remoteness was, however, illusory. The belief that horses and camels would be jostling with more modern means of transport turned out to be false. Almost every family in Ulaanbaatar owns a car and the city boasts some 70,000 cars, a disproportionate number of which are bulky SUVs. The result: horrible traffic jams that make it impossible to estimate journey time. One evening, I left for a destination at 5.20 pm and arrived in 20 minutes. My colleagues who left at 6 pm, hoping to reach by 6.30 pm, finally arrived at 8.45 pm.

Fortunately, experiencing the modern Mongolia wasn't the purpose of my visit as a delegate to Samvaad III, a conversation on conflict avoidance involving representatives of the Hindu and Buddhist faiths. The conference was held at the Gandan monastery where the venerable Khamba Lama and his team of monks were gracious and generous hosts.

The Gandan monastery complex, in the heart of Ulaanbaatar, is arguably the most important in Mongolia and the Khamba Lama occupies a position that can roughly be equated to that of a Shankaracharya. It dates back to the mid-19th century and was one of the few monasteries that the Communists kept open during the dark years from 1937 to 1990. However, it operated more as a museum monastery because the hardline Communists outlawed all Buddhist rituals, closed down and destroyed innumerable monasteries all over the country and killed some 30,000 monks, besides imprisoning an equal number. The Communists even changed the script since they associated the older one with religion and backwardness. There is a Museum of Political Persecution in Ulaanbaatar but unfortunately it was closed for renovation. When it reopens, I hope it will vividly document this cultural assault by these upholders of secularism.

There are two visible outcomes of this troubled history. First, the most ardent lay devotees tend to of an older generation that experienced the Communist oppression and probably saw valuable artefacts destroyed and Buddha images carted away to be melted down. It is not that the younger devotees are missing but that the contrived schism between modernity and the traditional faith persists.

However, the revival of Buddhism in Mongolia is inextricably linked to the preservation of traditional culture. The delegation was privileged to observe the Nadaam festival, held in a football stadium. Presided over by the Khamba Lama, the festival of archery and wrestling was preceded by a three-hour-long pageant of traditional dance and music. However, the dancers were not professionals. They were monks who had spent the preceding six days in meditation and prayer to prepare themselves for this symbolic festival of the triumph of purity and elevated thought over negativism and evil. Among the rituals was the symbolic burning of the evil spirits and the agents of Yama.

The festival was also dominated by a large tapestry of Vajrasena, below which was the depiction of Genghis Khan. In its own way it defined Mahayana Buddhism in the country—the deep blend of spiritualism and the Mongol identity. In Mongolia, as in many other lands, faith and nationalism are inseparable. ■

NOTEBOOK

Modi So Far

THERE'S SOMETHING VAIN about touting achievements of the first 100 days in the life of a government. There is, no doubt, a certain value—call it public relations spin or propaganda—to highlight such claims. In a country like India, this seldom works: 1,725 days later, no one remembers what happened in the first 100 days. By then the heat of keenly contested elections vaporises the memory of early days. From that perspective, what Narendra Modi and his Government have done (or not done) is unlikely to be forgotten soon.

In the welter of claims, counter-claims and controversies, three images stand out. First, muscular nationalism—of which Modi is the exemplar—is here to stay. It is striking that alternative ways of imagining what India should be, the liberal conception, the 'muddling through' option—the staple of centrist parties—and the idea of a strongly federal polity, all stand diminished. There are no convincing explanations so far for how (and why) this has happened. But two results are clear: the suddenness and intensity of the collapse of alternative ideas and the great liberal fear that when combined, religion and politics can form a formidable and dangerous combination that cannot be tamed.

Explanations for this will have to await calmer times but one initial thought comes to mind: perhaps the fear of 'Hindu nationalism' lay at the root of the present crisis of alternatives. Maybe too much energy was spent to demonise 'Hindu nationalism' and that has come back to haunt everyone involved in that project. It is not accidental that Modi, the politician most closely identified with conservative Indian nationalism, has gained the most from this backlash. At one time, his established and emerging political rivals thought that demonising him personally and running down nationalism would do the trick. In retrospect, the potential gains from such a strategy were always limited. But such was its intellectual power that it confused criticism with political viability. Now, much chastened, Modi's rivals are very careful in criticising him.

Second, this clearing of the field so to speak, has allowed Modi to engage in extraordinary political projects that were inconceivable even five years ago. Right from the time the Constitution was launched in 1950, India as a nation-state has rested on a series of compromises. From the special status for Jammu and Kashmir to virtually immutable personal laws for minorities, these provisions created a special class of regions and citizens who were placed on a different legal and Constitutional footing. In 1950, three years after Partition, these measures were considered essential to impart confidence and a sense of belonging to these citizens and regions. Even then, there were voices that warned against these steps but at that time it was easy to dismiss them as 'communal'. Seventy years later, however, these measures acquired a malignant political character. In Kashmir, Article 370 became an article of faith for separatists and even the so-called mainstream political outfits: for the former it was a psychological device that made it clear that Kashmir could be independent one day. For the 'mainstream' it allowed an uninterrupted reign of pelf, one that would have put Pareto's Foxes and Lions to shame. Similarly, the persistence of triple *talaq* as a measure to end a marriage ceased to be just that and turned into a political veto in the hands of Muslim clerics and political outfits. Politically, it became impossible for anyone to challenge, let alone get rid of, these measures. Centrist politics in India—called by any name, federalism, liberalism or whatever ism—was wedded to these pernicious ideas.

The claim that institutions under Modi's watch have become impotent is another way of saying that in 'normal' times these very institutions could be turned into vehicles of political opposition to a lawfully elected government. No one says so but that is the rotten secret of elite liberalism in India

For these reasons the abrogation of Article 370 and legislative reform to Muslim divorce law stand out starkly against the usual norms of what is acceptable and what is untouchable in Indian politics. These changes could not be carried out until Modi was unassailable. It was not just a matter of legislative majority but also ideological dominance that was essential. The reaction has been interesting: it is loud and sterile at the same time.

There are cries now that Indian

Illustration by SAURABH SINGH

democracy—no less!—is in danger from majoritarianism. But this begs the question: what is democracy all about if one removes latter-day ideological encrustations around it? It is simply an exercise of the will of the people. In that, contemporary India is no different from established democracies anywhere. If anything, Modi is careful not to tinker with any institutions at the formal level. The claim that institutions under his watch have become impotent is another way of saying that in 'normal' times these very institutions—conceived as politically neutral—could be turned into vehicles of political opposition to a lawfully elected government. No one says so but that is the rotten secret of elite liberalism in India. When someone says the judiciary has been 'compromised' or that the legislature goes about executing zombie-like motions, what is being implied is that institutionalised subversion is no longer an option.

Finally, there is a third image as well. But unlike the first two that cast Modi and his Government in a mellow light, this one has the potential to undo, if not unravel, the first two images. To put it mildly, the economic performance of the Modi Government has been disappointing. To be sure, India's economic growth continues to clock 5 per cent but that may be illusory. Sustained growth of 7 per cent-plus is essential to end structural poverty, which is simply not about lack of opportunities in an economy but more about the inability to make use of these opportunities. What economists call 'poverty traps', where the issue is more sociological and not economic, requires much higher growth. That hands enough resources to a government to spend the extra amounts needed to reduce poverty. At the moment, the Modi Government is scrounging for any money it can lay hands on just to meet normal expenditures. This situation could have been avoided by carrying out crucial reforms in the land and labour markets. But the time for those supply-side reforms is now gone: India is now in a crisis of dwindling consumption growth.

In this, it has to be said the Government is more or less clueless. Should the task of bringing the economy back on the rails be carried out as a sector-by-sector repair? Or should there be an economy-wide resuscitation plan, say, by a combination of greatly reduced policy rates by the central bank and a systematic effort to reduce the value of the rupee so that exports can grow? In the din of noise around falling growth and disappearing jobs—something that can unnerve any government—the Modi Government seems to be veering around the first approach. That will be a mistake: governments cannot pick sectors for saving (or destruction for that matter), that is a job for the markets. What a government can do, however, is reduce market frictions and eliminate them as far as possible.

Here the ideological legacy of the BJP, which has always harboured doubts about free-market capitalism, comes in its way. It is another matter that any government can design and create institutions to save those citizens who lose in a market-driven distribution of income and wealth. Even diehard economic libertarians have to agree with such a proposition in an age of galloping inequality. But call it an Indian phenomenon, the temptation to control things comes in the way. That is an illusion. Even at this stage, economic decline can be arrested. Immediate measures—lower policy rates and devalued currency—can go some way in alleviating pain. This, however, has to be followed by land and labour reforms. The fact that Modi has the political capital to do this, but does not want to, is the big political why of our times. ■

By SIDDHARTH SINGH

PORTRAIT • KIRAN NAGARKAR (1942–2019)

THE SPIRIT OF BOMBAY

The liberal in his labyrinth

KIRAN NAGARKAR, THE author who wrote in English and Marathi, is celebrated for many of his works—all for different reasons. If his first work capitalised on the absurd, his subsequent novels immersed readers in myth and lore, cities and kingdoms. His writing was always worldly, without being pedantic or obvious. His touchstones were freedom and equality, and he warned of the dangers of fundamentalism. In his writings, he raised the red flag against hegemonies, whether it was patriarchy or casteism.

Nagarkar's muse was often the spirit of Bombay, a Bombay of cosmopolitanism, dreaming big, and surviving against the odds. He strove against labels, believing that they limited rather than defined. An advocate of freedom of expression, he realised that doubt means independence and the lack of doubt can only lead to extremism. He used his platform as a leading Indian author to chastise society about the dangers of collective amnesia and the rewriting of history. In an interview with *Caravan* in 2015, he said, "Anything that happens anywhere in the world, you and I are responsible. There are few things as horrible and dangerous as apathy."

Nagarkar studied in Marathi only till class IV, continuing the rest of his education in English, first at Fergusson College in Pune and then SIES College in Mumbai. His first novel in Marathi *Saat Sakkam Trechalis* (*Seven Sixes Are Forty-Three*) published in 1974 did not merely intersperse English in the Marathi text but used blocks of English in it, baffling readers and critics alike. This early work was the first sign that Nagarkar would choose the subversive over the conventional, as the novel's Marathi had its own syntax and grammar and the plot its own logic. His play *Bedtime Story* published the year of Emergency ran afoul of the censors and the Shiv Sena because it used the Mahabharata to question authoritarianism. In one of its episodes, Nagarkar underscores the agency of Eklavya. Here was a Tribal student who had the quiet gumption to talk back to his guru. Nagarkar's Draupadi was no simpering wife, but a strong character in her own right.

SAURABH SINGH

If Nagarkar was often hailed as the Bombay writer because of his trilogy *Ravan and Eddie* (1994), followed by *The Extras* (2012) and *Rest in Peace* (2015); *Cuckold* (1997) proved he could be celebrated as a Rajasthani writer as well! Set in 16th-century Mewar, it received the Sahitya Akademi Award in English. The narrator is Maharaj Kumar, eldest son and heir apparent to the throne of Mewar. Readers are plunged into the prince's moral universe and the many infidelities that both king and kingdom must endure. The achievement of *Cuckold* is that the 16th century prince speaks to us across centuries like our very own Hamlet.

Ravan and Eddie tells the story of two boys: Ravan, a Marathi Hindu, and Eddie, a Roman Catholic. It takes readers through Mumbai's *chawls* in Mazagaon. It is the quintessential story of aspiration and accomplishment. By the third volume, Ravan and Eddie have made it to Bollywood, but dreams still lie ahead. His last novel *The Arsonist: Poet, weaver, seer, blasphemer*, published earlier this year, made contemporary mystic poet Kabir.

Looking back, he is, of course, celebrated for his writing and voice which encouraged readers and listeners to not be in thrall of authority and to revel in revealing uncomfortable truths. But 2018 forced a re-evaluation, as three journalists accused him of sexual misconduct. While Nagarkar denied the allegations, publishers and readers took a step back, and the sum of his legacy will always be coloured by it. For someone who believed that to be a writer is to know "right from wrong" (as he said in an interview to *The Wire* in 2017), in the final measure of the man, the chasm between his words and his actions will always be remembered. ■

By NANDINI NAIR

ANGLE

THE SMALL PICTURE

Why the Finance Minister is right about the auto sector

By MADHAVANKUTTY PILLAI

FINANCE MINISTER Nirmala Sitharaman this week put down the shift to Ola and Uber among millennials as one of the factors for the crisis in the automobile sector. Addressing a press conference she said that the industry had been on a roll till just two years back and is now 'affected by several things... some studies do tell us the mindset of the millennials who are now preferring not to commit an EMI towards buying an automobile instead would prefer to have Ola and Uber or take the Metro.' Maruti, the largest car manufacturing company of India, wasn't so sure. Its executive director Shashank Srivastava told the news agency *PTI*, 'Ola and Uber came into existence during last six-seven years. In this period, the auto industry also saw some of its best times. So, what happened only during last few months that the downturn became so severe? I do not think it is only because of Ola and Uber.'

There might actually not be a divergence between the two statements. The boom in the auto industry was also a result of the large number of cars being purchased to run in the Ola and Uber platforms. And one of the causes of its downturn has been that Ola and Uber are also not growing. They have considerably reduced incentives for drivers and many who took cars on loan just offered to return them to the bank because it was hard to pay the interest.

Sitharaman is right when she says that many don't want to own private cars. But what is left unsaid is why the switch is happening. In the West, especially Europe, environmental consciousness plays a large part. In India it is the absolute horror of driving in a city like Mumbai or Bangalore that makes those who can afford a car endure public transport with all its unpredictability and discomfort. Your columnist himself used to commute by car in Mumbai until half a decade ago when he suddenly saw as much as six hours of his time being taken daily going back and forth. And this was before the highways got clogged with the massive Metro railway work.

The finance minister avers that they are looking for ways to solve the automobile industry's problems. But if the sector is going through sociological and technological metamorphosis, then it might not be such a good idea to prolong it. Rajiv Bajaj, the Managing Director of Bajaj Auto, in fact, is one of those who says that the automobile industry's problems are of its own making and they don't need a GST cut. He told *Economic Times*, 'There's no industry that keeps growing forever without correction, so no point chasing that mirage. The answer lies in being global so that the company doesn't fall sick if one market catches flu.'

The only thing for the Government to do is to reduce its own size and take itself out as much as possible from micromanaging the economy. It is politically difficult but the only time tested formula to bolster the economy. ■

IDEAS

GETTY IMAGES

FINES

Several state governments appear to be considering a reduction of the recently revised fines under the new Motor Vehicles Act. The Gujarat government has already announced a reduction on 'humanitarian grounds', Mamata Banerjee claims she won't implement it in West Bengal because they are 'harsh', and several more from Karnataka and Maharashtra to Uttarakhand appear to be following suit. A fine isn't meant to be humanitarian or less harsh. It is meant to be harsh because its objective really is to change a habit. The earlier fines, as one can see every day on Indian roads, wasn't working. Consider over-speeding. It used to be a fine of just Rs 400 before. Now it is between Rs 2,000 and Rs 4,000 (for medium passenger or goods vehicle). Driving without a licence used to be Rs 500; now it is Rs 5,000. Drunken driving has gone from Rs 2,000 to Rs 10,000. We can fall back on the old cliché of Indians being bad drivers. But in truth, the system through its low fines and corruption, has also facilitated them to be at their worst. ■

WORD'S WORTH

'The stiffer the penalty, the greater the message is sent'

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RAM JETHMALANI
(1923-2019)

THE RAM WHO RAISED THE BAR

By SUMIT MITRA

FOR A ROOKIE journalist in Delhi in the 1980s, as I was, the suggestion of being given the 'law beat' would send shivers down the spine. The problem was not with access to courts, which were open in those days. But the language of the world of law was fearsomely arcane—or so it seemed.

Until I met Arun Jaitley, then in his early thirties, who'd come to the magazine office where I worked to see a colleague. As the colleague got caught up in some meeting, he'd told me to have a chat with this "bright young lawyer" and an "ex-Emergency detenu".

In the half hour we spent talking, I was much taken in by Jaitley's wit and his ability to make everything appear to be light, including legal issues. After a few more meetings, I requested him to introduce me to some legal heavyweight. My favourite film was *Witness for the Prosecution*, and I was eager to meet the Indian counterpart of the lawyer with bulldog-like ferocity as played by Charles Laughton in the Agatha Christie courtroom drama.

Jaitley readily agreed; he scrawled on a paper an address of Ram Jethmalani, and promised to fix an appointment with him. It was in the summer of 1984 that I met Jethmalani first.

Jethmalani's skin is bronze-coloured. He got up from his chair to greet me, and then ordered his men to bring some tea. Later, he made it a custom to pour a welcome drink of whiskey to his visitors, as I partook of it till the end of my Delhi years (2009).

"What do you think the lady will do now?" the legal eagle cut the preface short. I was disheartened, as I expected to see the Indian version of Laughton springing up from the chair with chilling accounts of the crooks he had defended in court and how they were—the smugglers Haji Mastan and Yusuf Pathan—in real life. Instead, I found Jethmalani fixated on Indira Gandhi.

Nor was it unexpected; during Emergency, he had escaped the clutches of the Sanjay Gandhi gestapo by the skin of his teeth. For a fiery speech he'd delivered at Palakkad (Palghat), a detention order under the dreaded Maintenance of Internal Security Act (MISA) chased him to Mumbai, where his 300 lawyer friends, led by Nani Palkhivala, petitioned the Bombay High Court for a stay order, which, lo and behold, was granted. But Jethmalani was indeed down on his luck. The *Additional District Magistrate Jabalpore vs Shivakant Shukla* judgment was imminent. Generally known as the *habeas corpus* case, it tested if, under Emergency, a detenu still had the right to appeal his detention. The *ADM Jabalpore* case showed that it was no more available. Ram promptly flew to Canada. For two years, he lived in the US as a political exile. With Emergency lifted, he returned to India, to be elected Lok Sabha member from

Mumbai on a Janata Party ticket.

In the Janata days, Jethmalani, though popular in the then ruling party, remained in the bad books of Morarji Desai, the morally fastidious Prime Minister, apparently for his drinking habits and the fact that he had two wives. Jethmalani remained unfazed, and even hit back with the public jibe that he'd have his evening whiskey while the prime minister was entitled to his "pissky" (referring to Desai's well-known fad for urine therapy). The Janata Party was torn to pieces between Desai's stubbornness and Charan Singh's greed for power, and the earlier Jana Sangh followers formed the Bharatiya Janata Party, of which Jethmalani became vice president.

Ram Jethmalani began his practice very early in Karachi, at age 18. He entered the SC Shahani Law College in 1939 and graduated in 1941 when he was 17. And that led him to his first legal challenge, as the Sindh Bar Council had suddenly resolved that the minimum age for practice would be 21 years. The young Ram, then going on 18, argued before the British chief justice of the Sindh High Court that the 21-year-rule shouldn't apply to him because it was passed after he had entered law school. Ram had by then been armed with a first class in the law school. As the chief justice nodded his assent, it was the young lawyer's first laurel of success.

It was in pre-Partition Karachi that Ram began a partnership with Allahbaksh Karimbaksh Brohi, the philosophy professor and lawyer who eventually became the law minister of Pakistan. With Ram Jethmalani coming on board, Brohi & Co was a hit. In *Rebel*, Jethmalani's biography, the author Susan Adelman writes that 'within six years of opening their practice, 20 out of 20 cases admitted each Monday in Karachi would be Brohi & Co cases'.

Then came the 1947 Partition. For some time, life in Karachi was unaffected, and so was the cashbox at the Brohi's. Things changed as the *mohajir* Muslim refugees from India began streaming in, and the loot of Hindu and Sikh shops started. In September 1947, Ram saw his family off on a refugee ship to Bombay, and continued his practice, hoping, like many others, that the 'madness' would blow over and things would be normal. But the riots broke out in February 1948, following Mahatma Gandhi's assassination, and Muslims and Sikhs attacked each other on sight. Ram grabbed a Jinnah-style hat off the head of an office clerk, and hid in his house for some time until Brohi told him, with sadness, that it might no longer be safe for him to stay back in Pakistan. He flew in a Dakota plane to Bombay, using a ticket given by a client as fee.

In Bombay, life was tough and the courts were teeming briefless lawyers. But there was no dearth of Sindhi litigants involved in all sorts of disputes over property, title, *hundi* payments, or unpaid loans. Some of them knew Ram from Karachi. So Ram identified his catchment area and, shrewdly, chose the lower courts for his practice. He became, as he always boasted, "the only refugee to pay income tax in the first year".

However, Ram's talent was being wasted on petty cases, and he was pining for a break. That came with the 'Nanavati case', which put not only sex and romance into courtroom trials but brought about a ban on trial by jury. The 1959 case involved an affair between Sylvia, a ravishing beauty and wife of Commander Kawas Nanavati, a Parsi naval officer, and Prem Ahuja, a Sindhi playboy. When Nanavati got to know about the affair, he confronted Prem at his house. Following an altercation, Nanavati shot him. He then went to the police to turn himself in.

In this case, Ram only had a "watching brief" from Prem's sister, Mamie Ahuja, "to protect the interests of the deceased". The case soon became the talk of the town and it created two fortunes: that of *Blitz*, the weekly tabloid, whose editor Rusi Karanjia, a Parsi, went hammer and tongs in defence of Nanavati, and Jethmalani, the lawyer whom the Press described as the 'puppeteer' who pulled all the strings. The *Blitz*'s open advocacy for Nanavati struck a chord with many. Parsi girls reportedly wrote messages to jurors in lipstick. Nanavati was acquitted eight to one. But, from the back seat, Ram got the argument so crafted that judges sent the case to the high court, and the high court agreed that the verdict was perverse. Finally, Nanavati was given life imprisonment. The story inspired books and a movie and it also catapulted Jethmalani in the public eye as the clever 'super lawyer' who gave Nanavati his just deserts.

As lawyer, he entered the national scene in 1970, when he was elected chairman of the Bar Council of India. During Emergency, he sharpened his attacks on Indira Gandhi from a legal platform. Therefore, unlike most of his later political allies, he was not initiated into opposition politics through right-wing Hindu organisations like the RSS, such as AB Vapayee, LK Advani, Arun Jaitley or Prime Minister Narendra Modi.

But he undeniably shared with them a general distrust of the Congress that began with the 1975 Emergency. Modi underlined it as he paid glowing tributes to Jethmalani after his death, specially remembering him for his "fortitude and fight for public liberties" during the 1975-1977 Emergency years. Even the enmity that began between Ram and Jaitley after the former's 2013 expulsion from the party evaporated. Last year, Jaitley, despite his physical condition, intervened, resulting in the party and Jethmalani burying the hatchet.

Jethmalani shared many of the BJP's political views, but his view of life was totally different. In private conversations with me, he seemed aghast at the Modi Government's religious fanaticism and was in a fit of pique by the incidence of cow vigilantism and lynching. If his health permitted, I suspect he would have fought the lynch mobs in court, much like Charles Laughton did to defend the innocent Marlene Dietrich against medical advice, in my favourite film. ■

Sumit Mitra is a commentator on public affairs

By Bibek Debroy

States of Despair

What is it that pulls the all-India performance down?

I READ REPORTS ABOUT what the Finance Minister of West Bengal recently said. Given the media's predilections, one is never sure whether an attributed quote has been correctly reported. For a news item like this, reportage is probably right. "I am delighted to say that as per the Government of India's Ministry of Statistics and Programme Implementation just-published table on GDP growth of states in 2018-19 West Bengal's growth is the highest in the country at 12.58 per cent... We are holding the baton and moving forward while the rest of the country is going through serious recession." Among social sciences, economics is certainly the most rigorous. Therefore, most, though clearly not all, economists are careful and precise when using expressions. The country isn't going through a recession, serious or otherwise. There can be different definitions of recession. But no economist will use the word 'recession' unless GDP declines, perhaps for two quarters. As things stand, there was real GDP growth of 6.8 per cent in 2018-2019 and no projection, including those from outside Government, expects growth in 2019-2020 to be less than 6 per cent. A careful economist wouldn't have used the word 'recession'. At best, the word used would have been 'downturn', "serious" or otherwise. But I wish to focus on something else, the performance of states.

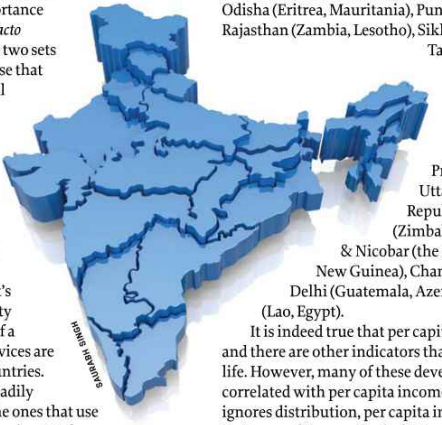
For states, growth means growth in gross state domestic product (GSDP) and real growth means these are constant price figures, with 2011-2012 as a base. The last year for which such GSDP figures are available is obviously 2018-2019 and these numbers originate with Directorates of Economics and Statistics of state governments. However, there are often time lags for some states and Union Territories (UTs). To be strictly accurate, these numbers aren't available for all states and UTs in 2018-2019. The last year for which these numbers are available for all states and UTs is 2017-18. But that's being pedantic. The numbers are available for most states and UTs in 2018-2019. The exceptions are Arunachal, Assam, Gujarat, J&K, Kerala, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Andaman & Nicobar Islands and Chandigarh.

West Bengal did clock 12.58 per cent and in that reduced set, this is indeed the highest. The next highest is Andhra at 11.02 per cent. To repeat, these figures are for real growth and, therefore, they are impressive. But how about 2017-2018, when we have figures for a complete set of states and UTs, not the reduced set? It transpires in 2017-2018, West Bengal's growth was 8.88 per cent, not the highest. Indeed, several states and UTs outperformed West Bengal. By the way, Andhra did clock 11.32 per cent in 2017-2018. The base for GDP measurement was changed in 2011-2012. Hence, numbers before 2011-2012 are not quite comparable with those thereafter. In the new national income account series, West Bengal's growth was 4.17 per cent in 2012-2013, 3.01 per cent in 2013-2014, 2.84 per cent in 2014-2015, 6.13 per cent in 2015-2016, 7.2 per cent in 2016-2017, 8.88 per cent in 2017-2018 and 12.58 per cent in 2018-2019. You might argue that growth has been inching up, but you will have to admit this series is less impressive than a spectacular 12.58 per cent.

Partly because of agriculture, though that does not explain it completely, growth rates in states are subject to a lot of volatility. There are two objectives of reform. First, growth rates must increase. Second, there must be reduced volatility and fewer year-to-year fluctuations. Both are important objectives, not just the first. However, today, volatility is a fact of life. Therefore, one way to gauge a state's performance is average real rate of growth since 2012-2013. (I have simply computed the arithmetic average of growth rates in these six years. You can try out other forms of averaging, but that won't alter the conclusion.) Let's now cluster the states and UTs. Those that have grown an average of more than 10 per cent are Gujarat and Mizoram. Those that have grown between 9 per cent and 9.99 per cent are Karnataka and Tripura. Those that have grown between 8 per cent and 8.99 per cent are Andhra, Haryana, Madhya Pradesh, Andaman & Nicobar, Chandigarh and Delhi. Given India's aspirations, we need more than 8 per cent growth. Therefore, it is only these states that can be regarded as stellar performers for the period I am talking about. States and UTs that have grown

between 7 per cent and 7.99 per cent are Assam, Himachal, Maharashtra, Odisha, Telangana and Uttarakhand. Those that have grown between 6 per cent and 6.99 per cent are Arunachal, Bihar, Goa, Jharkhand, Kerala, Rajasthan, Sikkim, Tamil Nadu and Uttar Pradesh. This is a middling and sub-aspirational performance. It is not good enough. We are left with Chhattisgarh at 5.59 per cent, J&K at 5.63 per cent, Manipur at 5.62 per cent, Meghalaya at 3.04 per cent, Nagaland at 4.87 per cent, Punjab at 5.88 per cent, West Bengal at 5.37 per cent and Puducherry at 5.10 per cent. This is not just sub-aspirational, it is sub-par. It is growth rates like these that pull down the all-India growth rate.

To make cross-country comparisons, one needs to convert GDP (which is in domestic or national currencies) into a common currency or numeraire. Because of the importance of the US economy, this has *de facto* become the US dollar. There are two sets of figures one comes across, those that do the conversion from national currency to US dollar using official exchange rates and those that do the conversion using purchasing power parity (PPP) exchange rates. Typically, any PPP conversion increases per capita income of relatively poorer countries and decreases per capita income of relatively richer countries. That's because purchasing power parity measures how much one unit of a currency can buy and many services are cheaper in relatively poorer countries. Though those PPP figures are readily available, I am going to quote the ones that use official exchange rates for conversion. We have figures for 2019 and India's per capita GDP is $2,188. This means we are between Nicaragua and Djibouti. The world as a whole has a per capita GDP of $11,673. India's per capita income is 18.75 per cent of the world average, not a situation to be proud of. The poorest country in the world is Sudan, with a per capita income of $225, and the richest country, Luxembourg, with a per capita income of $115,203. That benchmarks India as a country.



But, as I have said before, the all-India GDP figures are mostly (with exception of railways and defence) an aggregate of state-level figures. Let us take the per capita net state domestic product (NSDP) figures, using an exchange rate of Rs 70 to $1 (after all, this is for purposes of illustration and an approximation is permissible) and search for a country that has a per capita income that is closest to this dollar figure. Stated differently, for any given state, which country's per capita income does it most resembles? There is more than one country that a state/UT can be bracketed with. I have chosen two of these at random. The figures are for 2017-2018, since a complete set is not available for 2018-2019. This is what the comparison looks like: Andhra (Nicaragua, Djibouti), Arunachal (Cote d'Ivoire, Bangladesh), Assam (Nepal, Tanzania), Bihar (Afghanistan, Liberia), Chhattisgarh (Mauritania, the Kyrgyz Republic), Goa (Iraq, Namibia), Gujarat (Papua New Guinea, Timor-Leste), Haryana (Lao, Egypt), Himachal (Papua New Guinea, Timor-Leste), J&K (Eritrea, Mauritania), Jharkhand (Nepal, Yemen), Karnataka (Vietnam, Honduras), Kerala (Timor-Leste, the Republic of Congo), MP (Eritrea, Mauritania), Maharashtra (Timor-Leste, the Republic of Congo), Manipur (Ethiopia, Benin), Meghalaya (Tanzania, Eritrea), Mizoram (Nicaragua, Djibouti), Nagaland (Senegal, Uzbekistan), Odisha (Eritrea, Mauritania), Punjab (Nicaragua, Djibouti), Rajasthan (Zambia, Lesotho), Sikkim (Samoa, Algeria), Tamil Nadu (Papua New Guinea, Timor-Leste), Telangana (Timor-Leste, the Republic of Congo), Tripura (Senegal, Uzbekistan), Uttar Pradesh (Sudan, Tajikistan), Uttarakhand (Timor-Leste, the Republic of Congo), West Bengal (Zimbabwe, Myanmar), Andaman & Nicobar (the Solomon Islands, Papua New Guinea), Chandigarh (Jordan, Tuvalu), Delhi (Guatemala, Azerbaijan) and Puducherry (Lao, Egypt).

It is indeed true that per capita income isn't everything and there are other indicators that measure the quality of life. However, many of these developmental indicators are correlated with per capita income. Therefore, though it ignores distribution, per capita income is a reasonably good indicator of the standard of living of the average citizen, of the country or of the state/UT. Unless you are very aware about how we stand in cross-country comparisons, you will probably be surprised at which countries in the world India is bracketed with and at which countries in the world some of our states/UTs are bracketed with. That's the reason why states need to improve their growth performances and reduce the volatility of growth. Both are functions of reforms. As those real growth figures showed, many state performances are sub-aspirational and sub-par. Many states are below average. For some reason, a statement like that seems to upset people. Therefore, let me rephrase it and say, some states are above average. That statement is probably more acceptable, even though it means exactly the same thing. Those states that are not above average are pulling the all-India performance down. They are not holding the baton. They may be moving forward, but that movement is exceedingly slow. ■

PROTECTING MODI

After the abolition of Article 370, Intelligence agencies feel the threat perception to Prime Minster Narendra Modi has significantly increased. The Special Protection Group, charged with protecting him, is doing internal reviews considering Modi's travel itinerary abroad and domestically his penchant for mass contact at rallies and road shows. The SPG comprises nearly 3,000 commandos and is modelled on the US Secret Service. But according to Intelligence Bureau reports, the agency gets stretched because they also have to expend manpower on several former prime ministers and families even though their threat perception is minimal.

SWADESHI WORSHIP

Kolkata Calling Bhagwat

The Rashtriya Swayamsevak Sangh has suddenly become deeply interested in West Bengal. Its head Mohan Bhagwat visited Kolkata twice in three weeks. He stayed three days in his last visit. Before the next Assembly election in the state, the RSS wants to project the BJP and Sangh Parivar as aligned and friendly with Bengali culture. The local wing of the organisation had prepared a list of intellectuals and professionals whom Bhagwat, who can speak and understand Bengali, met to explain why their Hindutva is not exclusivist or intolerant. In Kolkata, he stays in a small unostentatious room in the RSS state headquarters.

Mahatma's Help

Recently, the Congress party got some help from Mahatma Gandhi to address internal differences. On September 12th, party president Sonia Gandhi called a meeting of senior state and Central leaders for celebration of 150 years of Gandhi's birth anniversary. It was the first such major meeting after she became president and Sonia used the occasion to sort out quarrels, especially in Haryana, Madhya Pradesh, Delhi and Maharashtra.

Chinese intrusion into Indian rituals is worrying the BJP. Specifically, it has to do with cheap agarbattis which China exports to India. In 2016-17, 2,831 agarbatti factories had been started with the government's assistance, creating 22,686 jobs. But in 2017-18 and 2018 -19, there were only 279 and 397 such startups. The Khadi and Village Industries Commission complained to Commerce Minister Piyush Goyal about the cheap Chinese agarbattis flooding the market. Goyal informed the Prime Minister who immediately acted. The Cabinet has now imposed several restrictions on the incense sticks coming from China.

Defence Mode

An exhibition of defence and security equipment in London recently saw the unusual presence of Uttar Pradesh's industry minister. It had to do with the state's objective of becoming a defence manufacturing hub. Modi, who from his experience in Gujarat, had seen the potential of a defence corridor in UP. Chief Minister Yogi Adityanath is taking the idea to fruition. The corridor will include Lucknow, Kanpur, Aligarh, Jhansi and Chitrakoot. The UP government is giving incentives like concession in land purchase. The corridor is said to be a 5,000-hectare, Rs 4,000 crore project initially. But the total number could eventually go up to as much as Rs 20,000 crore.

MANAGING YEDIYURAPPA

The formation of the BJP government in Karnataka might have been a *coup de grace* for the party but the Central leadership is said to be somewhat worried too. BS Yediyurappa's leadership is being questioned from within the state apparatus, a main reason being local media reports of his son's involvement in transfer and posting of officers. Several BJP leaders apparently sent complaints to the party HQ. They also suggested a snap Assembly election for a fresh mandate so that there is no dependence on a few rebel MLAs. Another complaint is that Yediyurappa is only addressing his Lingayat vote bank and not expanding the party base as was successfully done in Maharashtra, Haryana, etcetera. Already, Yediyurappa is the only BJP leader who has flouted the 75-year age limit for retirement from posts. The high command reportedly wants the young Anant Hegde, known for his hard Hindutva line, to be the BJP's next face in Karnataka. He was made a minister at the Centre for that reason. But Yediyurappa seems to be in no hurry to leave the scene.

Spotlight On Rajasthan

Recently, the Jaipur airport lounge became the venue for a high-level BJP meeting. Present were the party's working president JP Nadda, former Chief Minister Vasundhara Raje and RSS senior pracharak Indresh who focuses on Rajasthan politics. He is said to be favorable towards Raje, despite the perception that the RSS and BJP brass were critical of her style of functioning. But now as opposition leader, it is said that she has an action plan and the BJP does not want to remove her from the spotlight.

Illustrations by **SAURABH SINGH**

THE MAYAWATI QUESTION

What will Mayawati do in Haryana is the question on every political mind interested in the upcoming state elections. Recently, she broke the Bahujan Samaj Party's tie-up with Om Prakash Chautala and his son Dushyant Chautala's Jannayak Janata Party that had been initiated before the Lok Sabha elections. Then she talked to Bhupinder Singh Hooda who was looking to float his own party by splitting from the Congress. Meanwhile, Congress President Sonia Gandhi tried to neutralise Mayawati's influence by making a Dalit, Kumari Selja, party president in the state. She is also said to be in touch with Mayawati to try to fight the state elections in an alliance.

By KEERTHIK SASIDHARAN

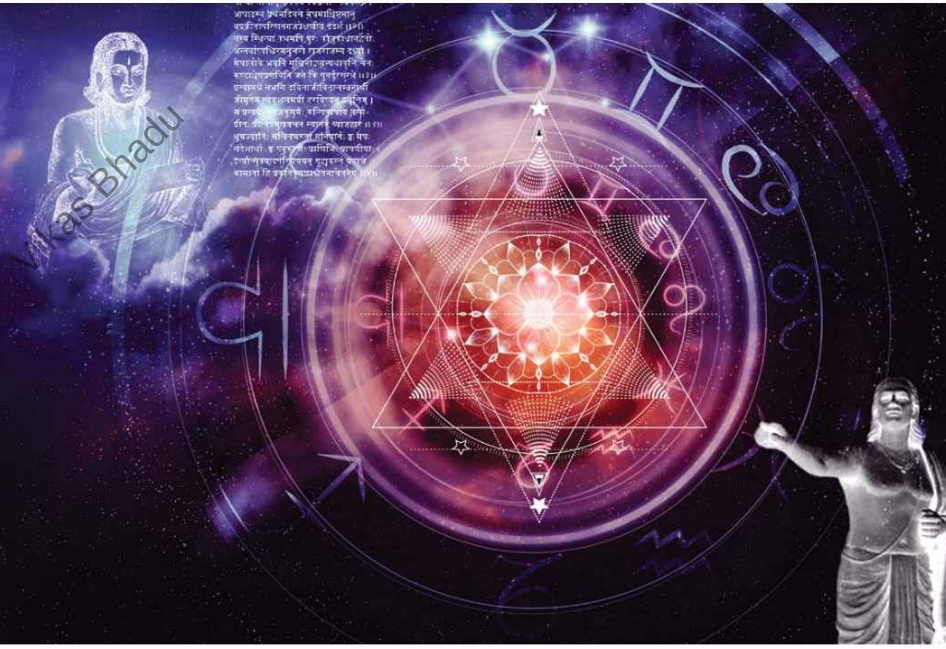
THE COSMIC GAZE

A meta-history of our space science

IN THE EARLY part of Kalidasa's narrative-verse called *Meghadutam* (the Cloud Messenger), a certain lovelorn *yaksha* (a demigod) asks the passing clouds to carry a series of messages for his wife in the celestial city of Alakapuri, where she awaited his return. The clouds become companions to the *yaksha*'s loneliness as well as an apostrophic plot device in the hands of an expert poet. In his messages, the *yaksha* describes the geographies of ancient India with his florid similes and tender exaggerations, yet his entreaties also were an exile's quest to impose meaning on the strange new world that he found himself in. A world brimming with humans and festivals, gods and forests, tumultuous rivers and adulterous loves. What follows in the composition are some of the most wondrous lines in Sanskrit—a confection of sounds and rhythm. What is often missed in this cornucopia of Sanskrit poetry is that there is also ensconced in the narrative another voice: a more sceptical voice, one that is a stand-in for both the reader and, perhaps, even Kalidasa himself. This voice wonders within the poem about the absurdity of speaking to a cloud. The unnamed narrator of the poem asks how can the clouds, which are nothing but a concatenation of vapour, water and wind ('*dhuma jyotih salila marutam*'), an assemblage of non-sentience, carry any message, far less become a messenger of complex imageries uttered by the *yaksha*. It is as if the poet acknowledged the thin ice upon which the narrative was premised and shrewdly defanged any putative criticism about the lack of reality by offering up a minor note of protest on behalf of empiricism in the poetic imaginary that was to unfold.

In much of traditional Indian texts, this contrasting duality—the empirical and the imaginative—is often a standard move, a readymade device to inject narrative tension. It reveals either as subtly as in *Meghadutam* or more explicitly in plays with prescribed roles for the *vidushaka* (the jester, a proto-Shakespearean fool who injects philosophical pessimism in the name of reality in contrast to the preening hero). A millennium before Kalidasa wrote his text, in the Vedic sacrifices we see such contrasts formalised in ritual: the officiating priest 'thinks' the ritual (*tad yat kim cemani bhutani mansa sankalpayanti tesam eva sa krith*—whatever these living beings imagine in their minds is performed) while others in the priestly order go about the ritual of the sacrifice. In old Tamil imagination, this duality emerges as a way to contrast the poet's inner temple (*akakkoyil*) with the king's outer temple (*purakkoyil*). Kalidasa, when viewed in this wider context, was merely borrowing and reiterating a traditional way of conceptualising any reality as a totality rather than as a mere assemblage of discrete parts. A totality that in 1953 was described by CP Snow, in language we now recognise, as comprising two cultures: the sciences and the humanities.

Illustration by **SAURABH SINGH**



UNLIKE IN THE WEST WHERE THE SCIENCES AND MATERIALIST THOUGHT SHARED AN UNEASY COEXISTENCE WITH THE CHURCH, IN ANCIENT INDIA THE DISTINCTIONS ARE SUBTLER

It is this commingling of empiricism and the poetic that makes the writing of the history of India's long abiding fascination, reverence and fear of the skies, astral objects and space—in essence, the history of India's astronomical sciences—particularly difficult. A priori, such a history faces a (seemingly) contradictory challenge. Unlike in the West where the sciences and materialist thought shared an uneasy coexistence with the Church, in ancient India the distinctions are subtler. A historical retelling of ancient Indian sciences must distinguish between histories of Indian materialist thought—which had little use for analytical or mathematical techniques and were often philosophical in nature—versus the histories of Hindu religious practice and thought—which developed analytical techniques to construct theological claims to impose order upon the world. Trying to parse the lineaments of this complex landscape where religious claims, astronomical speculations, mathematical techniques and historical borrowings come together to make unified claims is tricky business. A simple example suffices to show the challenges involved.

The Shatapatha Brahmana—a text brimming with chants, spells, incantations and stipulations—describes that speech (*vaak*) congeals into a physical presence as 36,000 fires. Why 36,000? The answer is linked to the incipient use of calendars: every year was assumed to be 360 days and every fully lived human life comprised 100 years—thus, 100x360 days. Each day of a fully lived life was therefore meant to be animated by a specific fire, a particular manifestation of human mind that expressed itself through speech. One could very well be satisfied with this sort of explanation. But a deeper question stares back: why did ancient Indians arrive at the idea of 360 days per year? Some like the scholar David Pingree have argued that early Vedic calendars and astronomy were entirely borrowed from Mesopotamia on the basis of a single, incompletely available recension of an older text called

Yavanajataka. Subsequent scholarship, led by the scholars KS Shukla and Harry Falk, demonstrated that this claim was due to misreadings and force-fitting evidence to arguments proffered by old scholarship. More recently, the historian Bill Mak demonstrated that the historical truth of this claim of borrowings—like Dharma—is subtle and ultimately more study was needed to address this question. To make matters more complex, there also follows the question of why did some other religious texts believe in adding a 13th month in a five-year cycle to arrive at an average of 366 days per year (5x360+30=1,830 days divided by 5 years). Finding the answer requires both imagination and a patient reading of obscured texts and tablets. What this simple example reveals is the complexity of trying to discern the fundamentals of how Indian scientific thought came about.

Irrespective of such controversies in relatively arcane corners of scholarship, what is almost a foundational article of faith is that the history of Indian sciences is also a history of influences between schools and individuals within India, as well as a give-and-take across cultures—Greeks, Mesopotamians and Persians. But the record of these influences is often only available in commentaries, digests and expositions which were written centuries later. Before long, like Alice down a rabbit hole, any historian finds himself chasing ancient calendars, conjecturing on the migration patterns of ideas, translating algorithms deployed into modern vocabulary—all of these in languages underscored by inflections and innuendoes that are by now largely foreign even to scholars.

WHAT IS ALMOST A FOUNDATIONAL ARTICLE OF FAITH IS THAT THE HISTORY OF INDIAN SCIENCES IS ALSO A HISTORY OF INFLUENCES BETWEEN SCHOOLS AND INDIVIDUALS WITHIN INDIA, AS WELL AS A GIVE-AND-TAKE ACROSS CULTURES—GREEKS, MESOPOTAMIANS AND PERSIANS

DESPITE ALL THESE challenges, the history of India's upward gaze into the skies is also a history of imposing theoretical frameworks to make the infinity of space more manageable. Nowhere is this seen more frequently than in our astronomically informed calendar. Time was typically cleaved into twos—the nycthemeron was divided into night and day, the month into two phases of the moon (*shuklapaksha* and *krishnapaksha*), the year into two journeys of the sun (*uttarayana* and *dakshinayana*)—even as discourse developed on both ends: the small time frames of *muhurtas, naadi, tithi, praana* versus the vast and cyclical epochs that ran into millions of years. The five main schools involved were the Brahma, the Arya, the Ardharaatrika, the Saura and the Ganesha: the main difference between them was the estimated rotations of planets within each vast cyclical enclosure of time and creation called *kalpa* and, therefore, the difference between parameters used in specific models. Loosely speaking, all astral bodies were subject to two calculations: a 'theoretical' (mean) estimate and the empirically observed (anomalous) location. It was deemed that the reason planets drifted from their theoretically calculated mean paths was because of 'demons' who pulled these astral objects by cords of wind. What is important to recognise is that even by the high Vedic period, around 600 BCE to 400 BCE, an elaborate analytical infrastructure that involved recursive computations, error minimisation algorithms, parametric drifts was in place. These calculations were used to compute time of festivals, temporal frames of auspiciousness, cast horoscopes and, more fundamentally, enable continuity in locating one's place in a world that still largely comprised forests, darkness and the unknown.

In the absence of writing as a technology, much of the early part of this increasingly complex enterprise relied on memory to transmit knowledge across generations. But memory's fickleness resulted in an elaborate formalisation of mnemotechnics that relied on unbroken recitations, rules to model the structure of sound and ultimately a careful arrangement of euphony itself. A simple example from the Agnicayana rituals (courtesy Frits Staal) makes some basic mnemotechnics more vivid for present purposes. A standalone fragment like *agnih nah yajnam upa vetu* (Agni, may he come to our ritual) is transformed at the boundaries of each word to sound like *agnir no yajnam upa vetu*. By transposing *agnir* for 1, *no* for 2 and so on, one recitation algorithm may be '1 2 2 1 1 2 3 3 2 1 1 2 3'. Thus, we get a recitation that sounds like *agnir no no'gnir agnir no yajnam* and so on. The result of such a mnemotechnic is an increased reliance on abstraction and developing a metacognition about how to modify certain parameters to arrive at newer incantations. What follows is less focus on the content of the utterance than on the aural shapes they acquire. (The great Austrian philosopher of language Ludwig Wittgenstein wrote in the 20th century, 'You might say that certain words are only pegs to hang intonations on.') Whereas Romans used techniques of 'memory palace' (about which the great Frances Yates has written evocatively) which relied on association between

objects and words, in the Vedic ritual narrations—recorded in associated texts called *pratisaakhya*—what also acquired importance was the relationships, movements and dynamics of sounds. The learning to adjust the parameters in sinusoidal calculations (called *manda-jya* and *sighra-jya*) through practice and labour, these mnemotechnics had an element of the counterintuitive that could only be mastered by long practice. The upshot of such techniques is that they acted as a template for knowledge dissemination—where newer material could be tacked on preexisting formats. Anomalies lay not in new content but in failure to comply with extant structures of memorialisation.

AMONG THE EARLIEST of such evidence of transposition and borrowings is seen in Lagadha's *Vedangajyotisha*, composed around the time of the Achaemenid Empire in Gandhara. Certain stylistic innovations within it are similar to Pingala's *Chhandahsutra* which uses *nakshatras* (star clusters) as markers within the text. This technique of using astronomical markers to annotate texts has a surprisingly long history and is worthy of a historical survey by itself. Perhaps nowhere is this technique of recording dates seen better than in the text of mathematical astronomy called *Tantrasamgraha* by Nilakantha Somayaji from 16th century Kerala. In the latter text, two Sanskrit phrases *he vishno nihitam krtsnam* and *lakshmisanihitadhyanaih* act as beginnings and endings of the mathematical treatise. An unsuspecting reader would think of these fragments as merely religious invocations that marked many such texts in the 16th century. However, thanks to the mathematician Sankara Variyar in the 16th century, we learn that upon using the Katapayadi schema (words are transposed to numbers) these phrases annotate the *kali-ahargana* (the number of days since the Kali Yuga commenced). Thus, we learn that the *Tantrasamgraha* was composed between 1,680,548 and 1,680,553 days after the Kali Yuga began, which translates to March 22nd, 1500, and March 27th, 1500—a stunningly short period to compose a text of mathematical astronomy.

But we are often not lucky to have dates explicitly spelt out by the text. The time span between Lagadha's Rig Vedic recension of *Vedangajyotisha* and Nilakantha's *Tantrasamgraha* was nearly two millennia, during which religions like Buddhism rose and fell, Islam arrived in India along with the Arabian breeze and as whirlwinds through the Khyber, and intellectual thought underwent extraordinary ferment. To tell a fully fleshed history of Indian sciences is thus intimately linked not just to the history of transmissions—oral or textual—but also to the history of evolving complexity of topics under investigation. Concurrently, the history of Indian sciences is also a history of extraordinary gaps (in contrast to the ongoing project called *History of Philosophy Without Any Gaps*). The great scholar of ancient astronomy Kripa Shankar Shukla writes, 'Practically no scientific work of intervening period ranging from c 500 BCE to c 500 CE is available.' Those that survived, as mentioned, were often religious texts in which we find analytical techniques. Yet mysteriously, as if the goddess Saraswati had decided to throw a lifeline to future historians of science, around 500 CE there appeared the singular figure of Varahamihira, who was an extraordinary compiler of analytical techniques that now allow us a glimpse into the scientific mind around the age of the Gupta dynasties. For reasons not fully understood, it led to an efflorescence of textual learning. Various types of texts, including the *siddhantas* which were often algorithms to compute theoretical paths, the *karanas* which included more localised calculation around the time of composition and *koshthakas* which were tabular summaries, appear. Some like the *siddhantas* were models of economy and algorithmic terseness, others like *koshthakas* had distant ancestors in the star catalogues we first see nearly a millenium earlier in Mesopotamia such as the Three Stars Each tablets which spoke of the water god Ea, the sky god Anu and the wind Enlil. What Varahamihira does—an extraordinary service to all posterity—is he summarises the five *siddhantas* of his time into a treatise called *Panchasiddhantika*. Among these were included the Romaka and Saura *siddhantas* which, according to KS Shukla, 'bear traces of the Greek influence'. If Varahamihira played the role of a diligent compiler that provided ballast to the renaissance of Hindu astronomy, Aryabhata I was its most luminous expression. He left behind not just treatises, but also inspired subsequent generations (Bhaskara I and others) to either modify his work or set the stage for others (Brahmagupta and others) to devise entirely different methods of modifying parametric constants relevant for mean calculations. Perhaps, Aryabhata I's longest surviving contribution was the nearly hundred-year long research agenda that his work inspired, which found its most original expression in the trigonometric power series devised by the Kerala school of mathematics before Newton and Leibnitz.

All of this may lead one to think the histories of Indian science are merely a matter of listing names, studying their texts and attempting to draw some linkages. Yet, the reality of such seemingly 'humble' goals is imperiled by confounding factors. Recensions abound of a single text across geographies and the construction of critical editions and bibliographies requires great knowledge accompanied by a detective's skill to unearth obscure linkages. Some texts are no longer preserved or available in Sanskrit, rather only commentaries about them survive in languages that are in medieval versions of modern-day languages (the mathematical text by Jyeshtadeva called *Ganita Yuktibhasha*, translated as *Rationales in Mathematical Astronomy*, is in the Malayalam of the 16th century and with the pioneering translations of KV Sarma and annotations by K Ramasubramanian, MD Srinivas and MS Sriram). Often, abject disregard for autobiographical detail adds to the challenge of dating texts, even ones that were ostensibly written closer to our times (the *Karana-paddhati* of Putumana Somayaji is even today described as being written sometime between the 15th and 17th centuries). More perverse, from a modern perspective,

is the method of naming texts solely by eponymous means that references ancestral homes, *gotra* of the writer, lineage of a writer and so on—which makes mockery of any modern conceit that a text can be reduced to singular authorship. In the absence of well-informed local histories, any attempt to contextualise with details about the social environs in which these texts appeared remains a forbidding challenge. To round up this litany of seeming insurmountables, there is also the saturnine reputation of astrology that a modern scholar must learn to overcome to study and understand ancient astronomy itself. The economist John Maynard Keynes wrote of Isaac Newton, who was a more fervent alchemist than perhaps a mathematician, that: 'Newton was not the first of the age of reason. He was the last of the magicians, the last of the Babylonians and Sumerians.' Similarly, almost all of our ancient masters of analytical techniques were also proficient users of astrology and other occult. To study ancient mathematical astronomy and write the history of Indian science inevitably also means studying variations in astrological terminologies and descriptions on one hand alongside with techniques from modern spherical astronomy such as occultation of stars by the moons. This demand on scholarship is not an Indian problem but rather a problem of studying antiquity and medieval science. The great Austro-American scholar of Babylonian mathematics Otto Neugebauer wrote many years ago: 'No Arabic astronomer can be fully understood without a thorough knowledge of astrological concepts.'

THE COMMINGLING OF EMPIRICISM AND THE POETIC MAKES THE WRITING OF THE HISTORY OF INDIA'S LONG ABIDING FASCINATION, REVERENCE AND FEAR OF THE SKIES, ASTRAL OBJECTS AND SPACE—IN ESSENCE, THE HISTORY OF INDIA'S ASTRONOMICAL SCIENCES—PARTICULARLY DIFFICULT

These difficulties notwithstanding, two other great unknowns face any retelling. One is to understand the absence of drawings in most manuscripts. Unlike Hellenistic Greeks or later Latin Church Fathers, Indian sciences relied extraordinarily on formulae and hypothesis and rarely on diagrammatics. Perhaps this has to do with lack of paper or parchment for writing and the difficulties of using palm leaves to record writings. Or, it was perhaps because the art of drawing structures belonged to the domain of experts in the field of carpentry, masonry and architecture and thus the provenance of a different set of practitioners. The other is more consequential for the history of Indian science: the lack of experimental devices or automatons or tools to aid observations. As KS Shukla writes, 'The Hindu astronomers did not possess the telescope.' This is however not to be understood as that Indians merely engaged with theory and had no history of mechanised instruments. On the contrary, there are well recorded instances of objects like *ghatika*—a time-keeping device from 4th CE—which was described by Aryabhata I in his *Aryabhatasiddhanta* and used by astronomers and common folk alike. In it, we also find mentions of *yantravalaya*, 'a spherical instrument', that may have aided observations as well. Likewise, Varahamihira's *Panchasiddhantika* also describes astronomical instruments. Mentions of clever automatons (*yantras*) abound and much of these were intricate arrangements of pulleys and presses that used water as a source of kinetic energy. In a landmark survey by the scholar V Raghavan, we learn about a bewildering assortment of water presses, war machines, water horses, talking dolls, fountains, etcetera which were in due course classified and their lore spread into popular narrative. Be it in the works of Dandin the playwright or King Bhoja of the Paramaras in the city of Dhara, early medieval literature often spoke about a variety of machines, automatons and labour-saving devices. Bhoja, according to the scholar Daud Ali, goes on to classify machines as those which are self-driving (*svayamvahaka*), need periodic propulsion (*sakrtpreryа*), are invisibly driven (*antaritavaahyam*) and far travelling (*vaahyam duratah*). Despite this demotic culture of technology that seemingly thrived well into 10-11th centuries—there seems to be an element of play in these texts, a quality of tinkering with contraptions no different than the early phases of the Industrial Revolution—it was not until 1651 that the first telescope is recorded as being used for scientific purposes in India to observe the transit of Mercury out of Surat. For a culture that was quite open up to the 11th-12th centuries in scientific, astronomical and astrological exchanges with the Persian and Arab worlds, a remarkable decline begins in the centuries thereafter. Enclaves like the Kerala school of mathematics survived by refining and inventing new techniques for computation and mathematics, but after Bhaskara II wrote his *Siddhantasiromani* in 12th CE, astronomical sciences slowly decline. It is as if the maximal extent of our skygazing by the naked eye was exhausted—perhaps owing to the lack of telescopes or artisans involved in lenses and glasses. Any history of Indian science thus has to also try to discern how a technical and scientific culture began to withdraw, look inwards instead of growing and expanding its prowess. What social constraints—caste, language, patronage, political

upheaval—led to this quiescence of Indian sciences?

There are other challenges as well. Any history of Indian science up to the advent of colonisation runs the risk of portraying the whole enterprise as an organised, coherent exercise where progress was incrementally achieved. In parts, our ability to interpret the growth of scientific knowledge is influenced by a certain form of triumphalist narratives that abound in the traditional description of the Scientific Revolution in Europe upon which a tyranny of coherence is imposed. (In more recent years, the pendulum has swung the other way and now the entire scientific enterprise of the early modern Europe is interpreted as merely a set of 'cultural practices' to control the natural world.) How are we to understand the age that followed Aryabhata I to Bhaskara II—nearly 600 years of technical refinements, cross pollination of ideas and clusters of knowledge centre? As a revolution, a renaissance or merely an archipelago of loosely connected innovations on which we now force fit a narrative shape?

TO TELL A FULLY FLESHED HISTORY OF INDIAN SCIENCES IS INTIMATELY LINKED NOT JUST TO THE HISTORY OF TRANSMISSIONS—ORAL OR TEXTUAL—BUT ALSO TO THE HISTORY OF EVOLVING COMPLEXITY OF TOPICS UNDER INVESTIGATION. CONCURRENTLY, THE HISTORY OF INDIAN SCIENCES IS ALSO A HISTORY OF EXTRAORDINARY GAPS

IRRESPECTIVE OF HOW we choose to describe this period of our scientific history, the reality of it is that we still know very little of our scientific past. In a recent lecture, an economist and eminent translator of Sanskrit estimated that over 40 million manuscripts lay about in various archives and private libraries of which 95 per cent remain untranslated; of the 5 per cent which have been translated, only a few have been annotated to the standards of modern scholarship. If we assume that only 0.5 per cent of those 40 million are related to scientific and technical matters, this translates to 200,000 manuscripts, an amount that should leave a few generations of scholars actively occupied. As David Pingree writes, 'The exploration of the millions of surviving Sanskrit and vernacular manuscripts copied in a dozen different scripts would probably reveal a number of other Madhavas whose work deserves the attention of historians and philosophers of science.' In fact, in many senses we are like the British in the 19th century who discovered Sankara Varma's 1823 trigonometric work called *Sadratnamala* and didn't know what to make of such works. Our social, intellectual and cultural establishment, barring a handful of scholars, no longer knows how to study such works.

None of these potential discoveries however helps address the more fundamental questions of how to think about our scientific past and the actors who were involved in it. Who were these people who went about stargazing, constructing algorithms, painstakingly calculating figures to construct calendars? What were their inner lives like? To an extent, much of this is unknowable and we enter the world of poetic imagination. The great Irish novelist John Banville wrote a tetralogy of scientifically fascinating and psychologically intricate novels where Copernicus, Kepler, Newton and Dr Faustus are the protagonists and struggle in the face of self-doubt as they wage battles to retrieve universal laws from the skies. Few Indian literary minds however have attempted a deeply imagined novel about Varahamihira or Aryabhata or Madhava. In parts, this reluctance to head down this path is due to the mathematical ignorance of our literary class and lack of adequate material for non-specialists; but there are also deeper psychological wounds in Indians as a people that can only express itself as malignant neglect or as witless triumphalism when faced with the history of Indian science. The role of novelists, of imagination in preparing the groundwork for an entire culture to take its past seriously, to study it more rigorously cannot be understated. If there is any lesson to learn from the lives of Aryabhata or Nilakantha, as distant as they are to our sensibilities, it is the need to recognise that knowledge which survives across generations is born from mastering the grammar of the discipline while still subjecting it to empirical verification. What will then follow is the ability to make imaginative leaps. For us, separated as we are by centuries, the challenge is to ask more rigorous questions about how we should write about this practice of knowledge production—an activity that survived and thrived over generations. To do so, we will need to put aside the sociopolitical needs of the present so that we may intuit the shadows of a long forgotten past as truthfully as we can. ■

Keerthik Sasidharan writes a fortnightly column for The Hindu. *His upcoming book* The Dharma Forest *will be published by Penguin India in late 2019. He lives in New York City*

THE

Vikas Bhadu

THE RAKHIGARHI SKELETON AT THE NATIONAL MUSEUM, DELHI

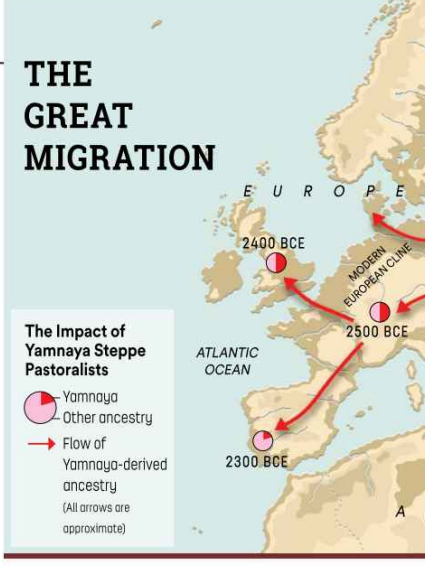
The debate on Aryan migration has long divided Indian academics into opposing camps. Two recent genetic studies appear to have solved the mystery of where we come from by offering fresh insight into who the people of the Indus Valley Civilisation really were

Photograph by ROHIT CHAWLA

RIGINS

By LHENDUP G BHUTIA

In the mid-2000s, when archaeologist Vasant Shinde was leading an excavation at the Indus Valley Civilisation (IVC) site of Farmana in Haryana, he would often travel, some 25 kilometres away, to another known IVC site, Rakhigarhi. On every visit he would find more mounds being razed and new houses getting built over it. The current-day village of Rakhigarhi of around 5,000 individuals was expanding over and around the old archaeological site. "It was terrible, and I could see it happening in front of my eyes. Here was the most important [archaeological] site in India and it was getting destroyed," he says.



For a long time, sites such as Rakhigarhi were considered less important compared with its more famous counterparts in Pakistan. The conventional view has been that the IVC originated in Sind in current-day Pakistan, around sites like Harappa and Mohenjodaro, and spread later into distant areas, such as Rakhigarhi and Farmana, in Haryana.

Rakhigarhi was discovered in the 1960s, briefly excavated in the 1990s by the Archaeological Survey of India, before being forgotten about entirely. But we now know, because of the efforts of Shinde and other archaeologists, that Rakhigarhi is much larger than even Mohenjodaro and is throwing up such old dates that some archaeologists have begun to consider the possibility that the civilisation might have even first begun here.

By the time Shinde turned his eyes to Rakhigarhi, he had spent several years exploring IVC sites across northern India. He now reoriented the objectives of his archaeological excavations. He didn't want to find things, he wanted to answer questions. He was leading what he calls "problem-oriented excavation".

"There was no point in finding what had already been found at other [IVC] places, like Mohenjodaro. We already knew the IVC was developed. No point finding more signs of development," he says. Instead, he turned his eyes to the big questions. How did the IVC come about? How did it transition over time? And the biggest of them all: Who were the people at the IVC?

Several have had a go at this question. Some have looked for archaeological clues; others have tried their hand at deciphering its script. All efforts however had so far come to naught. But Shinde was using an entirely new technique—the emerging field of genetic science. There was however one issue. How do you find human specimens from the IVC that had somehow managed to withstand several millennia of the harsh Indian climate and heavy rains and retained sufficient DNA information?

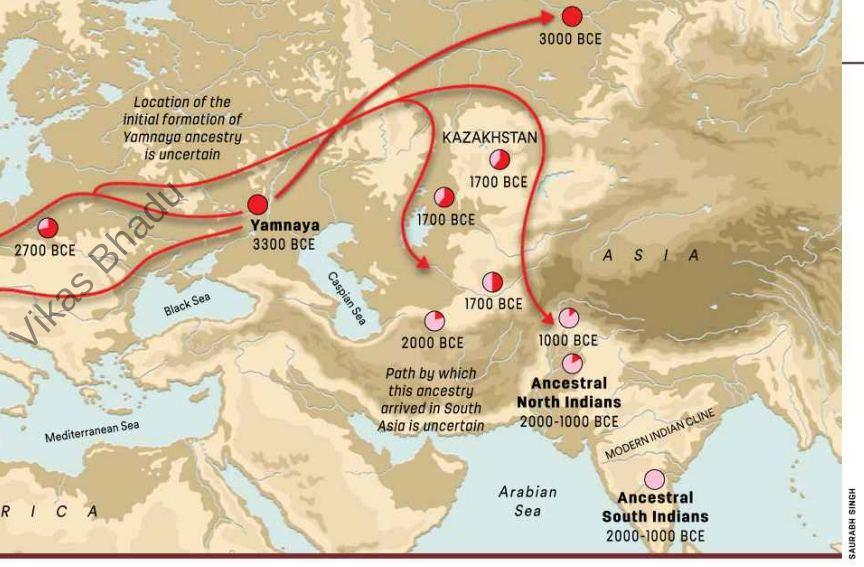
Genetics has in a very short time begun to revolutionise the study of the ancient human past. Harvard geneticist David Reich, who has made some significant discoveries, including about ancient people living in South Asia, compares geneticists to barbarians. 'Geneticists may be the barbarians coming late to the study of the human past,' he writes in his 2018 book *Who We Are and How We Got Here*, 'but it is always a bad idea to ignore barbarians. We have access to a type of data that no one has had before....'

Shinde first began collaborating with geneticists and researchers at Hyderabad's Centre for Cellular and Molecular Biology (CCMB), then forensic scientists from South Korea and later with Reich. But he kept hitting a dead end. Skeletal remains were hard to come by. And those that he found weren't able to provide sufficient DNA information. The digs at Farmana, where they had found a cemetery and human remains, had led to a spectacular failure. All the samples, because of their inexperience at handling remains for genetic data, had been contaminated. The graves had been left open for far too long and too many curious people had visited the site. At one point, Shinde even began to look inside graves for parasite eggs that might have once existed in the gut of Indus Valley people, in the hope that this could lead to the researchers being able to isolate the DNA of their hosts.

It appeared that genetics too was failing to shine any light on the question of the IVC people's identity.

The IVC stands at the centre of a large and complex mystery about our origins. It is the missing piece in not just an archaeological but also a highly political jigsaw puzzle. Who were these people living in this large swathe of land along the Indus River and its vicinity? Were they indigenous or outsiders? Were these the same people who later composed the Vedas and started what is known as the Vedic Age? Or did another foreign race come and drive them out? And, most crucially, how do we, modern Indians, relate to this ancient group?

Genetic studies have so far pointed towards the coming of a new group of people into the Indian subcontinent towards the end of the IVC about 4,000 years ago. According to these studies, modern Indians are the descendants of two highly distinct ancestral groups. One of them, categorised as the Ancestral South Indians (ASI), who probably spoke an early Dravidian language, had been living in the subcontinent for thousands of years. The other, consisting of people who had come to the Indian subcontinent from the Yamnaya region of Central Asia—the Eurasian Steppes—and who probably spoke an Indo-European language, termed Ancestral North Indians (ANI), had formed more recently. (There is an inter-



esting catch here. It has been discovered just a few years back that both the ANI and ASI groups, while being distinct from one another, also possess large amounts of Iranian-related ancestry.) All of us, except for the people who remained secluded in the Andaman Islands, both from the highest to the lowest castes, including non-Hindu tribal populations living outside the caste system, are affected by the mixing of these two groups. The percentages of the mixture however vary depending upon geography, caste and language groups. There is higher ancestry among upper castes, Indo-European language speakers and those who originally hailed from north India.

If one were able to decode the genetic history of the people at the IVC and find either the presence or absence of ANI ancestry in their samples, it would go a long way in confirming whether or not this ancestral group was indigenous to this region.

This hadn't happened so far.

But last week, as one of two studies published in the *Science* and *Cell* journals (published by the same group of researchers and on the same date) describes, geneticists managed to squeeze out, with immense difficulty, just enough genetic data from the petrous bone in the inner ear region of the skull of a 4,000-plus-year-old woman from the IVC.

While the study in *Science* is more expansive, using the genes of over 500 people who lived over the past 8,000 years, to track migrations and admixtures of various ancient people across South and Central Asia, the second study, published in *Cell*, focuses entirely on the analysis of a single genome, the first ever, from the IVC.

This woman, titled I6113, was excavated by Shinde and a team of archaeologists from a cemetery in Rakhigarhi in 2016. IVC cemeteries usually throw up three types of burials. Either the graves contain the remains of the entire body along with possessions such as pots, beads and bangles, or just a few bones and possessions (leading some experts to believe that some people in the IVC also left dead bodies in the open, for vultures and other scavengers, and buried whatever remained), or empty graves where only possessions are found (possibly because the person's corpse could not be traced).

Not only were all of I6113's remains found in her grave, her head, like typical IVC graves, was to the north and the feet to the south. There were also a very large number of ceramic vessels and beads, leading Shinde to believe that she probably enjoyed a high social status during her lifetime.

The remains of this woman, along with 60 more people from the IVC, were collected. In the lab, the list of the most promising samples came down to just four. Among them, only a tiny bone from the inner ear region of I6113 managed to provide sufficient data.

"India is a very challenging place for a geneticist trying to extract ancient DNA," says Vagheesh M Narasimhan, a geneticist working at the Reich Lab in Harvard Medical School's Department of Genetics who was the lead author of the *Science* paper. "The weather is so harsh. You have a very hot sun and then heavy rains which degrades the genetic information in ancient samples." Niraj Rai, the head of the Ancient DNA Lab at Lucknow's Birbal Sahni Institute of Palaeosciences, who was also a co-author of this paper, claims that the work put into I6113 is the most extensive genetic research ever conducted on any single sample. "This was going to be such an important sample. And we were very meticulous that there should be no questions over it," he says.

I6113 carried no ancestry from people of the Steppe region. This means the movement of people from this region into

South Asia happened only after the decline of the IVC. I6113 instead contained a mixture of two groups: an ancient Southeast Asian hunter-gatherer group and another group with an extremely old Iranian-related ancestry. (This ancient Iranian component in the IVC people dates to at least around 10,000 BCE, long before farming emerged in the Fertile Crescent region in Middle East, not just overturning the theory that Iranians brought farming into South Asia, but also establishing that the split in the common ancestral line between the IVC people and ancient Iranian farmers happened a very long time ago.)

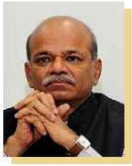
Although the analysis is based on just a single sample found in the IVC, when we know that the IVC was a cosmopolitan place with various people living there, it does appear that her genetic profile would match what was found among the people of the IVC. This claim is supported by the findings of 11 'outliers', individuals living between 2500 and 2000 BCE and found in modern-day Iran and Turkmenistan, whose genetic ancestry and burial sites appear to suggest they were from the IVC. We know from archaeological evidence that the people of the IVC were in touch with people in these parts. These 11 outliers, the researchers believe, were migrants or the children of migrants from the IVC.

According to the two studies, after the decline of the IVC, some of the people from the civilisation mixed with Southeast Asian hunter-gatherers to form the ancestral group termed ASI. These people probably spoke a proto-Dravidian language. The others from the IVC mixed with with the incoming migrants from the Steppe, who probably brought the Indo-European languages, to form the ANI group. These two ancestral groups, ANI and ASI, then mixed and gave rise to the great diversity of India. A few years ago, some of the researchers associated with these two papers also found that the mixing between the two groups took place mostly between 2000 and 1000 BCE (also the time the IVC was collapsing and the Rig Veda was being composed). Around 2,000 years ago this admixture stopped, pointing probably to the emergence of the caste system and the practice of marriages happening only within a subcaste.

"We are suggesting [through our findings] an out-of-India migration theory," Rai says over the phone.

According to the conventional understanding of this theory, the so-called Aryans were an indigenous race of people, some of who moved out of the subcontinent towards Central Asia and Europe, thus explaining the genetic and linguistic similarities we find among the people in those areas and some Indian groups today. But Rai uses the same terminology to drive at an entirely different theory, one that doesn't seem to be supported by what is mentioned in the study. The discovery of 11 people from the IVC at sites in Iran and Turkmenistan indicates strongly, he says, that the common 'Iranian' ancestor could be from South Asia. "The IVC people shared some kind of ancestry with the Iranians but the ancestral population could be South Asian. More results are required but there is a strong possibility of an out-of-India migration," he says.

> "There was no point in finding what had already been found at other (IVC) places, like Mohenjodaro. We already knew the IVC was developed. No point finding more signs of development"
>
> **Vasant Shinde** archaeologist



The paper in *Cell* however says just the opposite: 'Multiple lines of evidence suggest that the genetic similarity of I6113 to the Indus Periphery Cline individuals [the 11 outliers] is due to gene flow from South Asia rather than in the reverse direction."

This is part of an unusual pattern that has emerged after the publication of the studies. Some of the Indian researchers associated with the study have made claims that are unsupported and sometimes run counter to what the studies say. Several media outlets interpreted the findings in such a way so as to claim that it debunks the Aryan migration theory, when in fact the studies now make it clear that the IVC people had no genetic connection with the Steppe pastoralists and whatever Steppe ancestry we now find among modern Indians points clearly towards the arrival of a new set of people after the IVC.

At one point during the press conference while reporting these findings, Vasant Shinde told journalists, "Harappan people are the same as Vedic people." This is not what the two papers find. The Vedas were composed in Sanskrit, which falls in the Indo-Iranian branch of the family of Indo-European languages. According to the *Science* study, 'The Steppe ancestry in South Asia has the same profile as that in Bronze Age Eastern Europe, tracking a movement of people that affected both regions and that likely spread the unique features shared between Indo-Iranian and Balto-Slavic languages.'

When asked, Rai agrees that there is no evidence to back Shinde's claim of the Harappans being the same who started the Vedic Age. He however also says that he does not agree with the suggestion in the *Science* study that Indo-European languages probably came from outside the subcontinent. "I don't think we have enough proof to say this," he says.

This unusual diversion from what the studies themselves say perhaps has something to do with the intense political scrutiny over the findings. Rai says they removed all political terms from the papers. "The papers are purely scientific," he says. "Let people make their own inferences and interpretations." Reich mentions in his book how in 2008 their work on ancient Indian ancestry almost came to a halt when he discovered that modern Indians trace their ancestry from two distinct groups, one being a 'West Eurasian' group. His

Indian collaborators, who had supplied the samples, Lalji Singh and Kumarasamy Thangaraj of the CCBM in Hyderabad, he claims, appeared to be threatening to nix the project. 'They did not want to be part of a study that suggested a major West Eurasian incursion into India without being absolutely certain as to how the whole-genome data could be reconciled with their mitochondrial DNA findings. They also implied that the suggestion of a migration from West Eurasia would be politically explosive,' he writes. The impasse was resolved by coming up with new terms for the two ancestor groups, ASI and ANI (which Reich had earlier termed West Eurasian). Although the ANI's relation to Europeans and Central Asians was mentioned, the paper made no claims about the location of their homeland or any migrations.

When I ask Shinde about the incongruence between what he says and what the two studies report, he says, "Look, we are presenting the *Cell* paper [which focuses on the IVC's I6113 sample] as the base... The [*Science*] paper was written before the findings of the *Cell* paper. So [we haven't] been able to take [the *Cell* paper] into account."

He appears guarded when I ask him more questions on this issue. According to him, we all come from the same ancestors. But people use the theory of migration to pull one another down. And he corrects me. "Let's not say 'migration' [of Steppe pastoralists]. There was no migration. Maybe we can say movement."

Narasimhan points out that if we look at the issue of whether the people of IVC later established the Vedic Age through the prism of languages, then it is clear that this is not the case. "Indo-European languages are now spoken right from Dublin to Delhi. How did this come to be? And language spreads in pre-state society by the significant movement of people," he says. "But genetically [if we look at whether IVC people established the later Vedic Age], then it is not wrong to say so. The people of the Vedic Age were a mix of Steppe pastoralists and the IVC people. So the IVC did [genetically] contribute to it."

The science of genetics usually can only tell who one's ancestors were, or when and where a mixture began. But in the Indian context, this science has also begun to provide an interesting insight into the resulting social structure such a mixture might have provided.

Geneticists, in the past, looking at the mitochondrial DNA (which is transmitted only from mother to daughter) of modern-day Indians found that nearly all of them come from the ASI, even in north India. However, when they looked at the Y-chromosome, which is transmitted from father to son, they could see a large trace of ANI ancestry. About 17.5 per cent of Indian male lineage, for instance, belongs to the haplogroup R1a, which is found today across Europe and Central and South Asia.

How does one explain such incongruence? This probably has to do with the differences in social power between men and women and who among the two ancestral groups was more powerful. According to Reich, similar sex-asymmetric population mixture is seen among African-Americans, where the approximately 20 per cent of ancestry that comes from Europeans derives in an almost four-to-one ratio from the male side, and the Latin American population in Colombia, where the approximately 80 per cent of ancestry that comes from Europeans is derived in an even more unbalanced way from males (a fifty-to-one ratio). '[T]he common thread is that males from populations with more power tend to pair with females from populations with less,' he writes in his book. 'This pattern is exactly what one would expect from an Indo-European-speaking people taking the reins of political and social power after four thousand years ago and mixing with the local peoples in a stratified society, with males from the

GENETIC STUDIES HINT AT THE HIGHER SOCIAL STATUS OF ANI ANCESTRY THAN THE ASI. THOSE IN UPPER CASTES TEND TO HAVE A HIGHER PROPORTION OF ANI ANCESTRY COMPARED TO THOSE BELOW THEM

groups in power having more success in finding mates than those from the disenfranchised groups.'

Genetic studies also hint at the higher social status of the ANI compared to the ASI. Those in upper castes typically tend to have a higher proportion of ANI ancestry compared to those traditionally below them, even when the two groups are from the same state and speak the same language. Those belonging to the Brahmin caste tend to have the highest ANI ancestry. The *Science* paper mentions finding incredibly high proportions of Steppe ancestry among Tiwaris and Bhumihars today. This is another line of evidence, the paper writes, for a Steppe origin for South Asia's Indo-European languages since Brahmin groups are the traditional custodians of liturgical texts in the early Indo-European language Sanskrit.

Shinde, even though being one of the credited researchers of the *Science* study, disagrees with this view. According to him, if such a group of Indo-European language speakers came from outside the subcontinent, they should have left behind archaeological evidence. "When we go to Europe or America today, don't we still carry our culture there? The women still wear saris there, right?" he asks. "Why don't you see such a migration archaeologically then?" ■

AN OLD THEORY IN THE LIGHT OF NEW SCIENCE

Rakhigarhi does not end the Aryan invasion debate but it provides more accurate answers to who we are

By SUDEEP PAUL

Courtesy: PLOS ONE

AERIAL VIEW OF RAKHIGARHI EXCAVATION SITE

There was a time when things were simple. History textbooks in school were unambiguous about chronology. The chapter titled 'The Indus Valley Civilisation' (IVC) always preceded 'The Coming of the Aryans' or 'The Aryan Invasion', there being that inevitability that the Aryans followed the IVC, destroying and replacing it with the rudiments of their own civilisation in India. There was, however, already a well-entrenched argument against the theory of an invasion by pale-skinned hordes from the north—an argument born long before the early 20th century discovery of the IVC—but we mostly remained oblivious to it. Later, when the late 20th century and 21st century inheritors of this counter raised the flag of revolt and engaged in pitched academic battles with the so-called children of Macaulay—still subscribing to the theory of an Aryan invasion and a fascination for fair-skinned, sharp-nosed ancestors—we realised that the world as we knew it had changed. Perhaps it was always something different to begin with.

The IVC, or Harappan Civilisation, took a long time to be mapped. The date of discovery and excavation of an archaeological site is important, since it influences how the site is perceived in the overall scheme, and the importance and attention it subsequently enjoys. Rakhigarhi, in Hisar, Haryana, is a case in point. Spread over 224 hectares, the Rakhigarhi site is almost two-and-a-half times bigger than Mohenjodaro (100 hectares, presently in Sindh, Pakistan). It has resonances in history: a 12th century manuscript of the Saraswati Purana mentions Rakhigarhi, a site of considerable importance by the then-flourishing Saraswati river. The name crops up in the Mahabharata as well, in the context of Balarama's journey from Dwarka. Yet, Rakhigarhi's excavation began only around 1997, letting one argue that had the site been excavated, say, 60 or 70-odd years ago, it would have emerged as one of the main Harappan sites. It might have ended up influencing how the civilisation was described—and the names given to it.

The 'Rakhigarhi skeleton' in question dates back to c 2,500 BCE. Now, what does the skeleton say, or do? What it does not do is clear—it does not resolve the Aryan invasion issue. What it does say is that most Indians, or South Asians, are descended from the woman the skeleton belonged to.

Vasant Shinde, who led the Rakhigarhi project, attested along with his colleague Niraj Rai that combining the first genome of a Harappan individual with archaeological data, we conclude that South Asian hunter-gatherers had an independent origin, the same people who later settled in the region. And as David Reich, one of Shinde's co-authors for the paper published in *Cell* under the title 'An Ancient Harappan Genome Lacks Ancestry from Pastoralists and Iranian Farmers', affirmed, there is finally a genetic model that is a statistical fit for the majority of South Asians of our own time. Reich's own 2009 study 'Reconstructing Indian Population History', published in *Nature*, talked about two broad ancestral groups to explain the majority of the Indian population as a mixture of—the Ancestral South Indian (ASI) and the Ancestral North Indian (ANI), with the ASI being the older (roughly 60,000 years) and not related to any group outside the Indian subcontinent, and the ANI being more recent (roughly 40,000 years), with links to Europeans. There is, of course, no pure ANI or ASI and this must be kept in mind when we return to the current debate. Not only are we dealing with very ancient populations, but the very idea of a 'pure race' as understood at the time the Aryan invasion theory was put forth no longer holds. And the fact that there are no pure races is what genetics has been demonstrating again and again.

At the outset, what must be kept in mind is that we are dealing with a single skeleton (there are several at the Rakhigarhi site). Drawing conclusions from a single data point is always fraught with danger and yet, an absence of evidence does not mean evidence of absence. What must also be understood is the nuance on the Iranian genetic inheritance of South Asians. The Rakhigarhi findings do show that Indians and Iranians share a very close and old relationship but this predates agriculture. The IVC's Iranian ancestry is related to early Iranians, long before the separation of their ancestors. The idea that the shared ancestry implied an eastward movement of west Iranian farmers into the Indus Valley region, who then developed farming, has been discredited. Farming in the IVC developed without interference from people moving in from the Fertile Crescent, ruling out thereby any Anatolian influence too, unlike in the case of Europe. What is also missing is the trace of

> "We need to give up the idea of unidirectional genetic flow from Central Asia to India... We are dealing with multidirectional movements over long expanses of time"
>
> **Sanjeev Sanyal** historian and economist

migrants from the Steppes of Central Asia. Thus, the Rakhigarhi findings tie in with evidence from global agricultural history which shows that farming developed separately in many places around the same time and there was no need for migration for the IVC people to take to agriculture.

Historian Sanjeev Sanyal, author of *Land of Seven Rivers: A Brief History of India's Geography* (2012) and *The Ocean of Churn: How the Indian Ocean Shaped Human History* (2016), has been studying the developments in genetic research into India's population for a long time. Speaking to *Open*, Sanyal says: "The genetic findings confirm that India and Iran were a continuum since the Neolithic period. We have indepen-

dent archaeological evidence that the two were linked by trade in the Bronze Age. Why do we need Central Asia to explain links between Vedic and Avestan?" The contention that Indians and Iranians do not need the Central Asian connection to explain their very old linkages has implications for the debate on the Aryan invasion theory. The 'Indo-Iranian continuum', or the 'Persian Gulf-north India continuum', was a site of constant churn and of migrations within and outward. Even as groups of people were coming into the subcontinent, others were leaving. This has led geneticists to believe that India is the point of origin of many significant lineages prevalent worldwide. But the multiplicity found in the subcontinent makes any generalisation about ethnic roots of Indians as a whole a fool's errand.

Just the case of a single gene mutation, R1a1, throws light on the matter. Its parent R1a and subgroup R1a1a are important components of ANI. R1a1 is shared between Indians and eastern Europeans such as Czechs, Poles and Lithuanians but western Europe's lineage is mostly through R1b which is rather rare in India. R2, meanwhile, is found only in India and its highest concentration is in the east, particularly in Bihar and Bengal. The mapping could go on, but the point is that the Indian subcontinent is the only place where all the siblings of R1a1 are found. Gerard Lucotte's 2015 study published in *Hereditary Genetics* showed that the oldest strains of haplogroup R1a are to be found in the subcontinent, strains that are older than those in eastern and western Europe. Biologist and anthropologist Gyaneshwer Chaubey from the Estonian Biocentre and University of Tartu, Estonia, currently working at Banaras Hindu University, has been conducting advanced research into the genetic mapping of Indians which is to be published in an upcoming paper. Speaking to *Open*, Chaubey says: "There is a clear continuity of R1a1, showing links of over 20,000 years. Now, half of this has roots in central India."

All of this would appear to make the subcontinent not so much a receptor of genes as a dispenser, a point of origin. As far as the Aryan invasion theory is concerned, this may not have any direct bearing at all, but it does raise questions as to where the Central Asians are in all this. The reason why Central Asians cannot be excluded from the mix could, of course, be a matter of timelines. A 2006 study published in *The American Journal of Human Genetics* had argued that the population mix in the subcontinent has been more-or-less stable for a long time with no major injection of Central Asian blood for longer than 10,000 years. That would place any theoretical or real influx of Central Asians, or Indo-Europeans, well before the timeline for iron weapons or the domestication of the horse. On the presence of Central Asian ancestry, Chaubey says: "Not more than 5-10 per cent of Indians, that too mostly in the north, have any Central Asian ancestry."

Doubtless, with the constant movement of people back and forth, Central Asians too came into the subcontinent but there is no genetic evidence of an invasion of India (and Iran) in the Iron Age from the Steppes and, thus, of no dominance of Central Asians in the story of the Indian population. Peter Underhill's 2010 study published in the *European Journal of Human Genetics*, looking into the issue, said that it excludes a 'significant patrilineal gene flow from East Europe to Asia, at least since the mid-Holocene period'. Indeed, one particular group could have travelled through Central Asia and ended up in eastern Europe with the R1a1a gene. Sanyal argues that it is time to move on: "We need to give up the idea of unidirectional genetic flow from Central Asia to India. The so-called 'Aryan' haplogroup R1a1a is common in north India and eastern Europe, but its ancestor P* is found in Southeast Asia. We are dealing with multidirectional movements over long expanses of time." (The Rakhigarhi skeleton does not help with R1a1 of course, with R1 being a Y-chromosome haplogroup, or the male lineage.)

Last year's discovery of a chariot in a Bronze Age burial pit in Sanauli in Uttar Pradesh has impacted the Aryan invasion

THE FIRST SYSTEMATIC REFUTATION OF THE ARYAN INVASION THEORY CAME FROM SRI AUROBINDO, WHO MADE THE DISTINCTION THAT 'ARYAN' MAY AT MOST BE A CULTURAL NOTION, NOT RACIAL

DAVID REICH'S 2009 STUDY TALKED ABOUT TWO BROAD ANCESTRAL GROUPS TO EXPLAIN THE MAJORITY OF THE INDIAN POPULATION: THE OLDER ASI AND THE MORE RECENT ANI

debate as well. If the Rig Veda's mention of chariots was used to locate chariots in India in the 2nd millennium BCE, speculation about when the Vedic texts were written may not have allowed the use of the same as evidence. But Sanauli now appears to have given Indians chariots for the same period when the Mesopotamians and Greeks had them. So, contemporary to the Harappans, we find other people in the Gangetic plains with chariots, helmets, etcetera. The Aryans, we heard, were chariot-using people wielding iron weapons. Strangely, artefacts of the kind mentioned above have not been found in the Punjab and adjoining areas. If Central Asians flowed into the subcontinent around the same timeline, did they skip Afghanistan (where chariots would be useless anyway) and the Punjab to land directly in what is today's Uttar Pradesh and begin riding chariots? In place of logic, we have a gaping hole here. Sanyal explains: "The emerging genetic data needs to be mapped with new archaeological finds. So far we had Bronze Age sites on the Indus and Ghaggar-Saraswati, but now we are finding evidence of a sophisticated culture in the Gangetic plains. Moreover, iron seems to be an Indian discovery that developed in the Godavari valley and eastern Gangetic plains before heading north-west."

A very complex story is being told by genetics and archaeology, often corroborating each other. Rakhigarhi is no exception. The problem arises because many of us are still looking for pure races which has, unfortunately but expectedly, turned it into a political debate. Geneticists have been demonstrating time and again that there is no pure origin for anybody. And Indians are much more mixed than most. In that light, it is perhaps time for us to shed our obsession with the debate of old. Yet, as soon as the Rakhigarhi study became public, news headlines wrapped themselves around the same 'Aryan invasion theory' and whether the findings demolish it or keep its embers burning. The headlines can be dismissed as innocuous after all, but they hark back to a divide that grew wider over the last century, beginning with the first challenges to the Aryan invasion theory propounded long before genetics and the scientifically sharpened linguistics of today.

Perhaps the first significant refutation of the Aryan invasion theory as a colonialists' invention came from Dayanand Saraswati, based on his complete rejection of the 19th century European view of the Vedic texts. Bal Gangadhar Tilak, of course, while no friend of the colonial project, argued that the mass of the Indian population are descended from people who migrated south from the Arctic— from much farther north than the Steppes. Swami Vivekananda was categorical in his rejection of the Aryan theory, as evidenced in a lecture delivered in the US: "And what your European Pandits say about the Aryans swooping down from some foreign land snatching away the land of aborigines and settling in India by exterminating them is all pure nonsense, foolish talk" (*The Complete Works of Swami Vivekananda*). While dismissing the Aryan invasion theory, Vivekananda was also pointing out the lack of evidence in Indian scriptures that proves the Aryans, whoever they were, came from outside. The main villain was, of course, Friedrich Max Müller who, in his own words, believed that '[T]he translation of the Veda, will hereafter tell to a great extent on the fate of India and on the growth of millions of souls in that country. It is the root of their religion and to show them what the root is [is] the only way of uprooting all that has sprung from it during the last three thousand years' (*The Life and Letters of the Right Honourable Friedrich Max Müller*). The counter to the Aryan theory, in the service of politics, would later be reductively used to blur boundaries, erase subtleties and start a war with the camp adhering to the Aryan invasion theory which remained unconvinced, even blind and condescending—a war that reignited on social media immediately after the publication of the Rakhigarhi results.

"Not more than 5-10 per cent of Indians, that too mostly in the north, have any Central Asian ancestry"

Gyaneshwer Chaubey biologist and anthropologist

But the first systematic, text-based refutation of the Aryan invasion theory had come from Sri Aurobindo: 'But the indications in the Veda on which this theory of a recent Aryan invasion is built, are very scanty in quantity and uncertain in their significance. There is no actual mention of any such invasion. The distinction between Aryan and un-Aryan on which so much has been built, seems on the mass of the evidence to indicate *a cultural rather than a racial difference*. The language of the hymns clearly points to a particular worship or spiritual culture as the distinguishing sign of the Aryan,—a worship of Light and of the powers of Light and a self-discipline based on the culture of the 'Truth' and the aspiration to Immortality,—Ritam and Amritam. There is no reliable indication of any racial difference' (*The Secret of the Veda*, emphasis added). Aurobindo had made an important distinction—that 'Aryan' may at most be a cultural notion, not racial. From another perspective, BR Ambedkar reportedly called the Aryan invasion theory "an invention" necessitated "because of a gratuitous assumption that the Indo-Germanic people are the purest of the modern representative of the original Aryan race".

Genetics has shown that the pure race is a myth. It has put both warring camps in their place. The moral of the Rakhigarhi story is that there is no 'left' or 'right' to this debate. We know better now where most of us come from, and we remain a mixed bunch. Whether we call ourselves indigenous or foreign is beside the point. ■

SPACE

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But India's space dream is bigger than Chandrayaan-2

By V SHOBA

No mission has evoked a deeper and a wider range of emotion at the Indian Space Research Organisation (ISRO) than Chandrayaan-2. On a high after scoring clean hits with its previous big-ticket missions, which found evidence of water on the moon and put an orbiter around Mars on a shoestring budget, ISRO was preparing for a historic moment: a dream touchdown near the lunar South Pole that would cement its standing as a Columbus of the space age. As the GSLV Mark 3 bearing Chandrayaan-2 lifted off on July 22nd after a minor snag, India was caught up in the power and the promise of the launch. Stowed in the composite spacecraft was Vikram, an indigenous quadrupedal lander carrying Pragyan the rover, a talisman inscribed with the Ashoka Chakra and the collective hopes of 1.4 billion people. In the first week of September, Vikram detached itself from the orbiter about 100 km from the surface of the moon, intending to land in time to make the best of the lunar daylight that would last 14 days. As per plan, in the early hours of September 7th, it began to execute an autonomous powered descent lasting about a quarter of an hour—"15 minutes of terror", as ISRO Chairman K Sivan described it. During this time, the ground control team could do little but pray that it landed firmly on its legs. India cheered on, as though for an Olympic gymnast performing a spectacularly dangerous routine. Twelve minutes into the complex, multi-staged manoeuvre, the lander abruptly malfunctioned, going off course and losing contact with mission control. India's latest and most ambitious space project had just been reduced, in the words of a senior ISRO scientist, to "an honourable miss".

Had things gone as per script, Vikram and Pragyan, landing on a sunlit plain between two craters in a cloud of lunar regolith, would have been among the first—after China's Chang'e-4 landed on the far side of the moon in January 2019—to look for water and Helium-3, a possible source of unlimited clean energy in the future, in the South Pole region before anyone else got there. Previous missions to the moon have landed in and around the equatorial region and have not studied the poles, which could potentially hold precious stores of water-ice in deep craters hitherto untouched by sunlight. India had hoped to be the first to shine a light into this reservoir of darkness. "If we had landed, it would have made a big impact internationally, wedging India between the US and China in the race to the moon. It was to be the precursor to future moon landings in the South Pole. It was a modest maiden effort, but we wanted to prove, as we did with the Mars mission and with Chandrayaan-1, that we could strike big with the limited resources available to us," says Mylswami Annadurai, who saw through the successful launch of Chandrayaan-1 as project director. "Every ISRO mission is a culmination of strategic and scientific interests. In the case of Chandrayaan-2, the lander was the strategic part and the orbiter, containing eight new-generation instruments, is of high scientific value. But an orbiter is something we have done before—we put it together in just two years after successfully launching Mangalyaan," Annadurai says.

A TRIUMPH OF INDIGENOUS TECHNOLOGIES, CHANDRAYAAN-2 MAKES A POWERFUL STATEMENT AT A TIME WHEN THE US STILL USES RUSSIAN SOYUZ ROCKETS TO SEND ASTRONAUTS TO THE INTERNATIONAL SPACE STATION

Sivan has downplayed the faulty landing, calling it a "failed technological demonstration" and stressed that the orbiter,

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● Prime Minister Narendra Modi consoles ISRO Chairman K Sivan, Bengaluru, September 7

equipped with a high-resolution camera, a terrain-mapping camera, a dual-band synthetic aperture radar to look for subsurface water-ice and an advanced IR spectrometer, besides other payloads, will continue to do important science and could be in orbit for up to seven years, although the planned lifetime was just a year. ISRO has once again demonstrated its mastery of orbiter mechanics and planning, but the failure to safely land Vikram, which has since been located lying tilted on the lunar surface, has deeply unsettled scientists, who say none of their simulations had prepared them for the eventuality of a crash or a loss of communications. Scientists at ISRO's Telemetry, Tracking and Command Network facility in Bengaluru now labour on grimly to re-establish contact with the lander, knowing the chances of retrieving the unit or getting it to function as planned are bleak. "It is a nightmare situation for us. We were hoping to get some sleep after working long days for the past few months," says a junior engineer. "This is just unbelievable. We had simulated everything, tested every part. In fact, during a test to ensure the load-bearing ability of the lander's legs—they were originally supposed to fold out, but the design was later simplified—we had attached sensor blocks to them which introduced extra leverage and the test ended up failing. It had us worried at first before we figured out that the test itself was wrong. So you see, nothing was left to chance." Employees say they have been warned not to talk to the media, lest they let slip information about mission plan-

CHANDRAYAAN-2 IS THE FLAGSHIP PROJECT OF A NEW INDIA THAT WANTS TO LEAPFROG TO A MANNED MISSION IN 2022, WITH OTHER EXCITING PROJECTS, INCLUDING A VENUS PROBE AND A MISSION TO STUDY THE SUN, ON THE CARDS

ning and execution that could be held against ISRO while it is yet to announce the cause of the failure. "Space missions are always under scrutiny and ISRO officials are often asked not to reveal strategic information," Annadurai says. "You may tell children to watch out so they don't get hurt, but you don't ask them not to play. I don't recall such a time in my 36 years of service at ISRO."

To be sure, there is a lot at stake, not the least of which is India's confidence in landing on the moon despite a string of failed attempts, the latest being a private Israeli mission that crashed in April 2019. The moon, with its stark chiaroscuro of brightness and shadow, and its terrain slopes and hazards, is not an easy world to conquer. Dust, radiation and charged particles make the environment extremely unpredictable. The temperature on the lunar surface can vary from 200 degrees Celsius below zero in the dark polar regions to 120 degrees above zero during the day. The Indian capsule was designed to use solar energy to explore the area around the landing spot before the sun went down on it. In the absence of sunlight, the electronics aboard the Indian lander-rover duo were expected to fail, for unlike the Chang'e-4, China's second lander mission, the Indian capsule is not equipped with radioisotope thermoelectric generators (RTG) to power its operations during the lunar night. Given the limited range of the rover—500 m, according to ISRO, although scientists who worked on the project say it could traverse up to twice the distance—however, no power source other than solar was considered necessary. "RTGs were part of the original design. There was concern about the handling of radioactives but the real reason we did away with them was that India does not yet make RTGs. We did not want to import this when the rest of the mission could be built in-house," says a senior scientist who worked on the lander design.

A triumph of indigenous technologies, Chandrayaan-2 makes a powerful statement at a time when the US still uses Russian Soyuz rockets to send astronauts to the International Space Station. It is the flagship project of a new India that wants to leapfrog to a manned mission in 2022, with other exciting projects, including a Venus probe and a mission to study the sun, on the cards. As per an agreement signed in 2007 between ISRO and Roskosmos, the Russian Federal Space Agency, Chandrayaan-2 was supposed to be a joint mission with ISRO providing the orbiter and the rover and Roskosmos, the lander. Following a failure in December 2011 of Roskosmos' Phobos-Grunt mission, however, Russia pulled out of Chandrayaan-2, originally scheduled to be launched in 2015. "We decided then to build everything ourselves," says SVS Murty, a former scientist with the Physical Research Laboratory (PRL), a unit under ISRO, in Ahmedabad. "There was always a small chance that the lander, which we had no previous experience with, could crash. But we were left with no choice—we tried to build a reliable system that could automatically correct its course based on AI and used honeycomb design shock absorbers to handle hurdles and upsets." The UR Rao Satellite Centre and the Laboratory for Electro-optical Systems in Bengaluru, and PRL and the Space Ap-

● Chandrayaan-2 lander Vikram (foreground) and orbiter, ISRO, Bengaluru, June 10

plications Centre in Ahmedabad jointly designed and built the orbiter, lander and rover and all the instruments onboard. Vikram carried payloads to study lunar seismic activity, the ionosphere and a surface thermo-physical experiment that would have helped Indian scientists understand heat flows on the moon. The six-wheeled Pragyan was equipped with a Laser-Induced Breakdown Spectroscope and an Alpha Particle-Induced X-ray Spectroscope to inspect and identify the composition of elements near the landing site.

"Given a chance, our scientists can design and build almost anything. But the results we achieve at ISRO are irreplicable elsewhere. Like wine from a certain terroir," says N Vishwanatha, a former director of the Spacecraft Mechanisms Group, ISRO.

The group, which had been working on the rover from 2011 and certain parts of the lander for the past five years, is a cheerless one today. "Among the complex technologies we have built in the past is a six-metre-diameter S-Band unfurlable antenna for the GSAT-6 military communication satellite launched in 2015. We tried to buy the technology but the cost was more than that of the entire mission. We are one of the few countries that can make such a large antenna," says Vishwanatha. "The mechanisms group holds the distinction of having performed 130 successive successful on-orbit deployments."

ISRO is yet to fully analyse the landing manoeuvre to determine what went wrong, but among the theories that have emerged is that one or more of the lander's five engines failed to properly de-boost in the terminal phase of the descent. Those who have worked on the project say the fifth engine was a late addition made to ensure a smooth descent, and not a redundancy. "Changes must not be made so late into a project," says a former mission planner. "Ambition is great and inspiring but not at the cost of stressing out scientists. Many of them are sleepless and on the brink of burnout. They are being denied leave." Those of us hymning the virtues of competitive space science have only a foggy sense of the unremitting demands it makes of our engineers. In his interaction with ISRO scientists in Bengaluru, when Prime Minister Narendra Modi acknowledged their dedication, he was rewarded with guileless smiles. "You are the ones who live for the country," he said. "You are the ones who sacrifice your own dreams and spend sleepless nights to keep India's head high."

Others say that the meticulous review system at ISRO leaves little to chance. "The plus point of ISRO is the excellent review system at various levels. If you have a technical doubt, you can raise it irrespective of your rank. This is a culture that we have inherited from Dr Sarabhai, Dr Satish Dhawan and others who have led the organisation. This is the secret behind our resilience," says V Adimurthy, mission concept designer for the Mars Orbiter Mission, who is now Dean of Research at the Indian Institute of Space Science and Technology. "The one thing we were clear about was that we had to do the best thing that had not been done—whatever the outcome. Because whatever resources we may lack, we make up for with courage."

Indian space science is a unique cocktail of courage, hard work and improvisation—"*jugaad*"—says Annadurai. "In 2004, when we were sanctioned Rs 25-30 crore to build a lunar terrain simulation facility in Bengaluru for Chandrayaan-1, we first bought 10 kg of lunar simulant for $150 a kilo. But we needed 60-70 tonnes and it was working out to be too expensive. With help from soil experts at Periyar University and IISc, we identified similar soil and rocks in a village near Salem in Tamil Nadu and acquired it almost free of cost. We took over a shed formerly occupied by a stratospheric balloon-testing facility and recreated the moon's surface there," he says.

Space missions are catechisms for man's ambition, especially now that the rhetoric of saving humanity by venturing to the moon has become every billionaire's dream. Elon Musk, Jeff Bezos and Robert Bigelow all hope to bring people and materials to the moon in the near future. The moon is not just a trove of resources and minerals we are fast running out of on earth, but with one-

ISRO IS YET TO FULLY ANALYSE THE LANDING MANOEUVRE TO DETERMINE WHAT WENT WRONG, BUT AMONG THE THEORIES THAT HAVE EMERGED IS THAT ONE OR MORE OF THE LANDER'S FIVE ENGINES FAILED TO PROPERLY DE-BOOST IN THE TERMINAL PHASE OF THE DESCENT

sixth the gravity, it is an attractive stepping stone for greater cosmic journeys of the future. Mining the water-ice on the poles and turning it into hydrogen-oxygen rocket propellant no longer seems inconceivable for a space-faring civilisation. For Chang'e-4, named after the Chinese moon goddess, finding and extracting helium isotopes is a key priority. It will also study moon dust and try to melt it using sunlight to develop a sturdy construction material. The US, which recently launched a programme called Artemis to take Americans to the moon by 2024, plans to build a large space station orbiting the moon and a fleet of heavy-lift rockets.

● Scientists at ISRO's command centre react after losing touch with lander Vikram, Bengaluru, September 7

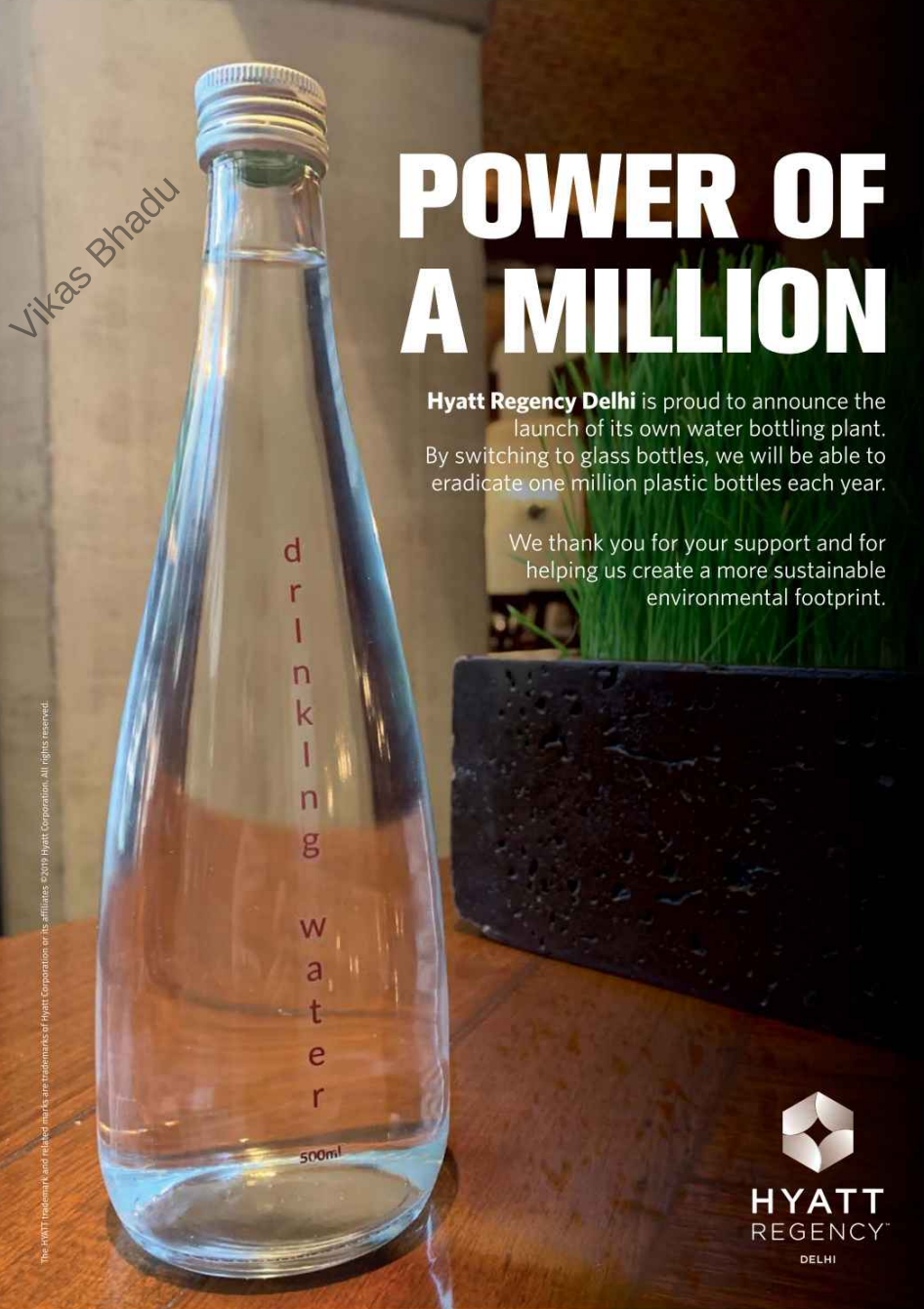
AP

ISRO'S NEXT PRIORITY IS THE $1.4 BILLION GAGANYAAN MISSION, WHICH AIMS TO LAUNCH THREE INDIAN 'GAGANAUTS' INTO SPACE. ASTRONAUTS FOR THE MISSION WILL BE TRAINED IN RUSSIA EVEN AS INDIA IS WORKING ON SETTING UP A TRAINING CENTRE IN BENGALURU

For India, the moon could be a perch to set up telescopes through which to peer deeper into the galaxy. "By the end of the Cold War, after a few people had jumped around on the moon and picked up stones, there was nothing left to do. The target to reach the moon had been achieved. The second phase of lunar exploration, which has picked up pace in the past few years, is driven by a hunger for resources to feed the future needs of the human race," says Ajey Lele, a senior fellow at the Institute of Defence Studies and Analysis who works on space security and strategic technologies. "Despite technology limitations and with just a small rover, ISRO wanted to do a mission that would not just be an advertisement, but also give it a scientific advantage. India's priority is finding water," he says. "Location matters. We chose to land in a place where we were bound to discover something new. We are not competing with China, but we are trying to break new ground in our own way." ISRO's next priority is the $1.4 billion Gaganyaan mission, which aims to launch three Indian 'gaganauts', at least one of them a woman, into space. Astronauts for the mission will be trained in Russia even as India is working on setting up a training centre for a second-generation of space-men and -women in Bengaluru, where ISRO's new Human Space Flight Centre is also located.

ISRO has come a long way in the past 30 years, using every failure to inform and enrich successive missions. At an informal meeting of retired ISRO scientists at the Aeronautics Society of India, Bengaluru, two days after India lost contact with the lander, grey-haired south Indian gentlemen recount stories of spectacular failures. The first experimental flight of SLV-3, in August 1979, launched from Sriharikota by the then mission director APJ Abdul Kalam via a manual override despite a system warning, failed, plunging the Rohini satellite into the Bay of Bengal. The same team managed to launch it successfully on July 18th, 1980. Through the 1980s and the 1990s, failure was a rite of passage as India worked to achieve independent access to space with SLV and ASLV rockets. "Even in a successful mission, there are underperformances that you don't hear about. We learn from these—this is how redundancies come to be built into launch systems," says G Ravindranath, who worked on SLV, ASLV, GSLV and the cryogenic project and retired as GSLV project director. Indian scientists made basic errors that momentarily set the space programme back. In 1993, the first PSLV flight ended in failure due to a software overflow—which would be an obvious check today. Ravindranath, who lost two missions, says the entire crew got emotional both times. "Thankfully, we didn't have TV cameras hovering over us. When the GSLV-D3 failed due to a malfunctioning of the indigenously developed cryogenic stage, we lost the satellite too. It was an expensive mission. But we learned from it."

India's failure to roll out a moon buggy on its maiden attempt is not an Icarus fable. A crash wasn't a likely situation, it simply was a possible one. Ever fleet of foot, ISRO remains as eager to strike out into new scientific territory as it was when it set out on an impossible voyage to the red planet. "We will not turn tail," says a Chandrayaan-1 mission planner. "Once we have found the granular element that must be got right, we will focus on the next project—actually, several—at hand." ■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THE ANATOMY OF

Inside the technology that thrilled—and failed

By JATAN MEHTA

Landing a spacecraft on the moon is hard. Prior to Vikram lander's heart-sinking failure to nail a soft landing, the Israeli craft Beresheet had crashed on the lunar surface this year. Only two Chinese missions, Chang'e-3 and 4, have successfully soft-landed on the moon in the 21st century. That gives a success rate of 50 per cent in this renewed moon race.

If 50 years ago we landed humans on the moon with Apollo and even had robots bring back soil samples on Soviet Luna spacecrafts, why is a lunar landing so nail-biting now? The answer to that and what Vikram's failure means are crucial to our future in space.

The ability to soft-land on extraterrestrial surfaces is key to long-term space exploration and sustenance. Right after the ability to get out of earth, that is, rockets. Now that the Vikram lander has failed to touch down as planned, does it mean that the Indian Space Research Organisation (ISRO) will go back to the drawing board? To understand the answer, we need to take a look at Chandrayaan-2's full technology stack.

The Rocket
THE FAT BOY

While most people focused on the lander and rover elements in Chandrayaan-2, the GSLV Mk III rocket that lifted it off has risen the stature of ISRO's space capabilities. Launching Chandrayaan-2 on July 22nd marked the rocket's first operational flight.

CHANDRAYAAN-2

Called the Fat Boy, India's most powerful rocket to date was key to be able to launch not just missions like Chandrayaan-2, but also heavier communication satellites, for which India has had to rely on the European Ariane-5 so far. Notably, the Mk III will also be the launch vehicle of choice for carrying India's first astronauts to space in 2022. Getting the GSLV Mk III up and working has opened up possibilities of more elegant space missions for the ISRO, and for anyone utilising the rocket. Things that are beyond the reach of the trusty PSLV.

It is to be noted however that lifting 10,000 kg to low earth orbit or 4,000 kg to geostationary transfer orbit isn't much in the grand scheme of things. Complex interplanetary missions require medium lift rockets. Such rockets from the US (Falcon-9, Atlas V), Russia (Proton, Angara), Europe (Ariane-5) and China (Long March-3, 7) all outperform the GSLV Mk III.

The price argument is also rather moot. For example, SpaceX's Falcon-9 rocket costs about the same as a GSLV Mk III, yet it can carry twice the payload. A Falcon-9 could've placed Chandrayaan-2 in a trajectory that goes all the way to the moon instead of an earth orbit, saving both mission time and launch cost. Something to think about while we go about bragging about our cost effectiveness.

Human deep-space exploration missions, including human lunar landings, require superheavy lift rockets of the Saturn V kind; not even the Falcon Heavy, ULA's Delta IV Heavy or Chinese Long March-5 are up to the task. That is why the US' National Aeronautics and Space Administration (NASA) is building the behemoth SLS and China, the Long March-9, while SpaceX is betting on Starship and BFR.

So, while India's homegrown GSLV Mk III is a major step forward in the ISRO's launch capabilities, it pales in comparison with the contemporaries. Without India's space launch capacity growing significantly over time, all interplanetary missions will be limited and may likely be spinned off as cost-effective endeavours.

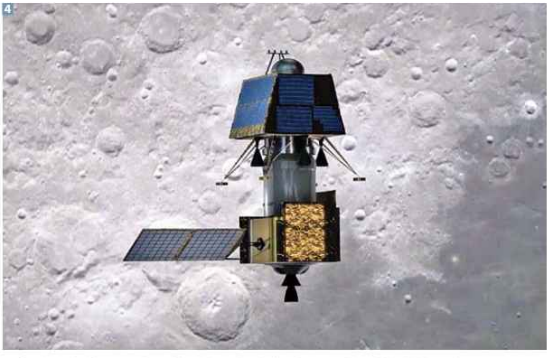
However, that is precisely why Mk III's successful debut is important. Focus has thus shifted to the future: more capable rockets that will allow the ISRO to take on missions as complex and rewarding as any. It is therefore clear that the launch failure of GSLV Mk III would've induced a larger setback than a failed lunar landing.

The Orbiter
THE NAMELESS ONE

The Chandrayaan 2 lander-rover pair got so much media attention that most people didn't bother about the orbiter until after the landing failed. Notably, the ISRO didn't even give the orbiter a name, while the lander and rover got called Vikram and Pragyan, respectively. Ironic, if the orbiter was supposed to be a major chunk of the "95 per cent mission success".

But the fact is that the Chandrayaan-2 orbiter is a major upgrade over Chandrayaan-1, India's first lunar orbiter. The Chandrayaan-2 orbiter carries with it a set of versatile scientific instruments as it orbits the moon. It's high-resolution camera can capture the lunar surface at 0.32 m/pixel resolution, better than the 0.5 m/pixel that the NASA's Lunar Reconnaissance Orbiter (LRO) can do, which is over 10 years old.

Chandrayaan-1 has been acknowledged for its excellent mineral mapping capabilities and elemental composition determination of the lunar surface. Noah Petro, Project Scientist for LRO, recently noted on Twitter: '10 years ago today Chandrayaan-1 ended. I was so lucky to be a small part of that mission. The M3 instrument allowed us to take a huge step forward in learning about the composition of our 8th continent!'



● **1&2** An artist's impression of the Vikram lander in descent **3** The GSLV Mk III rocket **4** Chandrayaan-2 above the moon CREDIT: ISRO

The Chandrayaan-2 orbiter instruments build on that excellent capability.

It is also to be noted that the Chandrayaan-2 orbiter successfully carried out orbital manoeuvres that placed the Vikram lander in the desired orbit, for an eventual descent. Until then, the lander was attached to the orbiter. The ability to remotely detach a craft is a useful capability for more complex missions like sample return and human lunar exploration.

Heavy space systems to the lunar surface are, for practical reasons, expected to be modular. Their carrier modules will be key to enabling future space stations around the moon, like in the case of the NASA's Deep Space Gateway.

The Chandrayaan-2 orbiter is the first wave that can lead to eventual realisation of such complex missions. And with the ISRO now claiming seven years of operational life for the orbiter, troves of valuable scientific data are being looked forward to.

The Lander
THE THRILLER

Of course the successful rocket that launched Chandrayaan-2 and the orbiter are only part of the story. The prime focus was always on the lander—for a very simple reason.

India has been building rockets and orbiting satellites for decades now. Sure, with Chandrayaan-1 and Mars Orbiter Mission since 2008, the ISRO started building interplanetary satellites. But never had a spacecraft designed to land on another planetary body arrived in the picture until Chandrayaan-2.

Akin to the seven minutes of terror of Martian landings (for example, the NASA's Curiosity), the prime test for the ISRO's indigenously designed lander Vikram was during the descent phase of the Chandrayaan-2 mission.

The descent begins with extremely high velocities achieved in lunar orbit and the lander is faced with a monumental task of gradually braking itself down until it gently drops on the lunar surface. All the while having no aid of an atmosphere to slow it down, unlike Earth or Mars.

It was desirable that Vikram's main engines operate at varying thrust levels, to attain the kind of fine control demanded during the descent. Chandrayaan-2 thus marked the ISRO's first realisation of a variable thrust spacecraft engine for planetary surface exploration.

The biggest challenge however is communication. During the descent, the earth-moon communication lag is significant enough to not allow controlling the lander from earth. As such, Vikram had to be designed to operate autonomously during the entire phase, that is, continually take input from its sensors about its distance, velocity, acceleration, orientation, etcetera and orchestrate the firing of its engines in accordance with the desired trajectory. All until a safe touchdown on the lunar surface.

If this nail-biting phase had gone as planned, it would've made the ISRO as the fourth organisation in the world to achieve the feat of a soft lunar landing, following the US, the former USSR and China.

It is true that orbiters, with their imaging and mapping capabilities, lead the way to enable surface exploration. But landing technologies thus developed are an entry to so much more: mobile exploration, *in situ* resource utilisation, long-term habitats, etcetera.

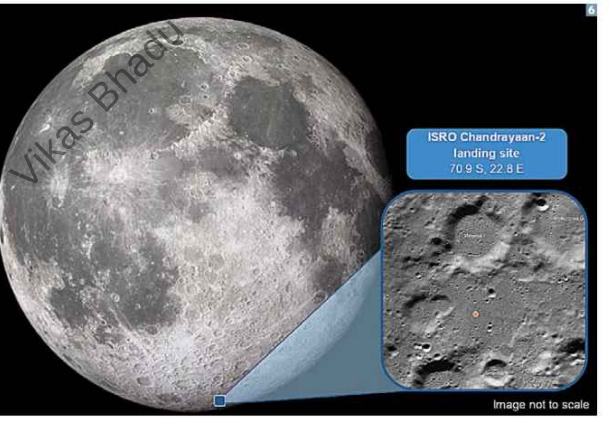
With Chandrayaan-2's failed landing, India is dealing with a different technological beast altogether. A successful touchdown with a revived Chandrayaan-2 mission, or 3, can pave the way forward for an eventual Mars landing mission and on worlds beyond. Europa, anyone?

The Rover
PRAGYAN'S PATH

Speaking of stepping stones towards a multiplanetary future, right after rockets and landing technologies comes planetary surface exploration using mobile platforms. That is why the Russian Lunokhod rovers from the 1970s were a big deal, and so is the current Chang'e-4 rover Yutu-2.

Chandrayaan-2's rover Pragyan represented India's foray into designing a platform capable of traversing foreign landscapes and delivering good science. Pragyan was to be let out by Vikram on the Chandrayaan-2 landing site (70.9°S, 22.8°E), which is a primarily rocky region.

With the exception of the NASA's



5 Chandrayaan-2 with the Vikram lander CREDIT: ISRO
6 Chandrayaan-2's landing site CREDIT: JATAN MEHTA

Apollo-16 and Surveyor-7 landing missions which landed in rocky regions, all other missions have descended on the dark, smoother lava plains. By the virtue of such rocky lunar regions being rarely visited, the geology of the Chandrayaan-2 landing site is deemed interesting.

What made the rover most appealing to lunar scientists is the age of Chandrayaan-2's landing site. Using crater size frequency distribution, a method for estimating a region's age, the site was found to be at least 3.8 billion years old. This means the region formed during or before the time of large crater-forming asteroid impacts in the solar system. The significance of this is that very few missions have studied materials from this period up close.

It therefore shouldn't surprise anyone that much was expected of the two spectrometers onboard Pragyan, which could've found pristine material from the lunar crust in the landing region, formed at least 3.8 billion years ago. Notably, Chang'e-4 landed in an even older region on the moon, the intriguing South Pole-Aitken basin.

There's also an exploratory aspect that involves the terrain. Since Pragyan was their first lunar rover, it made sense for the ISRO to choose a landing site with a benign enough terrain and gentle slopes allowing safe exploration. However, the ISRO touts Chandrayaan-2 as a South Pole-landing mission, which is technically incorrect. Conditions unique to polar areas, including eternally dark regions and long periods of sunlight, are prominent from the 80° S/N latitude onward, not from around 70° S/N. The ISRO's claim of Chandrayaan-2 being the first polar landing mission is wrong.

It is not merely about terminology. True lunar polar exploration, for which the global community has a consensus of being the resource and colonisation hub for humanity's future in space, requires versatile mobile exploration platforms. All paths to using resources *in situ* and building lunar habitats go via traversing steep slopes, crossing potential boulder fields and managing rocky landscapes. As such, Pragyan exploring a partially rugged terrain on the moon would've been a great technology demonstration. Alas!

Both Vikram and Pragyan would've been excellent technology demonstrators, albeit most limited by their 14 earth days lifespan on the lunar surface. Post-dusk, the cold lunar night kicks in and peak temperatures can be a harsh −180°C. So with the lunar day, both crafts would've stopped functioning, permanently. This dictates limits of the mission's scientific output. While the Chandrayaan-2 lander and rover both were to last just 14 days, the Chang'e-4 lander-rover pair have been surviving the harsh lunar night for over seven months now, using radioactive heaters. The Chang'e-3 lander, which touched down in 2013, is still alive the same way.

The Road Ahead
TO THE LAUNCH PAD

We now have reliable means to launch things out of our planet, best demonstrated by the democratisation of access to space. Technologies for soft landing on extraterrestrial surfaces and their mobile exploration are stepping stones towards sustained space exploration.

China and the US are currently spearheading that space, each with a lead on lunar and Martian landings respectively. The US and Russia, having lost most of their Cold War talent, essentially need to rebuild their lunar soft-landing capabilities. Hence the birth of the NASA Artemis Program.

India came close to nailing the landing. Now it's imperative we set it in stone with a revival of Chandrayaan-2 in the form of a new launch. Let's not forget that next year China is set to launch a sample return mission to the moon, followed by a Martian orbiter and rover. Waiting for Chandrayaan-3 until 2025 is moot.

Without extraterrestrial landing technologies, there exists a giant hole in our space capabilities. If India is to play a leading role in sustained space exploration, we need to go back to the launch pad. ■

Jatan Mehta is a science writer and former science officer of TeamIndus Moon Mission

BROKEN BRITAIN

When conservatives throw away the guidebook of tradition

By RODERICK MATTHEWS

INTERESTING TIMES WE live in. So interesting, indeed, that you need a thesaurus, a crystal ball, several dusty books on parliamentary procedure and an unlimited supply of aspirin to make any sense of it all.

Baffling times. And, for any self-respecting Brit, humiliating times. Our unwritten constitution has turned into a free for all, and our political parties, our conventions and our sense of dignity seem to have dissolved.

Perhaps WB Yeats had it right when he lamented that 'The best lack all conviction, while the worst are full of passionate intensity'. Or, maybe, the Kaiser Chiefs were nearer the mark when they sang 'I predict a riot'.

How did we get here? The condensed version goes something like this.

In 2016, we held a referendum on the UK's membership of the European Union (EU). The Leave side won. We have not left.

We did have a leaving date, chosen by our then Prime Minister Theresa May—March 29th, 2019—but this was moved, twice, and now stands at October 31st, 2019. May's government and the EU negotiated terms for a mutually acceptable 'orderly exit'—the Withdrawal Agreement—but the House of Commons rejected it three times.

Ever since, angry Leavers, who were told we would 'Take Back Control', have been on the hunt for culprits, and habitually use warlike language—collaborators, betrayal, surrender, treason. Tempers have risen to worrying levels. Why can't we just *leave*?

Surprisingly, the culprits who were most demanding about the conditions of leaving were not Remainers, trying to cling on to nurse for fear of something worse, but arch-Leavers, who considered that anything less than a complete, clean, 'no deal' exit was not leaving at all. The deadlock brought down Theresa May.

Enter the saviour, long-time Tory maverick Boris Johnson, after a stay of rather more than 40 days in the wilderness. He had led the Leave campaign in 2016, but then left the government, because he felt that the Withdrawal Agreement was not sufficiently Brexity. Many Leavers also believed that having

Johnson has trust issues, and his opponents smelt a very pungent rat. They believed his strategy was designed to serve many more purposes than implementing the will of the people

Illustration by **SAURABH SINGH**

any hint of connection with the EU did not take back sufficient control, and the notion of a 'no deal' Brexit caught on.

Johnson won the Tory leadership election in July 2019, and became prime minister, sparking euphoria among Brexiteers. At last! A true Leaver they could trust after the deadlocked days of Theresa May. Johnson had energy and charisma, and made bold promises. He soon said that negotiations with Brussels were going 'tremendously well'. The poll ratings of the newly-formed Brexit party, which believes in one thing (no prizes), began to drop. The one serious rival to the Tories on the Leave side had been fatally winged, or so we thought.

But they say a week is a long time in politics, and last week has been the longest of all weeks in British political history.

On Monday, September 3rd, Boris Johnson had a slim majority, a buoyant party and a range of options. By Monday, September 9th, he had lost the lot. His majority vanished with a single defection, and he lost six votes in a row in the Commons. Meanwhile, he further depleted his parliamentary strength by sacking 21 of his own colleagues, some of whom were the kind of grandees that Tory leaders usually venerate. Why? Because they had not supported him in trying to defeat an opposition bill that ruled out a 'no deal' Brexit. Why didn't they? Because many of them, even the ones who actually want to leave the EU, believe that leaving with 'no deal' would be very bad for the country—an unpredictable leap over a regulatory, legal and diplomatic 'cliff edge'.

Johnson, ironically, has always professed to agree with them. He says he doesn't want a 'no deal' Brexit either. But, and this is the crux, the EU has to believe that he is willing to leave without a deal, because this makes it more likely that Brussels will budge and give him a better deal than the one he resigned over.

That is why the backbench rebellion was such a grievous blow to him. His credibility was at stake, having promised he would get a better deal than May's, or leave without. This had been his pitch to the Tory party, and the thing which probably won him the leadership. But, but, but. He pressed this message

so hard—'we will leave on 31 October, do or die'—that his whole premiership has come to hinge on this one issue.

When he became prime minister back in July, things looked good for him. He was generally popular in the country—he has always been something of an entertainer—and many people expected a good show. Then August was strangely quiet. New proposals? No, just 'more oomph!' said the prime minister. No details. But the UK's team in Brussels was quietly, but massively, scaled down.

Johnson himself said that the chances of a 'no deal' Brexit were 'a million to one', but the absence of new proposals seemed to tell another story. What was the endgame—deal or no deal? And just as importantly, what was the strategy? Double bluff? Triple? How could Parliament, with its Remain majority, be persuaded either to tolerate a 'no deal', which it had already passed motions to forbid, or to accept anything like Theresa May's deal, which it had repeatedly rejected, and which Johnson simply did not have the time to modify in significant terms. The weakness of his position led many people to suspect that he would go for an early general election, framed as 'The People vs Parliament'.

With nothing else to write about, the British commentariat started to speculate. A popular idea was that Johnson would prorogue—shut down—Parliament, which would leave him free to do whatever he wished. This was thought to make a 'no deal' exit more likely, because many people believed that this was actually what he wanted. But, of course, Johnson's strategy prevents him from denying this. The Europeans must keep believing that he is playing the hardest of hard, hard balls.

PROROGATION IS A routine procedure over the summer months, and is the conventional way of rounding off a session of Parliament. The new session then begins with an autumn Queen's Speech, setting out the government's legislative agenda.

Wouldn't that be convenient? A legal cover for a sneaky move to avoid scrutiny and/or obstruction. But who would believe that of a British prime minister? And here is the next crux. Boris Johnson is known to have a ruthless side, which is not often seen. And one further consideration. Johnson has chosen as his chief adviser the man who masterminded the successful Vote Leave campaign—Dominic Cummings. Had Boris got the old gang together for one last big heist?

Cummings has a fearsome reputation as a member of the new tribe of data-savvy, Svengali advisers—the likes of Steve Bannon—who might be called 'institutionoclasts'. With Dominic Cummings whispering in his ear, what boundaries would Johnson fear to cross?

Under the banner of 'the will of the people', would it not be legitimate for him to push through Brexit, by whatever means necessary? To 'just get on with it', as so many people have been urging. But how wise is it to trash constitutional norms in the name of the will of the people?

Johnson has trust issues, and his opponents smelt a very pungent rat. They believed his strategy was designed to serve many more purposes than implementing the will of the people. Succeeding by force where others had failed by persuasion promised to make him the people's champion, glue him into No 10 Downing Street, secure his place in history, and, incidentally, get the Conservative Party out of a terrible mess.

But would he be so bold, so blatant?

Of course, the whole idea of prorogation was immediately pooh-poohed, by Johnson himself, and all his cabinet colleagues. So everyone relaxed. Until the day prorogation was announced.

Suddenly, all hell, as they say, broke loose. Johnson himself denied that there was any political motivation, other than the need for his new government, with its majority of one, to prepare for a Queen's Speech. And, in a piece of very fine judgement, he did not prorogue parliament till beyond the October 31st deadline, but only for about five weeks between the second week of September and the middle of October. Quite routine. Except that a routine prorogation lasts about three days.

All the ministers who had denounced the very idea of prorogation now fanned out across the nation's media chanting 'business as usual'. But many believed that this was simply a big lie, hidden in plain sight. One prominent right-wing commentator wrote a gleeful column, applauding Johnson for lying, and stealing a burger company's slogan. He was lovin' it.

Around this time, a worm must have turned somewhere. The Remainers in Parliament, spanning five political parties, had had enough. They had long been paralysed by infighting and arguments about what degree of remaining was Remainy enough, whether to have a second referendum or not, and so forth. Now the mixed whiff of grapeshot and perfidy seemed to shock them into unity.

So, in the short time they still had before the doors of Parliament were locked against them, and fearing that Johnson actively wants 'no deal', they agreed a plan, which was then successfully implemented. The opposition took control of the Commons' order paper, and introduced a bill ruling out 'no deal', effectively tying the prime minister's hands, and wrecking his strategy.

This represents the worst series of defeats for a sitting prime minister the country has ever known. And he only suffered those six defeats because he didn't resign after the second. He justified the sacking of 21 of his colleagues because he turned the vote on the 'no deal' bill into an issue of confidence. Justified in normal practice, certainly. But if a prime minister loses a vote of confidence, the normal practice is to resign, and Johnson did not.

His government fought back. With straight faces, senior Tories threatened they would talk out the bill in the Lords—thwarting the will of the elected chamber is a long-standing taboo—or might refuse to present it to the Queen for Royal Assent—a complete outrage. But they did neither, and the bill is now law.

So the prime minister has had to face humiliation over his flagship policy, mockery over his incompetence and torrents

REUTERS

Johnson has chosen as his chief adviser the man who masterminded the successful Vote Leave campaign—Dominic Cummings. Had Boris got the old gang together for one last big heist?

of condemnation over his party management and his behaviour in the Commons, where he has revived an unexpurgated version of yah-boo politics. He is probably the first First Lord of the Treasury to use four-letter words at the dispatch box that cannot be reported without asterisks in national newspapers. It's all been too much even for his brother, who has resigned from the government.

Johnson is now in a very tight corner because what he calls "the surrender bill" compels him either to get a deal at the next EU summit on October 17th-19th, or if he cannot, he must ask for a further extension of EU membership till the end of January 2020. The best counter he has come up with so far is to say that he would rather 'die in a ditch' than go to Brussels and ask for an extension, and to declare that the law is only binding on him 'in theory'.

And that snap election—the one he was going to call after securing Brexit, the one that would give him five years in Downing Street with a thumping majority? Unfortunately for him, he needs the cooperation of the leader of the opposition to get it, because under the terms of the 2011 Fixed-term Parliaments Act, a prime minister can only call an election inside the five-year term of a parliament by obtaining a two-thirds majority in the Commons.

But Johnson doesn't have the numbers. One way and another, his wafer-thin majority has turned into a mattress-thick minority, somewhere around minus 43. So he needs cooperation from across the aisle. Would it come? Jeremy Corbyn, the opposition leader, looked like he was minded to help out; he has spent every day since the last election, in which he did much better than expected, calling for another one.

But cannier heads prevailed. If Johnson is denied an election until after the October deadline, he will look like the most busted of bust flushes. Boris Johnson—the serial winner—may have to admit defeat. He could then resign, and become the shortest serving prime minister ever, or stay on as a zombie premier in a zombie Parliament. Or, horror of horrors, bring back a tweaked version of May's deal.

And why, for the first time ever, has an opposition leader refused to go for the earliest possible election? Again, this is largely Boris Johnson's own doing. He has been so tricky in the eyes of his opponents that they are reluctant to leave him the least wriggle room. If the opposition agreed to an election on, say, October 15th, this would give them, if they won, a chance to go to Brussels and negotiate their own deal. A nice prospect. But the prime minister retains a prerogative power to name the date of an election. So even if October 15th was voted through, signed in blood, and published in the streets of Ashkelon, the opposition is not reassured that Boris Johnson would not find a way of postponing it till after October 31st, and thus, at a stroke, getting back everything he currently seems to have lost. The game, it seems, is still on.

And we are still stuck. Nobody knows what is going to happen next. Everybody is accusing everybody else of undermining our democracy, whilst simultaneously advocating unprecedented, possibly unconstitutional courses of action themselves. What do you get when politicians say "we are only resorting to dirty tricks because the other lot did"? A race to the bottom is what.

People are beginning to ask what it looks like when democracy dies. If the prime minister is not bound by the law of the land, then who is? Will prime ministers in future be allowed to pick and choose the laws they obey? Partisans do not see it that way; they want to win, and winning ugly is still a win.

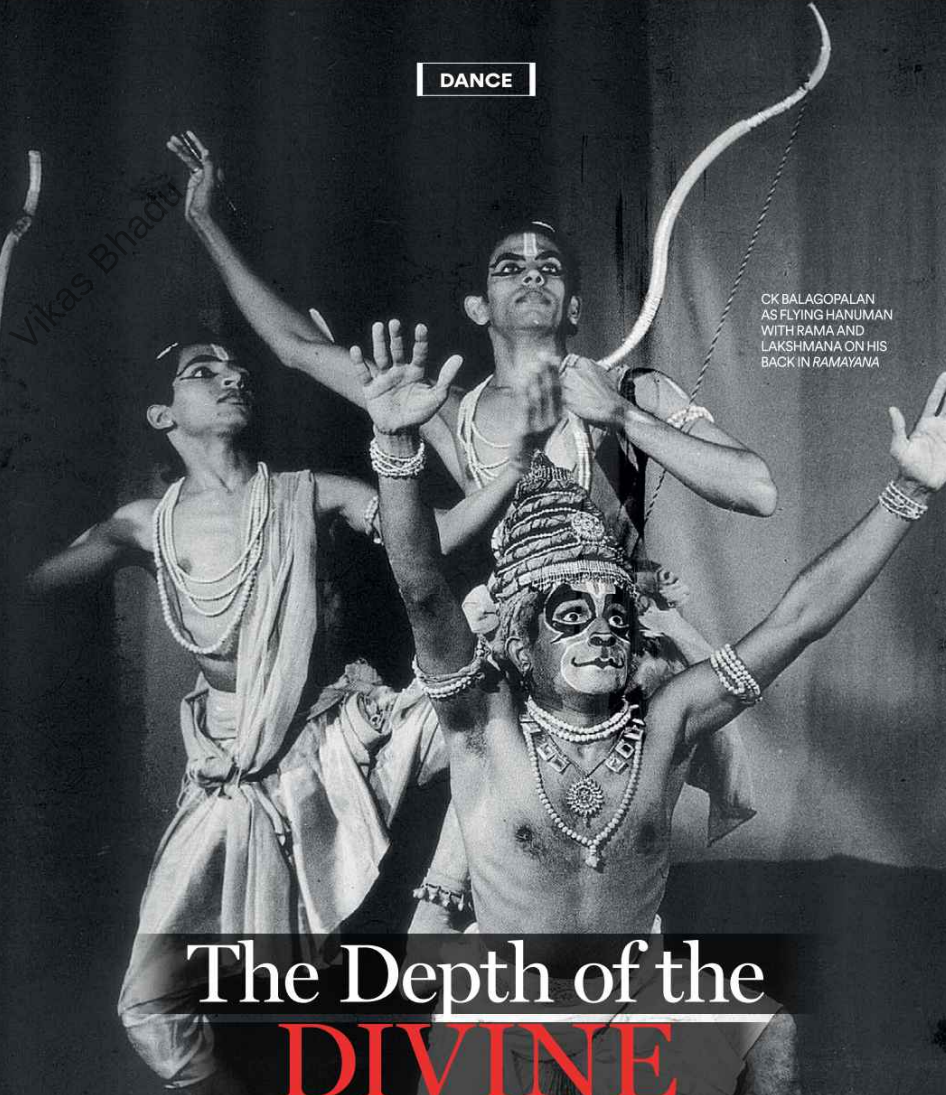
Things are going very awry when self-styled conservatives end up determined to smash institutions and conventions that have delivered generations of peace and functioning civility. This seems to be where Britain, slightly behind the US, has ended up. When conservatives throw away the guidebook of tradition, where exactly are we going? Who, then, are the revolutionaries?

Is Dominic Cummings a game-theory genius, or just a megalomaniac who has messed up, badly?

Parliament is now closed till October 14th, with no date set for an election, no deal in sight and no guarantee that the prime minister will obey the law.

Now, where's that crystal ball... ■

Roderick Matthews is the author of Jinnah vs Gandhi *and* Mountbatten and the Partition of British India



CK BALAGOPALAN AS FLYING HANUMAN WITH RAMA AND LAKSHMANA ON HIS BACK IN *RAMAYANA*

The Depth of the DIVINE

The quiet death and instinctive art of Bharatanatyam dancer CK Balagopalan (1939-2019)

By Gowri Ramnarayan

Photos C. NACHIAPPAN

ON AUGUST 25TH, 2019, a great dancer passed away at age 79 in Chennai. How many people knew what a loss it was? No, CK Balagopalan's death did not make headlines. No matter. He had made his contribution to the world. As a true artist he had fulfilled his responsibility without compromise.

A few years ago, I had done detailed video interviews of several alumni of the Kalakshetra Foundation, Chennai. Spontaneous, impulsive, oblivious to the camera, Balagopalan (Balan to friends) made a splendid raconteur, recalling his life as disciple, repertory artist and teacher at this world-renowned institution of the performing arts, founded by Rukmini Devi Arundale.

When I reminded him how, as a pig-tailed student at Kalakshetra, I used to peep through the window as he rehearsed his leading part in *Gita Govindam*, Balan smiled, and suddenly slid from chair to the floor with a single order: "Sing!" In a split second he had morphed into a kneeling Krishna begging Radha to place her tender foot on his head to cool his burning ardour.

Balan was 72 years old then, wearing an old *veshti* and a limp kurta. There was no one to watch his performance on the verandah except the cameraman, the sound technician, and a stray dog. Did he care? Why would he? For Balan was in Brindavan, sporting with his love, until the song ended, and he thudded back into the present.

Short, dark, small made, somewhat shy, with a slight squint to boot, Balan was hardly the kind of person anyone would identify as a charismatic stage artist. A writer or painter, yes. But a dancer playing larger-than-life roles as a mythic hero? However, Rukmini Devi, the guru whom he adored and worshipped, taught him a great secret; "An artist plays a character, not with his body, but with the mind."

Rukmini Devi's first impression of Balan had been most unfavourable. The child looked distracted and scatty. The village boy was in Madras only because his school master father (whose passion for the theatre had earned him the title of 'Malabar Charlie Chaplin'), entrusted his son to Chandu Panikker, the eminent Kathakali artist and resident *ashaan* (teacher) at Kalakshetra. Panikker had come talent hunting in rural Kerala, to find young male dancers for Rukmini Devi's Ramayana dance dramas. As Balan accompanied him to the big city, Panikker's friend turned up on the train and begged the guru to take his son Dhananjayan as well. That is how Balan made his friend of a lifetime.

To the boys Madras was another planet altogether. "And then I saw Rukmini Devi! She was a goddess!" Balan recalls. "As Ashaan led us in she exclaimed, 'Here comes Viswamitra with Rama and Lakshmana!'" Closer inspection changed her mind, "Send the boy with the squint back," she said. Balan got to stay only because Ashaan promised to get his eyes corrected with Kathakali exercises. Which indeed he did.

The other boy who joined by chance became the star pupil. Dhananjayan was smart, handsome, quick to learn and win approval. Balan remained slow-witted. All the lessons were so much water off a duck's back. Panikker was a brutal task master who thought beatings were good for the disciple's soul. An appalled Dhananjayan forced his friend to practise in order to prevent the thrashings. But nothing could stop Balan from playing truant. He was found hiding on top of some tree, or on the football field playing with the boys of the Besant Theosophical School next door. The boys were overjoyed to find a superb goal keeper in the wiry interloper. He broke hostel rules when he ran off to watch movies. The next day he would entrance the boys with his perfect imitations of Sivaji Ganesan and MG Ramachandran.

Balan simply didn't fit in. "After two years of wasting time, Athai (Rukmini Devi was the universal aunt on the campus) decided to send me home. But Rukmini Devi's initial vision had to come true. When she began to choreograph *Sita Swayamvaram*, first of the Ramayana series, somehow I became Lakshmana to Dhananjayan's Rama, with Ashaan as Viswamitra! Dhananjayan kept me on my toes, made sure I did enough to satisfy our teachers!" said Balan breaking into laughter.

But a new trial began. The more he saw Rukmini Devi choreograph, the more he fell in love with Bharatanatyam. Panikker was enraged by this switch in "loyalty". Balan explained, "I respect Kathakali tremendously, Ashaan was spellbinding on the stage. But Athai took my heart. I wanted to do the dance that she had taught all the wonderful teachers there—Chinna Sarada, Pushpa, Jayalakshmi, Thangamani!" However, personal hurt did not prevent Ashaan from giving the boy his ultimate accolade. "People will notice you even if you simply run across the stage."

Playing role after role, small and big, positive and negative, Balan made a dis-

Balan's Krishna was no stereotype. The enchanting trickster displayed varying colours in each production—romantic, valorous, divine, impish

CK BALAGOPALAN AS KRISHNA IN *RUKMINI KALYANAM*

covery. "The more I performed the more I learnt about life. Gradually I realised that art is not about the artist showing off his skills, but about understanding other people, good and bad, innocent and wily." Audiences were amazed by his versatility in playing contrasting characters with equal conviction—the clown (in Kalidasa's *Sakuntalam*) or the tribal warrior devoted to Siva (*Kannappar Kuravanji*). He brought a whole new dimension to the traumatised Bharata in the Ramayana series, as he begged his brother Rama to return from exile and accept the throne. "When I found Rama in the forest and embraced him, my tears were not the tears of Balan but of Bharata. Even now when I think of Bharata's selfless love my hair stands on end! I knew that only *sadhana*—not rehearsal—could help me reach that level of devotion. You see, I had to communicate the noblest feelings we humans are capable of."

Balan could also switch between apparent saintliness and hidden lust, as he pulled off a cameo of the Ravana sanyasi, demon king disguised as holy monk

But Balan could also switch back and forth between apparent saintliness and hidden lust, as he pulled off a cameo of the Ravana *sanyasi*, demon king disguised as holy monk. "I did whatever Athai wanted me to do. Small and big made no difference. Mind you, you have to really slog to make the small role work!" he would say with a chuckle.

Balan remained the Blue God in every Krishna theme—*Gita Govindam* (Sanskrit), *Rukmini Kalyanam* (Telugu), *Andal* (Tamil), *Kuchelopakhyanam* (Malayalam). His Krishna was no stereotype. The enchanting trickster displayed varying colours in each production—romantic, valorous, divine, impish.

Kalakshetra housed Sanskrit scholars who explained the myths, librettos and dance techniques in detail as part of performance training. Great musicians lived on campus and the youngsters heard them discuss story and character as they composed music for the dance dramas. But Balan's art sprang more from instinct than intellectual analysis. He had the ability to innovate on the spot, and this touch of the unpredictable endeared him to audiences.

What a Machiavellian Sakuni he made! The master gambler from the Mahabharata who strips the righteous Pandava king of kingdom, brothers and wife. How he turned each move into a taunt as he found myriad ways of throwing the dice! Balan had indeed devised a whole language of sidelong glances and sadistic gestures for this villain.

However, his best role was the one everyone thought he was most unsuited for, a character with whom he had nothing in common, physical or mental. How could Rukmini Devi make the huge blunder of casting short and slender Balan as the great and glorious Hanuman? Balan himself was aghast. But she remained adamant, reminding him once again that stature was a matter of the mind, not body. "I know you have it in you!" she assured him. Four generations of viewers know she was right. To them Balan became synonymous with Anjaneya.

Through the 30 years of playing Hanuman, Balan practised his own personal rituals of abstinence and purification. He learnt from his teachers that Hanuman had animal and divine attributes, he was unmatched as warrior and philosopher. To play such a role demanded not just *sadhana*, but surrender.

"I don't know how Athai saw a giant in me!" he mused. "All I know is that in the scene where I take *visvaroopam*, the gigantic form bestriding earth and sky, I found an electric current coursing through my whole being. My breath became fierce, potent. I didn't see my fellow artist on the stage, I saw Rama, Prince of Ayodhya, standing before me. When I discovered the abducted Sita, my grief and rage were not drama but what I felt in my pulse and blood. When I said to her, '*Pasya devi anguleeyam*, look, here's your husband's ring,' I trembled with emotions that came from who knows where. They say that Hanuman is always present when Rama's story is told. Was he present in me at that moment?"

He had his regrets—who doesn't? A major one was that Kalakshetra did not foster solo Bharatanatyam, which he loved. He saw his colleagues who left the institute gain the kind of recognition and rewards which he never did. True, critics and reviewers raved about his performance, audiences thundered approval, but Balagopalan was always identified with the institution and its dance dramas.

Nor did a brief lucrative Singapore stint work; he returned to his guru and his alma mater.

When he launched his own Balanrityalaya after retirement, it was too late to pursue that dream. With support from wife Leela and son Pranesh (who opted for hotel management) he continued to dance in Kalakshetra's productions and train students, including daughter Prithvija, a highly talented dancer.

In his twilight years, he became a mentor to many seeking students. He was always ready to attend their performances and give advice. Though everyone gave him respect, the old and young also felt he was a friend.

CK Balagopalan belonged to a generation with its own code of *satya* and *dharma*. Art must be practised and taught 'untainted' by commercial transactions. A lifetime's devotion to the guru was the disciple's duty.

That is why he swallowed his sorrow to do his guru's bidding—she told him to stay back in Delhi for the Ramayana performance when a telegram announced his mother's death. "Long years later, I got over my guilt and grief when I was with my 'mother' at her death bed. Rukmini Devi died with her head on my lap. Didn't she always say I was her son from a previous birth? After all, I owe everything to Athai, Ashaan and Anjaneya!" ■

The MEEK must PROTECT the EARTH

Four novels answer the question of justice and law

By Shylashri Shankar

Illustration by **SAURABH SINGH**

WHAT DOES JUSTICE have to do with the law? Everything, you may say, but what if we think of law as a set of rules of conduct backed by state-enforced penalties for their transgression? Then justice need not have anything to do with it. You can have laws that are considered unjust by many—think of the Nazi sterilisation law of 1933 that subjected many to involuntary sterilisation in the name of racial hygiene. Justice is a judgement of value which each of us holds about rendering to each person what he or she deserves. Conceived substantively, justice speaks to the 'correctness' of the outcome of individual cases. In the books reviewed here, the characters have different answers to the question of justice and law. But for all, rest assured, it is only a matter of time before justice catches the perp.

BIG SKY (Random House UK; 368 pages; Rs 599), Kate Atkinson's fifth instalment of the Jackson Brodie series, opens with two pretty sisters from Poland being interviewed via Skype by an Anderson Price Associates representative. They are offered positions in top hotels in London. Atkinson tells us: 'They weren't stupid, they knew about trafficking...but APA wasn't like that. They had a professional website...all kinds of testimonials.' They accept. The representative turns the screen off. Yes, you guessed right. Fake office, fake jobs. Only his Rolex was real. Right, the main plot is about human trafficking and other awful sexual abuses.

Enter Jackson Brodie, ex-military, ex-Cambridge Constabulary who has lost the fortune he got from a client and is now a private investigator in a seedy seaside village in North Yorkshire. While working on a routine case of shadowing a philandering husband, Jackson spots a girl carrying a backpack with the picture of a unicorn hitching a ride. The car drives away before he can warn her about the dangers of hitchhiking. He yells at his surly teenaged son to take a picture but the number plate is blurred. The next day Brodie finds a backpack washed up on the beach and immediately goes to the police to find out if any girls similar to the one he had seen had been reported missing. If you have a bad feeling about this one, hang on to it.

Atkinson meanwhile has had us hop into the head of another character, Vincent Ives, a telecom equipment area manager going through a divorce, who is on the green at the Belvedere Golf Club with his 'golf-friends', Tommy the rich owner of a haulage company and Andy, a travel agent who runs a failing hotel with his formidable wife Rhoda. This trio, a canny reader thinks, will have links to the main plot, as will Tommy's trophy wife (Crystal), his teenage son (Harry) and two young police detectives who are tying up the loose ends of an old case, you guessed right, human trafficking. Harry has a summer job at the local variety theatre, which puts up a third rate show with an ageing comedian (also interviewed by the young detectives with regard to the old case), and a cross-dresser who becomes friends with Harry.

We are off on a rollercoaster ride through the riveting emotional landscapes of these characters who view human trafficking from different and conflicting positions. All through, Brodie forms the common link. One of the detectives is from his past; she rescued him from drowning. Jackson rescues Vince from making a mistake. Crystal thinks someone is following her, and she hires Jackson to investigate but he doesn't do a good job. He does, however, find a link with Crystal's past.

(Clockwise from left) Elly Griffiths, Kate Atkinson, John Grisham, Olga Tokarczuk

Old secrets emerge.

Atkinson is a master at playing with the story arcs of her characters, each of whom is at a particular point in their individual life story. She makes some arcs intersect at the beginning of their stories, others converge in the middle, and for all, the arcs collide at the end and the story is resolved. Old secrets and hurts emerge and clichés involving the passiveness of the powerless are upended. Atkinson gives these characters the ability to strike back, which emerges from their strong sense of what constitutes justice.

Funnily enough, Jackson Brodie is less interesting than the other characters. By page 11 we learn that Jackson and the mother of his son are toe-to-toe in the grief stakes. By age 13, Jackson's mum was dead of cancer, his sister had been murdered and his brother had killed himself, helpfully leaving his body for Jackson to find. Phew! Julie, the actress-mother of his son who edges forward in the trauma stakes: 'Oh and don't forget Daddy's sexual abuse,' she reminds him. 'Trumps to me, I think.' Atkinson's dark humour and mockery at the detective genre's trope of piling on tragedies in the protagonist's life shines here. Her insouciance at using coincidences (Jackson sees a hitchhiker get into a predator's car) to power the narrative is part of the send-up.

By the end, we realise that for some if not all the characters, law has little connection with justice.

Highly recommended read.

HOW CAN YOU resist a voice that begins: 'I am already at an age and additionally in a state where I must always wash my feet thoroughly before bed, in the event of having to be removed by an ambulance in the Night'? Janina is an ageing but supremely quirky caretaker in remote southwest Poland straddling the Czech border. She spends her days studying astrology, translating William Blake, and looks after the summer homes of the rich Warsaw lot during the bleak winters. The title is drawn from Blake's *Proverbs of Hell* in *The Marriage of Heaven and Hell*. A snippet from Blake's book captures Janina's spirit.

'Once meek, and in a perilous path
The just man kept his course along
The vale of death.'

Janina has lost her two dogs, 'my daughters', she calls them and is prone to Ailments ('for months my eyes had never ceased to water; my tears would flow for no reason, out of the blue'). She is passionate about animals—foxes, wolves, deer—in the surrounding forests. She abhors hunting in a community where the mayor, other notables and even the priest are hunters. Not surprisingly, she is treated as the village eccentric, to be humoured but not taken seriously. Then comes the vale of death. Bodies are found in strange circumstances, starting with her neighbour whom she calls Big Foot. Nobody believes Janina's theory about a common link between the murders. To help her prove the whodunit she commandeers an unruly, free spirited and eccentric band of friends with monikers such as Oddball, Dizzy and Good News.

Janina's idiosyncratic yet deeply honourable regard for nature lingers in the mind long after. The more you chew on the ideas sparked by the book, the more satisfying the taste. Not dissimilar to a character in an earlier Jackson Brodie novel who is incensed by the heedless cruelty of man towards fox cubs. It is up to the meek to protect the earth, for them as just men and women to rage in the wilds (Blake). I will leave you to discover Janina's answer to the question: What does law have to do with justice?

Drive your Plow over the Bones of the Dead (Translated by Antonia Lloyd-Jones; Fitzcarraldo Editions; 272 pages; Rs 1,757) is a brilliant and deeply reflective ecological thriller/literary novel by Olga Tokarczuk, the winner of the 2018 Booker prize.

IN JOHN GRISHAM'S ***The Accomplice*** (Hodder; 240 pages; Rs 299) you'd think that a 13-year-old boy who can't wait for the years of school and law school to pass before he can become a lawyer wouldn't have much in common with free-spirited Janina or gloomy Jackson Brodie. But no. They all seek justice for the meek. For Theodore Boone, a child of two successful lawyers, law and justice are synonymous. He lives and breathes law. He haunts the local courts, knows the local policemen, argues cases in Animal Court where his clients are dogs and rabbits accused of shattering the peace. In short, Theodore lives an idyllic Enid Blytonish life.

JUSTICE IS A JUDGEMENT OF VALUE WHICH EACH OF US HOLDS ABOUT RENDERING TO EACH PERSON WHAT HE OR SHE DESERVES

His friend Woody is not so lucky. Woody's mother is struggling to put the pizza on the table, a dad and a step dad who have checked out of their lives, and a 16-year-old brother who is already on probation. The brother's friend embroils them in a robbery with a water pistol, which under the law is armed robbery. Theodore has to get Woody out by using his wits and his knowledge of the law. Written for children, its simple language sometimes veers into talking down rather than talking to. Nevertheless, it is a charming read.

A ***GIRL CALLED JUSTICE*** by Elly Griffiths (Quercus; 320 pages; Rs 499) is a more solid Enid Blyton's Malory Towers meets country house murder and Harry Potter. Justice Jones, the daughter of a famous barrister, homeschooled till now by her mother, begins her first term in Highbury House Boarding School for the Daughters of Gentlefolk.

'As soon as she saw the school, Justice Jones knew that it had the potential for murder.' This is in the 1930s, an era of Morse codes and 'broadsword calling danny boy' radio communications. Her taxi driver tells her that a chambermaid Mary, has died very suddenly. He hints at foul play. Justice, who fancies herself as a sleuth and has devoured the mysteries written by her late mother, gets down to finding out the truth about Mary's death. Justice receives an anonymous note asking her to come at midnight to the tower (supposedly haunted). A second murder occurs when the school is snowed in.

While tracking down the killer without becoming a casualty herself, Justice has to navigate the usual shoals of boarding school life—finding friends, dealing with snippy peers, a brusque Matron, the hearty games teacher and the mysterious and capable headmistress, and of course, the soggy grey potato-ish lunches and dinners. Add suitably icy surroundings and Morse Code and we are in a scrumptiously eerie boarding school world of midnight feasts, tuck boxes and a juicy mystery.

Griffiths, who writes the popular Ruth Galloway series for adults, shows a knack for writing for children too by treating them as peers. While Grisham's Theodore is still childish, Justice is more self aware, matter of fact and intelligent in the way she solves the mystery. I am looking forward to the next instalment. ■

BREAKING THE SILENCE

Kavita Puri chronicles the lives of migrants caught in double displacement

By Shikha Kumar

BASHIR MAAN'S HOME was in the Punjab province of British India—a village called Maan where his forefathers had lived for generations. In the weeks after Partition, Hindus and Sikhs started to flee the village, packing up their belongings into small bundles, leaving behind homes, as they were lived in. Bashir and his friends tried their best to salvage the remnants—utensils, beds, sheets—from looters and transported them to a storeroom in a nearby gurudwara.

These would help Muslim refugees trickling in from India start a new life. 'People who could not share the same land would be sharing something even more intimate: the bed and bed sheets of the other,' writes Kavita Puri in *Partition Voices: Untold British Stories* (Bloomsbury; 320 pages; Rs 499).

Today, 91-year-old Maan lives in Glasgow with his family—from a pedlar selling clothes from a suitcase after arriving in Glasgow in 1953, he went on to become a member of the Scottish Labour Party. On the wall of his study hangs an Order of the British Empire, from the queen, for his work in public life in Glasgow. Maan's story is one of the many that Puri has chronicled in her seminal book based on South Asians who migrated to Britain after Partition.

The book is an extension of her BBC Radio 4 series—Partition Voices—in 2017 that documented these stories around the 70th anniversary of Independence. The BBC journalist embarked on the project after hearing her late father's account of what he had witnessed as a 12-year-old, as his family fled Lahore for Moga in Punjab. He immigrated to England in 1959, but didn't speak about his experiences until a few years ago.

"Many people like him kept their silence, it was a survival mechanism of sorts. Life was pretty hard here in the '50s and '60s—their generation was fighting to be accepted in this country, for equal pay and against racism. Some of them may have been doing jobs that were slightly beneath them, so they

also had to fight for promotions. If you thought about what you had left behind, how were you going to progress? There wasn't time to dwell on the past," says Puri, speaking on the phone from London.

The wider institutional silence about the Partition and the Empire in Britain—it's not even taught in schools, Puri adds—meant there was no platform for them to air their stories. With the 70th anniversary though, the narrative began to tilt. The generation that had survived the catastrophic events was now elderly and wanted to talk about it, have their stories recorded. Their children and grandchildren too wanted to know their history—being second and third generation immigrants, their understanding of identity (in Britain) was complex.

The book is structured in three parts—End of Empire, Partition, and Legacy. End of Empire also includes British colonial accounts like those of Pamela Dowley-Wise and Kenneth Miln, both of whom were born during the reign of the East India Company.

In the introduction to *Partition Voices*, explaining how the division was broadly across religious lines, Puri delves into how the border was imagined throwing aside practical, physical realities. 'The new border crossed agricultural land, cut off communities from their sacred pilgrimage sites, paid no heed to railway lines, and separated industrial plants from the agricultural lands where raw materials such as jute were grown,' she writes.

"It was so ill-thought through and rushed. How can you divide a nation in 10 weeks? And the Partition line was announced two days later, on August 17. People remember literally sitting around the one wireless the village had, or waiting for a newspaper to get delivered or word-of-mouth on whether their village was in India or Pakistan. They had suitcases ready in the eventuality that they would have to leave," she says, adding, "It was the same for my dad in Moga. They had packed a bag and were ready to leave, but didn't have to. It's impossible to conceive that kind of situation."

"This is a British national story. If you don't understand Empire and how it ended, you can't understand migration to Britain, why it looks the way it does today and why there are so many South Asians in this country"

KAVITA PURI author

Puri says that though their experiences were vastly different, she wanted to showcase how the histories of the British and the Indian subcontinent were intertwined. "Because I was doing it from a British perspective, it was important to me that the wider public in Britain today realise what it was like... many young people don't know that the British ran India."

In addition, people who were forced to cross the border didn't realise that the move would be permanent. Khurshid Sultana, one of the interviewees, recounts how her maternal grandmother buried all their jewellery in the ground thinking she would be back. "They thought they would be back in a few weeks so they didn't take that much stuff with them. Many handed their keys to their neighbours. What's heartbreaking is you speak to these elderly people and they say 'I never got to say goodbye to my best friend, and we could never get in touch. I want to go back, I want to see if he's still alive.' It's so sad, and these things never leave you, even when you're 85 years old."

Puri writes that the numbers killed in Partition violence will never be known, ranging between two lakh and two million, depending on the source. Gurbakhsh Garcha, an interviewee, remembers weeding in the fields near the railway lines and how the groundnut crop grew lush in random patches. It had been fertilised by the bodies of those who had died on the journey. The collateral damage, says Puri, was staggering. "It was the largest migration outside war and famine. The numbers are so huge, the events so cataclysmic that you can be blinded by that. But only when you drill down on the stories, all epic in their own way, that you realise how utterly life-changing it was."

Puri references Urvashi Butalia's *The Other Side of Silence* in the book while delving into the violence meted out to women during the period. When she was looking for interviewees, an overwhelming majority who volunteered were men. With women's bodies becoming the battlegrounds for settling religious scores, many of the voices were consequently lost, shrouded in shame and loss of honour.

"We never spoke to anyone who had been raped or abducted. I think these stories will never emerge in Britain now. The women we did speak to told of their visceral fear of sexual violence and of rape committed against friends. A female interviewee spoke about how her grandmother stood up to the males and refused to allow the women to be killed in the name of honour. To me, this was an unexpected story of empowerment," she says.

The stories of the women do emerge in accounts of the male interviewees, many gave eye-witness testimony of abductions and bodily mutilations. Iftkahr Ahmed, who's retelling is particularly distressing, recounts how

young women were picked up by Hindu men, and he had no option but to walk on by as to protest meant certain death. "To this day he still remembers the cries of the parents. People felt impotent to act," says Puri.

The hardest stories to tell were of the ones who had witnessed the violence first-hand, or were inadvertently party to it. Fifteen-year-old Swaran Singh, as the eldest son in the family, was chosen for a revenge attack by elderly Sikh members. While he didn't harm anyone, he had to hand over his sword to an adult, and watch a Muslim man being killed. The sword was then wiped and handed back to him—the day of killing has never left him. Puri adds that Khurshid's fear as a woman travelling by herself in the train's ladies' compartment is still palpable today.

"None of these people had any kind of post-traumatic counselling. The incidents affected them all in very different ways, and just like WWI soldiers, they had to deal with it all on their own. And often in their heads as they weren't talking to even family members about it."

"In my village we were like a big family, whether they are Hindu, Sikh... And then suddenly they become like animals. It is something very, very unusual. You can't think of these things"

KHURSHID SULTANA, born in 1932, Gurdaspur, and came to Britain in 1961

PURI SAYS BEING sensitive to the interviewees was a prime concern. She met them in their homes, with family members around so they felt safe. It was Karam Singh Hamdard's story that left her feeling the most unsettled. The octogenarian was attacked with a poisoned spear in his arm—the scar is a permanent reminder of the day.

While his father was killed by a Muslim mob, his sister was saved by their Muslim neighbours. "He still can't reconcile those two things today. No one thought it would descend into this bloodbath," she says, adding that she still thinks about him for how upset he was while narrating the story. "Often I would say in the middle of the interview, 'let's stop now' but he would say no. He wanted to it to be heard and recorded. They'd never seen their story in that kind of big way before, and only later did they realise they'd lived through a monumental period in history."

During the Partition, refugees left with the bare minimum—even if they did take something to remind them of home, it was lost on the way. Some of the interviewees have visited their homeland in the years since and picked up little mementos. Mohindra Dhall got a brick from his childhood home in Lyallpur (now Faisalabad), and it now sits in a glass case in his Edinburgh living room. Another interviewee, Raj Daswani, has stones from Karachi in his study—he kisses them and says they make him feel like he's still connected to his soil. "These mementos represent so much and it's touching to see them talk about it, a reminder that the land was theirs too."

Puri believes that it's impossible to grasp the make-up of contemporary Britain without understanding its colonial past. She writes that the double displacement South Asians went through has been passed down the generations—the obsession with owning property, getting the best marks at school, becoming a doctor, can be traced back to that feeling of insecurity.

"When you realise that things can turn so quickly, like it did for my father's generation, it makes you more mindful, and not complacent about your place. This is a British national story, even if it's not been framed that way. If you don't understand Empire and how it ended, you can't understand migration to Britain, why it looks the way it does today and why there are so many South Asians in this country," says Puri.

Most importantly, the refugees' memories and stories of living in undivided India are a way to ensure that future generations can't deny that different religious groups had been living peacefully together for centuries. "Their generation is the last people that can say 'I was a Hindu living in Lahore', or 'I was a Muslim living in Amritsar.' That is now pretty much relegated to the history books. When Gurbakhsh's uncle's mother, a Sikh, died prematurely, her Muslim best friend breastfed his uncle. What can be more intimate than that? That is another side of history that needs to be told," she says, adding, "And that's what left me hopeful at the end. They don't want just the stories of violence to get passed down. In Britain, in India, in Pakistan, we must listen to these testimonies. They are telling us something important and powerful." ■

The Radical Classicist

YG Srimati broke boundaries while remaining rooted to the ancient traditions of the subcontinent

By Somak Ghoshal

THE HISTORY OF Indian art in the early decades of the twentieth century seems peculiarly reticent about the role played in it by women artists, though those years of ferment affected the entire art world in the subcontinent. Independence from the British brought in its wake a sense of freedom from stifling colonial traditions of art-making—or, at least, an aspiration to break away from the fetters imposed by the fusty syllabus taught in colleges across India.

Art historian and administrator EB Havell, for instance, who acted as the principal of the Government College of Art in Calcutta between 1896 and 1905, believed in looking back to India's past to create a distinctly Indian vocabulary in art. However, with the dawn of independence, the idea of what constituted a fitting subject for art altered dramatically. The Progressive Artists' Group, an all-boys' club that came into being in Bombay in 1947, began to rebel against the academic niceties of colonial art education by forging a language that was risqué and often abrasive.

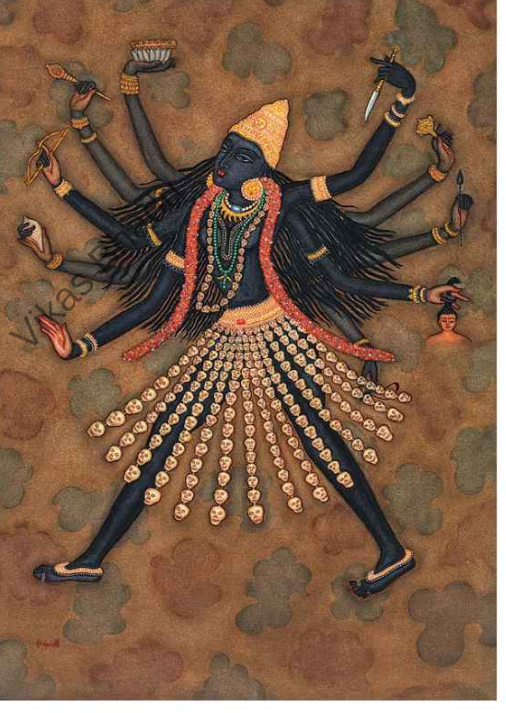
The neoclassical elegance of the Bengal School of Art, whose pedagogical and aesthetic standards were set by the likes of Abanindranath Tagore, was suddenly subverted by MF Husain, SH Raza, FN Souza, and VS Gaitonde, among others. These wild young men began to paint images that were strikingly erotic, even outrageous in their sexual openness and depiction of the body. Influenced by the trends unleashed by European high modernism, particularly by Pablo Picasso and other cubists, Indian artists, for the first time, dared disturb the universe of figurative realism. They decided to break out of the mould that had been hitherto set by classical notions of beauty and propriety as embodied, for example, in the murals on the Ajanta and Ellora caves.

Among the women, it was Amrita Sher-Gil (1913-41) who became a trailblazer, in spite of her tragically brief life. In her portraits, especially of women, Sher-Gil captured a dark interiority and a melancholic truth that seemed elusive, even unyielding at times. In contrast to the smouldering charge of Sher-Gil's paintings and her intransigent genius, some of her younger contemporaries like YG Srimati (1926-2007) remained faithful to an idiom which, even at the beginning of her career, seemed to have already become deeply unfashionable, if not commercially obsolete. If artists like Sher-Gil boldly defied norms by looking west for inspiration, Srimati remained affixed to her eastern roots—absorbed in the profusion of mythologies, histories, and folk tales from the subcontinent—with as much steadfastness and courage of conviction.

Born in Mysore, Srimati spent her formative years in Madras, where she came under the influence of MK Gandhi. In 1946, at the height of the freedom struggle, she would sing devotional songs at Gandhi's assemblies. Later in life, she moved to New York, where she worked as a performing artist almost till the end of her days. A painter who was an equally gifted vocalist, veena player and dancer, Srimati is nearly forgotten now, though some of her prized musical instruments and paintings remain in the holdings of the Metropolitan Museum of Art in New York. Since her death, there has been a revival of interest in her legacy, leading to public exhibitions in the US as well as scholarly studies, such as the recent book, *Art and Independence: Y.G. Srimati and the Indian Style*, by John Guy (Mapin; Rs1,750; 144 pages).

Srimati's painterly output cannot be adequately appreciated without understanding its links with the other arts she was skilled at—classical dance and music. In the 1940s, when she was emerging as a painter, choreographers like Ram Gopal and Uday Shankar were putting India on the global cultural map, taking Europe and the US by storm. Trained by her brother YG Doraisami, Srimati internalised the rhythms of dance and music in her paintings. Her figures, many of whom are drawn from the Ramayana and the Mahabharata, are noted for the precision of their forms, the exactitude with which their gestures are rendered, and the detailing of their facial expressions.

Parashurama with the Battle Axe, painted in 1946, shows the formidable mendicant with his face contorted with rage, roaming around with his vow to wipe out the kshatriyas, the warrior castes, to punish them for neglecting their duties as kings. From Parashurama's imperious frown to his curling fingers and toes, Srimati pays close attention to the body language of her subject. No less evocative is her depiction of Princess Yashodhara and Rahul, the wife and son respectively of Prince Siddhartha, looking out of their palace to greet the prodigal ruler, as he returns after becoming Gautama Buddha. From the lithe contours of their bodies to the delicate placement of their hands to the hint of a smile playing upon their lips, mother and son seem to have descended from the ancient mural paintings of the Ajanta caves, traversing thousands of years to arrive in the twentieth century.



Mahakali (left); YG Srimati

SRIMATI'S RADICALISM WAS MANIFESTED NOT IN FOLLOWING THE LEAD OF THE MODERNISTS, BUT BY REJECTING THE TRAPPINGS OF AVANT-GARDE EXPERIMENTATION

The appeal of Srimati's paintings, with their unapologetic focus on decorative beauty, on the lay viewer is not hard to perceive. But to connoisseurs and those in the business of art, her subjects and style of rendition often smacked of old-school orientalism. By the time Srimati began to publicly exhibit her work in the 1940s, modernism in India had already made gallant strides, riding on the polemics expounded by Sher-Gil and the Progressives. Jamini Roy (1887-1972), one of the last greats in the illustrious line from the Bengal School, remained the most remarkable exception among the modernists. With his spindly-eyed characters, drawn from myths and folklore, he crafted an idiom that was at once commercially viable and critically acclaimed.

Some of Roy's contemporaries, such as Abdur Rahman Chughtai (1894-1975) and Ram Gopal Vijayvargiya (1905-2003), were also noted for their adaptation of Mughal miniatures, Pahari styles and Rajasthani paintings into idioms that were suited to the twentieth century. Srimati, in contrast, steered away from the market forces, painting mostly for her own sake. Her abiding interest in spirituality and the scriptures became the fodder for her art, her radicalism was manifested not in following the lead of the modernists, but by rejecting the trappings of avant-garde experimentation.

It is no surprise that Srimati did some of her most memorable work on commission, based on subjects that suited her interests and temperament. In the 1960s, for instance, she worked on a set of 15 paintings for a special edition of the Bhagavad Gita. Even as she stayed faithful to the theme, Srimati took leaps with the execution, drawing on the exuberance of different schools of miniature painting. Although water colour was her chosen medium throughout her life, she managed to tease out remarkable depth and definition from the relatively flat texture of the paint. A classic example of her success in this format is her study of *Vishvarupa*, which describes the cosmology of Vishnu-Krishna, included in the Bhagavad Gita series. The original painting was so captivating that Indologist and curator Stella Kramrisch, Srimati's friend, wanted to buy it off her, but the artist refused to part with it.

In the 1980s, Srimati painted some of the luminaries of the Hindu pantheon—*Mahakali*, the force of destruction, for instance—as well as a series of miniatures as homage to the classical ragas. However, one of her most adventurous portraits, based on the former theme, was Saraswati, the goddess of learning and music, going back to 1947-48. The four-armed deity, in this soft water colour, is pictured against a backdrop of dusky clouds, playing the veena. Her bare breasts are exposed, while her arms are bedecked with jewels. Years before Husain incited the ire of the Hindu nationalists for painting the goddess in the nude, here was an upper-caste Hindu woman making an image as incendiary as his, though following on cues from temple carvings and murals that went back centuries. ■

RAJEEV MASAND

Star Trading

In a move that has surprised film *walas*, the usually non-controversial **Kareena Kapoor** has ended the services of super-agent **Reshma Shetty** and her agency Matrix, which had been handling her work for 13 years now. Kareena has reportedly jumped ship to rival agency Kwan, a move believed to have been engineered by her former manager (and ex-Matrix employee) **Poonam Malhotra Damania** just weeks after the latter had a falling out with Shetty, leading to her exit from Matrix.

Story goes that Kareena contacted Shetty last week saying she wanted to discuss "important matters". Shetty, who was travelling then, sensed trouble, but asked Kareena to allow her to return to Mumbai so they could meet and talk. But, sources say, days after their exchange Shetty learnt Kareena had already signed up with Kwan. Not one to lose an opportunity to rub a rival's face in the mud, Kwan quickly put out a statement announcing they would be representing the actress hereon. Insiders say Kwan and Kareena's former manager Poonam had already been in talks about a potential job, before the latter's exit from Matrix. But once she was out, the conversation got more serious. The rival agency apparently offered a sweet role to Poonam only if she could poach the actress from Shetty.

Some in Bollywood have been quick to point fingers. Shetty's camp was accused of leaking the details of former client **Salman Khan**'s unprofessional behaviour with **Sanjay Leela Bhansali** recently, which led to the shelving of their film *Inshallah*. Shetty's camp has denied the rumours. She has also been accused of instigating her current star client **Akshay Kumar** to quickly claim the Eid 2020 release date for his next film after *Inshallah* was called off. But Salman, never pleased at being upstaged, has announced he will have a release during Eid next year—even if there is no clarity yet on what film he could rush into production to meet that deadline.

Aamir's U-Turn

Aamir Khan's announcement earlier this week that he was returning to the **Gulshan Kumar** biopic *Mogul* he abandoned last year has created ripples—especially on social media. The actor was set to produce and star in a film based on the life of the slain music baron, but he publicly distanced himself from the project after he learnt the film's writer-director **Subhash Kapoor** had been accused of sexual misconduct some years ago and after those allegations resurfaced in the wake of the MeToo movement last year.

Now the actor has said that, following a recommendation from the Indian Film and Television Directors Association asking him not to deny Kapoor a right to work unless he was declared guilty by a court of law, he is compelled to take a relook at the case. Aamir has said his wife **Kiran Rao** and he were also satisfied—after reaching out to several women who had worked with Kapoor in various capacities—that the director deserved the benefit of the doubt. He told *Hindustan Times* he felt especially guilty that Kapoor had lost out on other projects too after he dropped out of *Mogul* without any judgment in the matter.

While several in Bollywood have applauded Aamir's decision to not "boycott" Kapoor based on "unverified accusations and in the absence of a court verdict", there have been some brickbats on social media especially from women's groups who expressed disappointment that Aamir's stand takes the MeToo movement back by a few steps.

Carping about Love

A clutch of catty, cynical Bollywood *walas* can't even summon up enthusiasm for those that seem to have found love. Earlier this week, two young *filmis* made their relationship public through a social media exchange, and while many expressed their wishes to the couple, a camp comprising insiders exchanged WhatsApp messages insisting the actress is merely using this relationship as a foil to distract attention from the married man (now separated) whom she's been reportedly carrying on with for some time—and, they insist, she's still very much with him.

Oh, to be one of those who can't find it within them to believe in love. Sad. ■