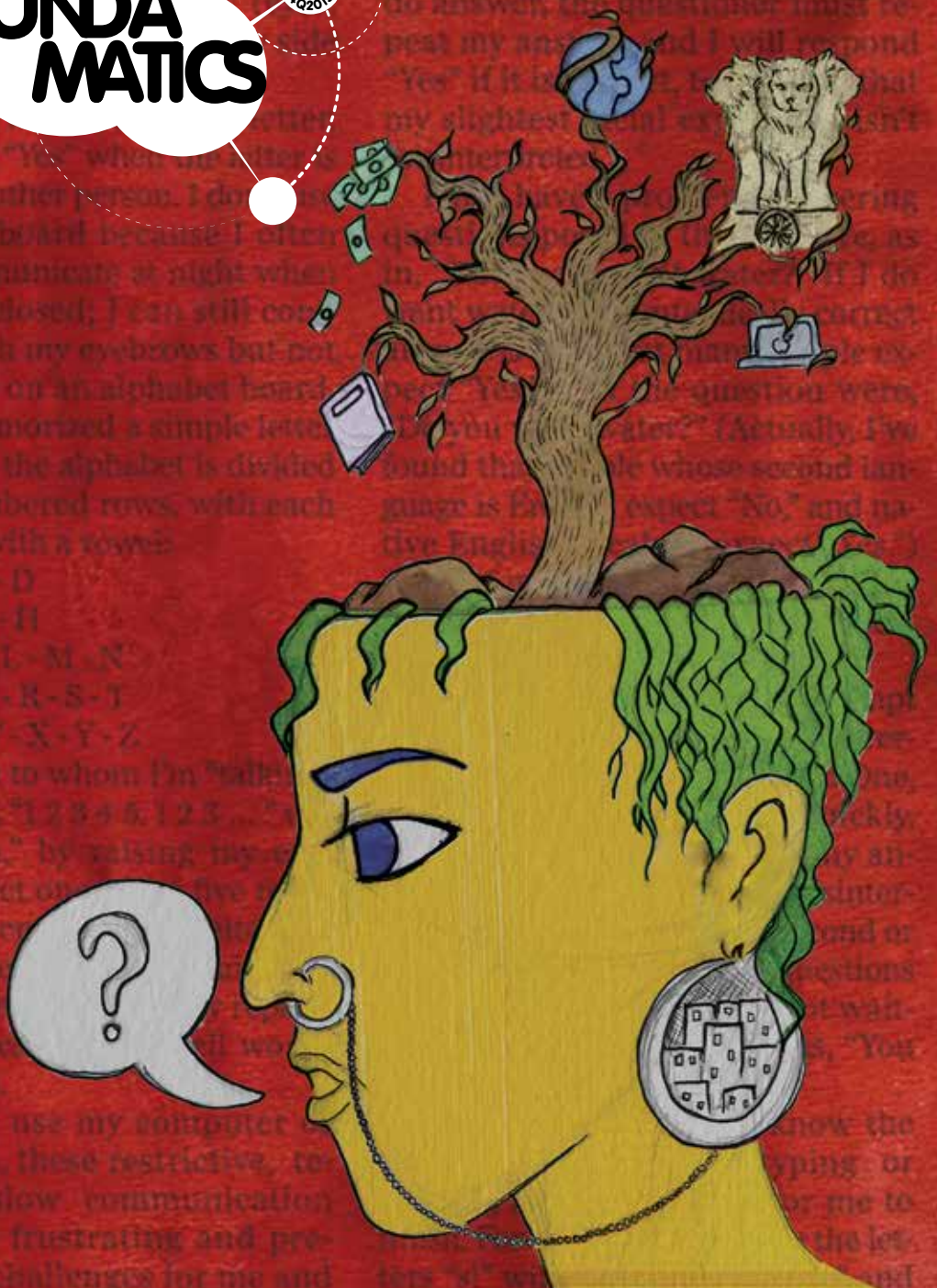


# FUNDA MATICS

1Q2015



...but there are times when my computer is inaccessible—for instance, when I wake in the morning, when I am in a hospital or when the computer inevitably crashes.

Without my computer, I cannot use facial expressions to communicate. I cannot raise my eyebrows, I cannot smile, I cannot open my mouth or move my lips (I have a hearing aid).

I can speak, but only if someone speaks to me first. I can answer questions by answering "Yes" or "No" or by pointing to an alphabet board because I cannot hear.

I need to communicate at night when my eyes are closed; I can still communicate with my eyebrows but not with my gaze on an alphabet board. Instead, I memorized a simple letter grid in which the alphabet is divided into five numbered rows, with each row starting with a rower:

- 1-A-B-C-D
- 2-E-F-G-H
- 3-I-J-K-L-M-N
- 4-O-P-Q-R-S-T
- 5-U-V-W-X-Y-Z

The person to whom I'm talking slowly counts, "1 2 3 4 5, 1 2 3..." and I say "Yes" by raising my eyebrows, to select one of the five rows.

The person then asks me which row I select, and I raise my eyebrows to answer. Using this procedure, I can understand and sign sentences.

Whether I use my computer or my eyebrows, these restrictive, tedious and slow communication methods are frustrating and present unique challenges for me and

only answer questions to which "Yes" and "No" are the only possible answers. I can't answer multiple choice questions. "Do you want water?" is good. "Do you want food or water or anything else?" will be answered with my expressionless face. When I do answer, the questioner must repeat my answer and I will respond "Yes" if it is what I want.

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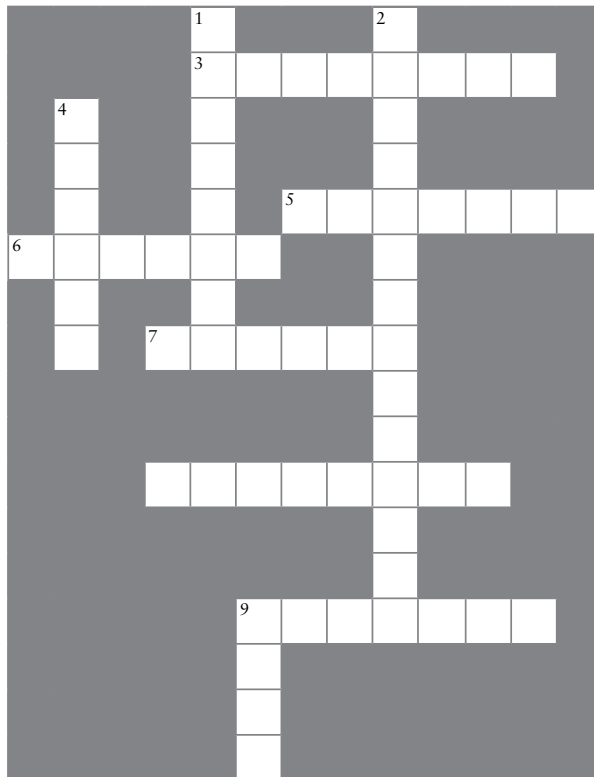
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The following Education themed crossword was conceptualized by alumnus Nitin Bhat (PhD, 2008, Chem Engg., H1).

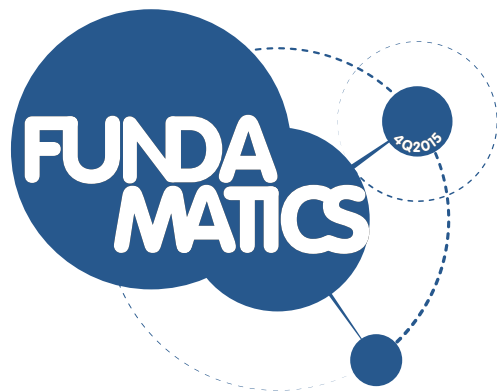


**Across**

- 3 Premier Institutes enjoy this (8)
- 5 This is a major concern with educational factories (7)
- 6 IITs and NITs come under this category (6)
- 7 Average class size in public schools is \_\_\_\_ (6)
- 8 This pattern is usually followed in Engineering Institutes (8)
- 9 Of late \_\_\_\_ has become a relative term (7)

**Down**

- 1 "Modern" SARATHI spearheading controversies (8)
- 2 Many private and newly come up Govt. Institutes lack this (14)
- 4 An episode associated with PhD (6)
- 9 Revision of this is a major challenge in Govt. Institutes (4)

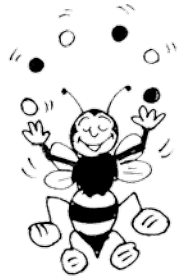


Quarterly magazine of  
The IIT Bombay Alumni Association

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# From the Beehive

There is certain serendipity in writing an editorial on an education themed issue of Fundamatics on the eve of the 70<sup>th</sup> anniversary of India's Independence. All the issues that we sought to escape from with the founding of the Indian state in 1947 are, bafflingly enough, still in place. The nationalities problem, as represented most starkly in Kashmir and Manipur; the native Hindu vs. the alien Muslim problem in other parts; the uncertain fate of our underclasses; all of it persists. So one is forced to ask, how fragile – if not failed a state are we?

Let us focus on just the third element, the uncertain fate of India's teeming poor in the context of education and then ask ourselves the question: have we done enough to realize the promises in the constitution? We have more than 96% enrollment in schools at the primary level and there about 1.86 crore students enrolled in various streams of higher education and yet there has been no major shift in our productivity. There are serious concerns regarding the employability of India's so called educated millions.

Nothing in India is without the extremes of complexity and education has more of its share than others.

To me the problem seems to be 3 fold – delivery, cost and content. By 2016, approximately 50 per cent of India's total population will be in the age group of 15–25 years. How do we provide access to quality education at

affordable costs to half a billion people so that this demographic dividend, as Parag Saxena points out in his interview, does not become a demographic disaster?

Rote learning still plagues our system, students study to score marks, to crack exams like IIT JEE, AIIMS or CLAT. Our colonial masters introduced education systems in India to create clerks and civil servants, and we have not deviated much from that pattern till today. If once youngsters prepared en masse for civil services and bank officers' exams, they now prepare to become engineers. As far as content is concerned, year after year our students focus on cramming information without realising that there is a difference between the *concept of information* and the *concept of comprehension and application*.

Our system rewards the best crammers. We may have the most number of engineering graduates in the world, but barring the IITs, this has not translated into a resurgence of technological innovation. Memorising is no learning; the biggest flaw in our education system is perhaps that it *incentivises memorising above originality*.

There are other worrying signs ahead. Our institutions of higher education are also ideological apparatus. The changes at the top of cultural and historical bodies like the Film and Television Institute of India and the Indian Council for Historical Research, unprecedented unrest across universities





across India in the past year, the most noted being the unrest in JNU, are all worrying signs towards the state's efforts at implementing a certain agenda which may exclude rather than include citizens.

For those who doubt this premise, consider this for a moment. In Modi's India, science grants are being cut and research and development grants are at an all time low, funding of the IITs have also been cut down. So science too is a part of this above mentioned agenda.

The articles across this issue will represent different aspects/viewpoints on all the issues cited above and I am sure it will leave you with food for thought.

But on ending I want to leave you with this thought. It is a fallacy to expect that education has a causal emancipatory and empowering effect. It is what we make with the education that we receive that really makes the difference.

With the rising cost of education (take the 100% fee hike in the IITs), more and more students will now sit across a classroom and look to wring the maximum value out of their investment. And not just they but their families will connect it to their placements in the job market and the packages that they draw. So far as purpose of education is concerned this is a wholly utilitarian approach and the rebirth Macaulay's India in a new guise.

The higher purpose of education as pursuit of knowledge, that knowledge itself is and can be a goal in itself, will somehow be lost forever. You may consider me an idealist and a romantic but you will agree that we Indians must do everything that we can so that the next 70 years of India tell a different, better story.

*Queenbee*



## Cultivating Liberal Arts: An Essential Colour for the Education Rainbow



*Discussion on the issue of education in India typically gets partitioned into either the issue of primary education or higher education, and most of the attempts at out-of-the-box thinking on education seem overly focused on the 'box' itself. In other words, the problem of delivery. How do we deliver high quality education to the millions of young Indians in a timely and meaningful fashion? Without discounting the enormity of the delivery issue, in this article we approach the education issue from a different angle by focusing what is within the box— in other words the content of Indian education. Parag Saxena, Distinguished Alumnus of IIT Bombay, Founding General Partner and CEO of New Silk Route Partners who also co-founded Vedanta Capital LLC, in 2006. Parag has been a member of the Foreign Direct Investment task force for the Prime Minister of India and during his last sojourn to India, the Fundamentals team discovered that Parag holds the issue of Indian education very close to his heart. Bumblebee got him to share his thoughts on what he feels is the need of the hour for Indian education and the content required to make Indian education and the institutions that deliver it more relevant.*

**B**y 2016, approximately 50 per cent of the total population is expected to be in the 15-25 years age group, and in the next 15 years a vast population will enter the working age group. To ensure that the young

Indians are productive members contributing to the increase in productive activities in India, it is but obvious that to address the tremendous rise in the number of employable workforce in the job market in the coming decade, India needs to make a massive, commensurate investment in education today.

The major challenge before Indian education is how to harness itself so that our advantageous demographic dividend does not end up being a demographic disaster.

## **This may have made it easier for us to ignore the study of humanities, but to neglect humanities is to lose sight of the long-term value of practitioners of liberal arts and the liberal arts institutions.**



India needs to expand the number of higher education institutions both at the graduate and post-graduate level. While a lot has been done at this level (there are about 26,478 institutions providing higher education in India which is one of the largest numbers in the world) both for the IITs and otherwise, a lot more needs to be done in terms of improvement of the infrastructure available within these institutions and recruitment of the right human capital necessary to deliver high quality education.

### *The Perils of Neglecting Liberal Arts Education*

A worrying trend that I have noticed in recent years is that as a nation, we are not doing enough to expand the number of institutions teaching liberal arts. This may be due to the fact that historically the demand for students from the Science, Technology, Engineering and Mathematics (STEM) disciplines have been higher. This may have made it easier for us to

ignore the study of humanities, but to neglect humanities is to lose sight of the long-term value of practitioners of liberal arts and the liberal arts institutions.

Even though India does have many excellent Universities that teach Humanities, not enough has been done to improve capacities and enable their expansion. The number of higher education institutions that teach liberal arts has not increased nor have they increased the number of students.

I also think that dropping the language requirement from the entrance exam of engineering colleges like the IITs was a mistake. The language need not have been English and we could have had aptitude testing of different regional languages specific to different states of India. But the communication abilities that language as a subject of study represents is a crucial aspect of professional life which we ignore at our own peril.

Quality of humanities teaching at technical engineering institutions is also another lacuna. The humanities classes in the engineering colleges are of varying quality depending on the institution. We need to critically look at what we are teaching people apart from physics, chemistry, maths and their upward rising derivatives and my feeling is that a lot more needs to be done in that area.

### *Importance of Skill Education*

To me it seems that the model that we have veered towards is the US model – K-12 education, college graduate degree followed by an advanced degree (PhD). I don't think that this is a good model for much of the world. Even the US today is realising that it is not a good model for them. A better model exists in Europe, specifically in Germany, of training people indifferent skill subsets.

We all realise that there is great need for skilling in India. We have the IIT, but can we increase their numbers while ensuring the quality of instruction remains top order?

Should we not have more and more people who are persuaded to enter skill-based professions? But it is important to understand that this would require a major cultural shift in the Indian psyche and this is bound to take time.

Let me illustrate my point with an example of skiing in USA as opposed to Europe and the differences that may be observed while skiing in both areas. If you went skiing in USA, say in Colorado, it is an elite and expensive affair and chances are that the person sitting

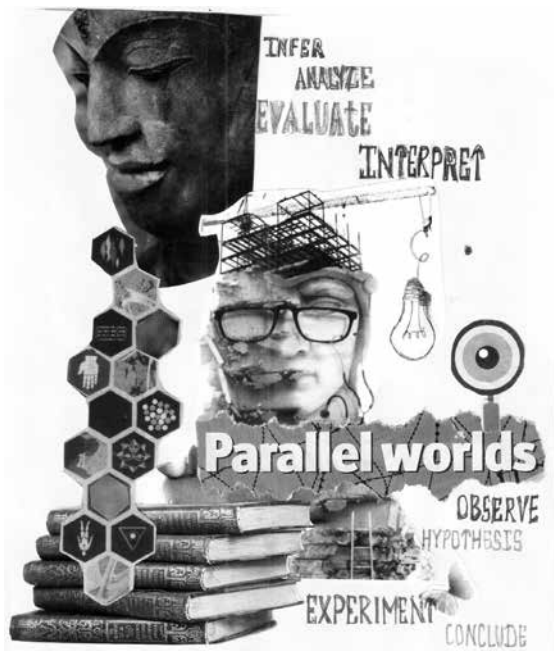
**For instance, if you stay in some of India's best hotels, their service is at par with global standards. There is a fair amount of training of their personnel which adheres to global benchmarks. There is no reason why this cannot be replicated elsewhere.**



next to you in the ski lift is likely to be someone just like yourself, someone working in a large metropolitan area, maybe in the financial business, a wealthy entrepreneur or something similar. Contrast this with the experience of skiing in Europe where the sitting next to you might easily be a plumber or a mechanic, and if you ask him about his profession you will find that he is very proud of what he is doing. He might say that I work for Daimler Benz and my name goes out on every car that I help build.

In Europe they have evolved a cultural mechanism of recognition for the humblest tasks. It builds a culture of pride for a job well done irrespective of what it is.

This is quite unlike what we have in India where historically we have never had something similar. Take the Ellora caves or the cave paintings of Ajanta, you will not know or



find the names of the artisans, craftsmen or architects who built these magnificent edifices. By a similar token, in the modern context we do not know the names of our mechanics who build our cars or elevators. We have not built pride in this kind of skilled work into our system and it is this cultural aspect that needs change.

To return to the subject at hand, it is important to assess the areas where the maximum number of jobs are needed and then focus on the issue of how we can supply that workforce. Typically in India, most people look at government certification sceptically except in from a handful of institutions. Trained apprentices can prove equally valuable. But the key challenge is to focus on how to find employment for them and also how to imbue their profession with dignity.

The problem to be alleviated is that we are not training enough people in the right skill sets nor is there post-graduate practical skill-based training of working in specific domains. Also can we solve this problem of skilling by

training them at an earlier stage?

To start with, can we get the top ten recruiters in each major domain to combine and come up with a global standard of excellence which skilling institutions that impart training can emulate and aspire to?

For instance, if you stay in some of India's best hotels, their service is at par with global standards. There is a fair amount of training of their personnel which adheres to global benchmarks. There is no reason why this

**In Europe they have evolved a cultural mechanism of recognition for the humblest tasks. It builds a culture of pride for a job well done irrespective of what it is.**



cannot be replicated elsewhere.

The issue is how we create high quality institutions that will train people with the right content so they are ready for employment as soon as they graduate.

Take the IITs for example, and if you compare them to how they were before with what they are like now you will notice that the students are far more practically equipped for the job market today. Even the students have a more practical bent of how they approach their education. The issue for us is how to expand this at every level?

Today technical training colleges in the US have focused on communication skills and imparting a high level of skilled training so that students are immediately employable, be it at a factory or service business or in some other area. We do not have enough numbers of such high quality institutions in India.

India needs more productive people in the workforce and that too at earlier stages, so that people who are coming out of educational and skilling institutions are immediately employable and can become productive in a

very short period of time.

if we segment the education conundrum, three distinct strands emerge that need to be addressed multilaterally.

1. At the high level, we are not increasing the number of liberal arts institutions or the number of graduates from existing institutions at a pace that is required today.
2. How do we impart a more practical orientation to the education imparted at our engineering and technical training institutions across the country?
3. People should also have the option of being skilled at a trade that is immediately useful to them for employment purposes.

We need to recognise that these are three very different strands, but we need to make strides in all of them. Take the analogy of the rainbow here; it is all seven colours together that make a rainbow beautiful. If the rainbow was just one colour, even if it was your favourite, it would not be as pretty. The three strands I mention are the key colours that would make the Indian education rainbow complete. ■



# IIT Fee Hike

**Dinesh Mohan**



Dear Xxxx,

As it is, 'good' education in India is reserved for rich parents' kids - kindergarten upward. It is a policy to make sure that the relatively stupid offspring of better off parents corner the better paying jobs in the country.

International experience suggests that the lower middle class and poor sections of society do not like to take loans or even avail of merit scholarships.

The poor don't have any role models in their community who took a large loan and didn't suffer for the rest of their lives. In India, lower castes and other low income groups also know that job opportunities are stacked against them as the relatively more equal opportunity employer, the public sector, has shrunk. By public sector, we don't mean Air India or Ashoka Hotel, but municipalities, schools, colleges, professional organisations etc. India has very small public sector employment of professionals compared to USA or Western Europe. We are at around 3-4% whereas US is at around 17% and Europe is at greater than 25%. Therefore, the poor are scared that they won't get adequate salaries to pay off their debts, as the children also have to

look after their parents in the absence of free medical care.

When merit scholarships are linked to grades throughout the student's college career, they are scared that at any point, if their performance drops, they would be out of the system with nothing to show. If merit scholarships were linked to good performance at entry and then just passing marks, then there would be more takers from the lower middle class. This is how a huge number of poorer Americans got educated through the GI Bill.

The GI Bill gave cash payments of tuition and living expenses to attend University, High School or Vocational Education, as well as one year of unemployment compensation. It was available to every veteran who had been on active duty during the war years for at least one-hundred twenty days and had not been dishonorably discharged. By the end of the program on January 31, 1965, approximately 2.4 million of 5.5 million eligible veterans had used their benefits: roughly 1.2 million for higher education, over 860,000 for other education purposes, and 318,000 for occupational training.

We also know that most of those who opt



**When merit scholarships are linked to grades throughout the student's college career, they are scared that at any point, if their performance drops, they would be out of the system with nothing to show.**



for research or technical careers (all over the world) come from middle income and lower-middle income households. They also want relatively stable jobs. These are the families that can't afford to keep their children in the education system for long periods. This was well understood by all the societies that are considered 'developed' today. It is no surprise then that, all over Europe and USA, more than 90% of the children went to FREE state schools. In India, all parents (except the very rich) spend all their money on their children's education before they go to college.

All through the 20<sup>th</sup> century, well into the 1970s (before Thatcher and Reagan), University education was free in Europe right up to PhD level. Scholarships were given for living expenses. In the US, the number of public Universities increased dramatically after 1940s.

Many of them also had the highest academic standards and were almost free for their state residents.

It is not surprising, then, that these countries experienced huge advances in science, technology, and research in the 20<sup>th</sup> century. In the post 1980s, education has become more expensive in US and UK. The result is that science and engineering schools are filled with non-white people.

Raising fees in our public institutions will have very negative long term effects. Even more of our B. Techs will abandon even semi-technical careers to earn a living with higher salaries to either pay back their loans to the banks or their parents. Lower middle class families will be scared to send their offspring to these institutions. The country will be starved of technical and scientific talent. As it is, we are 20 years behind China in our S&T workforce. This gap will only increase.

At present, IIT students have to spend about Rs 20,000 a month. This is not a small amount for a middle class family, especially if they have two kids. This will increase to 30,000. Charging fees for education actually amounts to extortion, because parents don't really have a choice. If education is deemed good for the society and the state, then they must pool resources and make it free. Extortion always results in negative consequences!



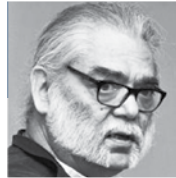


**Charging fees for education actually amounts to extortion, because parents don't really have a choice. If education is deemed good for the society and the state, then they must pool resources and make it free.**



Our education system is hugely underfunded, and the results are there for all to see—an extreme shortage of talented young people. The shortage of funds also ensures extremely unaesthetic, ugly, dirty campuses, hostels and class rooms. The best kids grow up in unaesthetic surroundings and then replicate them for the rest of their lives.

As it is, many of my students have opted out of technical and research careers because of financial compulsions of their parents. This is only going to get worse. An intelligent government would decrease fees and not increase them. We are in for bad times. ■



**Dinesh Mohan**  
B.TECH, '67, MECHANICAL  
ENGG, H6

*Dinesh retired as Volvo Chair Professor at the Transportation Research and Injury Prevention Programme at the Indian Institute of Technology Delhi. Currently he is Distinguished Professor, Shiv Nadar University and Guest Professor IIT Delhi. He is member of the WHO Advisory Panel on Accident Prevention and the Governing Board of the International Research Council on Biomechanics of Injuries. Dinesh is a recipient of the Distinguished Alumnus award from the Indian Institute of Technology Bombay and the Distinguished Career Award from the University of Delaware. His research includes transportation research (safety and pollution), human tolerance biomechanics, motor vehicle safety, and road traffic injuries.*



# An Arm And A Leg - Not Just A Thumb



**A**s the hapless Victoria driver from Manto's short story discovered on the day after, 15 August 1947 did not change anything for him. It would not have changed anything for many of us either, but for education. Education has been the single most powerful and the most reliable engine of social and economic mobility that has transformed the lives of millions of our country's men and women since Independence. Access to good and affordable education ensures that natural talent, no matter from which strata of our society, can aspire to achieve its potential and contribute to the nation.

One can see evidence of the socio-economic mobility that has taken place in the past six decades. The last names (generally caste based) of students I find in our classrooms today are quite different from those of my classmates. The geographical distribution of the regions from where our students are coming has completely changed. The four metros - Mumbai, Chennai, Delhi and Kolkata no longer dominate the incoming batches. Kota, Jaipur and Hyderabad send more than the proportion of their population, but that is an aberration and symptomatic of another malaise that ails our education system – too many aspirants for too few seats. However, there are first generation college goers among the new entrants as well as those from smaller towns and villages. We are tapping into hitherto untapped sources for intellectual talent and

**“Sadly, we seem to know the price of everything, but the value of nothing!”**



this can only benefit the country. It will make for a more equitable and just distribution of opportunities. But this will only be possible if we keep our educational institutions affordable to all sections of our society.

Unfortunately, of late, we have been treating education as a commodity rather than an investment in the future of our nation. We say that there are no free lunches. If you wish to get a ‘good education’; you must be ready to pay for it. Sadly, we seem to know the price of everything, but the value of nothing!

The government estimates that it spends Rs. 6 lakhs per year for every student at the IITs (this, by the way, represents the best value for money in education anywhere in the world). The Rs. 24 lakhs that are spent on the education of every IITian is probably paid back to it in less than five or six years as income-tax alone. The tax contribution that she/he makes for the next fifty or so years represents a fantastic return on investment, while the contribution to the GDP is a bonus. And every so often, you get a Raghuram Rajan or a Nandan Nilekani (though, one must admit, an occasional Arvind Kejriwal too).

Of course, it is ridiculous to try to calculate the benefits of educating our youth in





that better sense prevails and education is seen as an investment rather than as expenditure. Ignoring the aspirations of a youthful population can only come at a very high risk. ▣



**Prof. Aliasgar Contractor**

M.SC. '73, CHEM, PH.D '78  
CHEM, H- 9

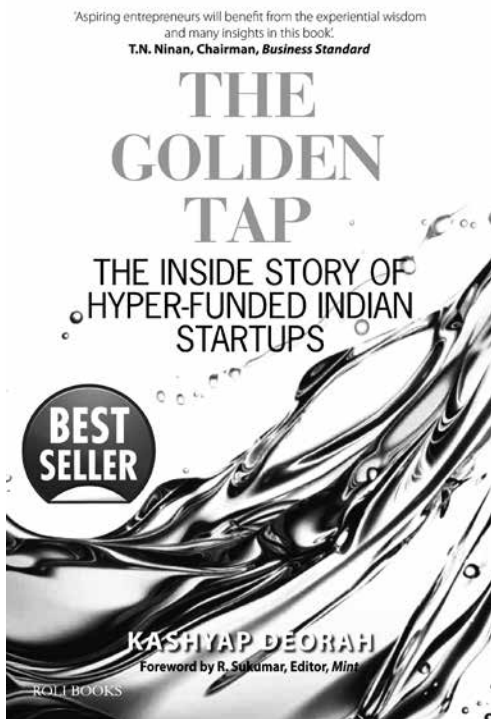
*Prof. Aliasgar Qutub Contractor, former HoD of Chemistry Department, and former Dean Alumni and Corporate Relations, is an alumnus from C'73. He is currently serving as Professor and Dean at College of Engineering, Dhofar University (Salalah, Oman). Endowed with a rare gift of narrating “serious” and “heavy” matters with a tongue held firmly in cheek, his incisive and informed views on IIT Bombay and alumni relations are in evidence in his column Sim Sim khul ja. He is currently 40 thieves short of his target.*

and increasing student tuition, particularly for international students, UK universities have managed to survive. But, now that the UK has voted to leave the EU, things will become that much more difficult. A similar situation exists in South Africa, where university students are agitating against high fees and have started a movement called ‘Fees must fall’.

It is hard to believe that our politicians would like to leave the youth uneducated and unemployable. However, it is also true that they are not particularly fond of the ideals of freedom of thought and speech that universities tend to inculcate in their wards. As reactions to recent events in some of our universities have shown, there is a strong urge to control. Reducing financial outlay for education is one way. This is the surest way of converting our so-called demographic dividend into a demographic disaster. Let us hope

# The Internet Wave (1994–2002)

## The Internet Changes Everything



*‘The Internet is the first thing that humanity has built that humanity doesn’t understand, the largest experiment in anarchy that we have ever had.’*

– Eric Schmidt

The sweltering summer of Mumbai had begun. It was May of 1994. I had finished my matriculation exams and was figuring out what to do next. When I had to choose my optional subjects during

high school, my parents said, ‘Pick the one that interests you most’. I blamed them for burdening a kid with the responsibility that should have been theirs. After all, my friends’ parents picked out the subjects for them. Why were my parents being goofy about the whole thing?

Now that I was ‘on my own’, I was going to enjoy my freedom of choosing my path for junior college:<sup>1</sup> science, commerce, or arts. It was going to be commerce, of course. Arts had the most girls and science the least. Science had the most hard working students and arts the least. Commerce was a good middle ground. I liked numbers, especially those with a currency pre-fixing them. My elder sister seemed to be having fun in college doing commerce. So it was set then.

Except this time my parents had an opinion. They thought I should consider appearing for the Joint Entrance Examination (JEE) for the Indian Institute of Technology (IIT). Woah, wait, that meant I would become an engineer, and that meant I had to pick science for junior college. But what about social development that comes with co-ed education. Besides, science had biology, and I hated biology. Mother said: ‘I was talking to our neighbor when doing groceries yesterday. Amit is here for his summer vacations. From IIT Kanpur. You should go meet him. Just to get

<sup>1</sup> Most state education systems in India employ a 10+2 pre-undergraduate junior college system.

his perspective. What's the harm in meeting?

Whenever my mother says, 'What's the harm?', it is a trap. And I walked right into it. I went to meet Amit Agarwal. There was an intensity about him. He wasn't much of a talker, and when he did talk, it was with a straight face. Just as I had been set up by my mother to meet him, he had been set up by his mother to meet me. He was in no mood to talk a kid out of a co-ed life that he himself was deprived of. That made communication easy: he answered

**I blamed them for burdening a kid with the responsibility that should have been theirs. After all, my friends' parents picked out the subjects for them. Why were my parents being goofy about the whole thing?**



my questions in a matter of fact manner. He was in his third year at IIT Kanpur, studying Computer Science and Engineering. He liked it there. He talked to me about the hostel culture, how he was making a lifetime worth of friendships and had all the freedom in the world to pursue what he liked. He thought IIT was about to open a whole new world for him, a world that was otherwise inaccessible. 'I want to go to the US and study further.'

The vibe in the room was that we had both talked enough. Enough to go back to our mothers with a clear conscience. As I was about to leave, I saw a picture of a group of youngsters playing in the snow. 'Wow, where is that?', I asked.

'That's Lake Tahoe in California. Those are my seniors from the department. They are at Stanford now. That's where I want to go.'

As I walked back to my home, my brain was racing between two choices: girls, snow, girls, snow. This was going to be tough. At

dinner, it was clear that my parents had plotted to get me to commit to prepare for IIT JEE. They wanted me to make my own choice, as long as it was IIT. The snow was inviting. There would be some girls at IIT, wouldn't there? It was decided. I was going to prepare for the IIT JEE.

That day, my world shifted in ways that would take me a lifetime to understand. At around the same time, half way across the world, some other momentous events were happening. Silicon Valley entrepreneurs Jim Clark and Marc Andreessen had decided to make the Mosaic browser commercial and had incorporated a company called Netscape [1]; Stanford grad students Jerry Yang and David Filo had renamed 'Jerry and David's Guide to the World Wide Web' to 'Yet Another Hierarchically Official Oracle' or Yahoo!; and a quant named Jeff Bezos working at a New York hedge fund had grown partial to the idea of 'the everything store' [2] while brainstorming with his boss about business ideas to exploit the coming technology wave called the Internet. The power of the Internet was limited only by human imagination. After all, what is technology except a way to eliminate the constraints of space and time? The Internet would fulfil the audacity of such boundless thought.

The US Department of Defense had started opening up the Internet for public use in the early '90s, and the idea of computers being able to 'talk' to each other caught the fancy of anyone associated with computers and software. During 1993, the amount of data transmitted over the Internet had jumped by a factor of 2,560. Something extraordinary was happening and many were trying to make sense of it. It was like in the movie 2001: A Space Odyssey. The apes woke up in the dawn of man to discover a slick black monolith in front of their caves. There was a spooky background score and the apes scuffled around the monolith to dare to touch it, feel it and figure

out what it meant. Eventually, it gave them god, religion and wars, as well as technology and the modern human civilization.

Did the dawn of the Internet mean that the world would become one giant computer with an infinitely large virtual disk? Did it mean that you could see a file on someone else's computer halfway across the world? Did it mean we could write to people without posting a letter? Did it mean we could type words on our computers and someone far away could see what I typed, instantly? Did it mean that my software built in one language could talk to software built in another language? Did it mean I could trade a stock without calling my broker who then ran to the trading floor to yell his lungs out? Did it mean my software running on a Windows could be operated from a Mac? Did it mean multiple people could create software without being at the same location or move files from one machine to another without using floppy drives? Did it mean smart software on multiple computers could self mutate, talk to each other and rise in mutiny against humanity? The world did not know the least of it.

### *Netscape, Yahoo! and Amazon*

By the end of 1994, Netscape launched the world's first commercial Internet browser called Navigator. Netscape Navigator was the window through which the world saw the World Wide Web for the first time. In 1995, Navigator gained 20 per cent market share every quarter. On the day of the IPO in August 1995, the Netscape stock that was first offered at \$14 and then doubled to \$28 last-minute soared to \$75 on the same day, and closed above \$58. By the end of the year, it had shot up to \$174. To many, it was the year that the Internet was commercially launched. The performance of the Netscape IPO was a sign of times to come. There was a general sense of agreement that the Internet changes everything, and everyone who was alive at the

time had a once-in-a-lifetime opportunity to invent how.

When a pair of eyeballs glared through the window of the Internet, they needed a start page to figure out what's out there and where they should go. Yahoo! became the home page of the World Wide Web. Just like a directory of files on a computer, it was a directory of web-pages and web-sites on the Internet organized in a hierarchical structure. After an initial investment of \$2 million from Sequoia Capital in April 1995 followed by a second round from Reuters and SoftBank in fall 1995, with less than 50 employees, Yahoo! went public in April 1996 valuing it at \$848 million on the day of the IPO. For youngsters around the world, and especially at Stanford University, Yahoo! inspired the first generation of right-out-of-college Internet entrepreneurs to dream up a new business on the World Wide Web.

Jeff Bezos and his wife Mackenzie flew to Texas. Bezos picked up his father's Chevy Blazer and they started driving cross-country to Seattle. For most, driving coast-to-coast in America is a once-in-a-lifetime experience, especially with your life packed in a suitcase. The sense of freedom, exhilaration, and adventure of a road trip was reflected in the still nascent Internet world – the journey had just begun. The Internet was moving information on the superhighway as budding entrepreneurs were moving their stuff on regular highways. This entrepreneur in particular was about to start something that would move a large amount of transactions and products on both highways. At D.E. Shaw and company, a hedge fund on Wall Street, Bezos had recently been elevated to the position of heading Internet initiatives. He saw the profound effect of the Internet on commerce. Anyone who was selling anything in the real world started creating web-pages and web-sites with their catalogue of products and services.

Bezos fell in love with the idea of an Internet store for virtually everything. It oc-



curred to him that for the practical constraints of building a supply-chain of products to compete with big box retail, he would need to start with one category and expand from there. He picked books as the category to start. The 1992 Supreme Court ruling with regard to mail order businesses was on Bezos's mind: merchants did not have to collect sales tax in states where they did not have any physical operations. In his shrewd mind, this ruled out Silicon Valley and New York City since the states of California and New York had a large population, and opening an office there would mean collecting sales taxes for all orders delivered in those states. Bezos picked Seattle because the population of the state of Washington was small and Seattle was a bit of a technology hub.

At the time, he had picked the name Cadabra as a placeholder for the company. He was looking at names starting with A or B since websites used to be listed alphabetically, and registered Aard.com, Awake.com, Browse.com and Bookmall.com. He got cozy with another possibility, Relentless.com, which till date points to Amazon.com. Shel Kaphan, Amazon's first engineer (who many, excluding Bezos, considered the co-founder) had previously consulted with a company called Symmetry Group. Kaphan's friends disparagingly confused the name Symmetry with Cemetery. He was horrified about the name Cadabra Inc., since the same folks would now confuse Cadabra with Cadaver.

Thankfully, Bezos was soon struck with an epiphany about the world's largest river, and registered the domain amazon.com on 1 November 1994. It started with the letter 'a' and had the letter 'z'. With the arrow in the logo going from a to z, signifying Bezos's ambition to offer the widest selection to customers. Bezos said, 'This is not only the largest river in the world, it's many times larger than the next biggest river. It blows all the other rivers away'. When Kaphan's former co-worker became the

first person to order a book from Amazon.com on 3 April 1995, there were several other online bookstores in the US. The choice of name and the way Bezos built Amazon over the next two decades showed his relentless ambition to 'blow all the others away'.

Based on Amazon's S-1<sup>2</sup> filing, Amazon was bootstrapped with a little over \$300,000 of equity investment from July 1994 to May 1996, including \$10,000 of his own money to start and \$245,000 from his parents in 1995. Bezos then raised \$1 million at a little under \$5 million in valuation by pitching to sixty individual investors in the Seattle business community. Business at Amazon had grown well since inception, and further accelerated in 1996. Bezos decided to raise VC money and pitched to Connecticut based private equity firm General Atlantic. Silicon Valley VC John Doerr of Kleiner Perkins Caufield & Byers caught wind and flew to Seattle to meet Bezos. After some back and forth, Kleiner invested \$8 million valuing the company at \$60, a whopping 6x of the valuation General Atlantic had started with. John Doerr joined the board after initially suggesting a junior associate take up the role. Two other board members joined in 1997 after investing \$100,000 each. After three years in operation and having raised less than \$10 million in funding, Amazon went public in May 1997. The new shares issued to the public valued Amazon at \$438 million. Jeff Bezos owned a majority of the company at the time of the IPO.

### *The Stanford Start-up*

In early 1996, there were two sets of Ph.D. students in the Gates Computer Science building of Stanford University who were inspired by the exponential growth of information on the Internet and the possibilities it presented. When Stanford Computer Science Ph.D. stu-

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2 S-1 is a public document shared with the US Securities and Exchange Commission (SEC) by companies planning to go public.



dents are faced with a life problem, they write code to solve it. A popular T-shirt on campus at the time said, 'Why write code, when you can write code to write code?'

While Venky Harinarayan was working to finish his Ph.D., his girlfriend, now wife, was making domestic plans. She went online looking for apartments, visiting several different sites, comparing the various listings, going through the tedious process we all know and hate. During that time, Larry Page had just begun his doctoral work and was scouting around for dissertation topics. He wondered about the structure of the Internet and how the fast exploding information was organized. He imagined the world's information as a graph of web-pages with links pointing to each other. His advisor encouraged him to pursue this direction. Ph.D. students measure their productivity by writing papers, and then measure success by how many other papers referred to theirs. The importance of a research paper was determined by how many citations it received from other papers. Why the World Wide Web should be any different, Larry thought.

Venky was working with Stanford classmate Ashish Gupta, and IIT Madras and Stanford junior Anand Rajaraman on a project related to databases. In a primal sort of way, Venky was pre-disposed to connect his current work with the woes of his distressed damsel. He re-oriented the project to build a comparison shopping engine for classified listings on the web. Like any committed boyfriend would, he put his colleagues Ashish and Anand to work with him on the problem. Like any committed project mates would, Ashish and Anand found reasons to like the idea and started working on it. Venky did well because Ashish and Anand were no ordinary students. They were both President's Gold Medal (PGM) winners from IIT Kanpur and IIT Madras respectively. Every year, each IIT rewards the topper from the entire graduating class

with this top academic honour. Considering how competitive it is to get into IIT in the first place, due to the selection of a few thousand out of a few hundred thousand, a PGM is no mean feat.

Around that time, a student called Sergey Brin had started his Ph.D. as well. He met Larry and instantly hit it off with him. He was inspired by Larry's research project because he thought it represented the quest of human knowledge. In the same lab, Anand Raja-

**The power of the Internet was limited only by human imagination. After all, what is technology except a way to eliminate the constraints of space and time? The Internet would fulfil the audacity of such boundless thought.**



raman was hacking up Attercop<sup>3</sup> alongside Sergey Brin who was hacking up BackRub<sup>4</sup>. Professor Jeff Ullman was the Ph.D. advisor for both students. Attercop was a crawler that would organize the world's inventory and help users comparison shop in an efficient way. BackRub was a crawler that would organize the world's information and help users search it in an efficient way. Attercop would be the transaction search for the Internet and BackRub would be the information search for the Internet. The value of a transaction was tangible and the value of information was not. It would have been interesting to place a wager at the time on which company would be more valuable. Attercop went on to become Junglee in 1996 and Backrub went on to become Google in 1998.

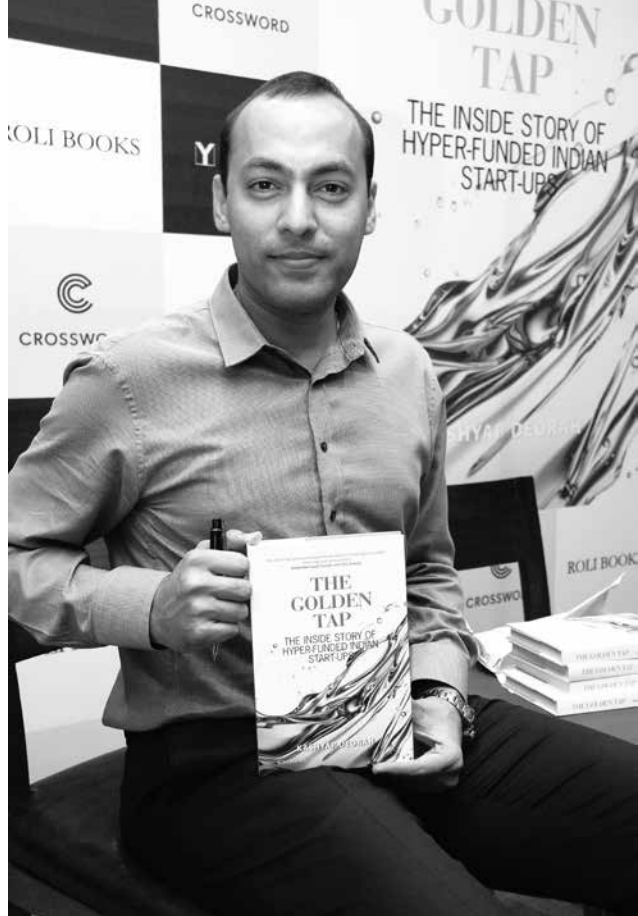
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<sup>3</sup> The big venom-spouting spider that tormented Bilbo Baggins in *The Hobbit*.

<sup>4</sup> The original name of Google.

Team Attercop had started falling in love with the notion of starting an Internet company with their idea, what with the Yahoo! IPO success in the background. Ashish had finished his Ph.D. two years ago, had worked at IBM, and was now working at Oracle. As a guy with industry experience, he took the lead to go raise money from VCs. In this process, Ashish started collaborating with serial entrepreneur Rakesh Mathur. They knew each other because their wives were best of friends from IIT Kanpur. After Rakesh saw the Attercop demo, he took matters in his own hands and called his mentor from his early days in the semiconductor industry for funding. Tsuyoshi Taira, or Taira-san, saw the demo and made a few phone calls to a group of seven Taiwanese businessmen who wanted to invest in this new Internet thing but did not have access to it. Taira-san narrates, 'I told them \$100,000 each, and some said they wanted to do \$200,000, and I had to calm them down. I was working hard and was underpaid. I invested what I could, which was \$50,000.' With \$500,000 raised, Rakesh asked Venky to quickly finish his Ph.D. Ashish quit his job at Oracle. Rakesh and Venky urged Anand to drop out of his Ph.D. at Stanford, just like the Yahoo! co-founders had.

Anand had grown up in a Tamil Brahmin family in Chennai that emphasized the importance of academic excellence. One could only imagine the weight of the decision to quit his Ph.D. to follow some new fad. He was now at his dream university, earning the degree he had always aspired towards. Was his judgment getting clouded by a bunch of yahoos who had dropped out from his university and were already worth over a billion dollars as a publicly listed company? Was he getting swayed by Ashish and Venky, the seniors he looked up to? After all, they had finished their Ph.Ds while Anand was going to take a plunge in the deep end of the pool? He went to his advisor with his dilemma. Prof. Ullman made it easy.



He said, 'The best way to prove the value of your research is to build a product and get many people to use it. You can always come back later and write your Ph.D. thesis.' And that is exactly what Anand did – took a leave of absence and promised to return at a later point to finish his thesis. Prof. Ullman ended up joining Jungle's Board of Directors.

Many things in life can begin with a few beers and a hit Bollywood song. But an entirely different sort of outcome was conspired one evening as the boys gathered at Ashish's apartment in Menlo Park, cracked open a few brews, and set talking about the name of their new company. As their collective thoughts turned to the inspiring success of Yahoo!, they were reminded of a classic Hindi film song featuring the screen idol Shammi Kapoor, who is seen quite free-spiritedly dancing around the snowy hillsides of Kashmir yelling out 'Yahoo!', followed up by an emphatic declaration that he did not care a hoot if the world called

him ‘Junglee’.

That word stuck in their heads. They rationalized that the Internet was a jungle of information and people needed someone who knew her way around the jungle. That would be a Junglee, and they wrote it as Jungle-E, the suffix that was only second in popularity to dot com, for new Internet companies. Anand, Ashish, Rakesh, Venky and one Dallan Quass, co-founded Junglee in June 1996. Dallan happened to work in the same lab as Venky and Anand at Stanford, and was drawn to join the fellowship. But he was always conflicted whether he wanted to be a founder or an academic. Dallan left the company after a year to pursue a career in academia.

Halfway across the globe, it was raining over Powai Lake. It was pelting down the expansive green patch connecting the campus with Vihar Lake and Borivali National Park beyond. I had bought a bucket and broom in preparation of my new life in the jungles of Powai. Like the other young freshmen, I was reading the survival guide to protect myself from trespassing leopards. Large spiders in my hostel room were spinning a web I did not know to surf. Setting up my new life in a shared hostel room, I remembered the time that I had first thought about studying at IIT. I remembered the snowy picture of Lake Tahoe in my neighbour Amit Agarwal’s room that had sealed the deal for me. And now, looking out of the window at a murky volleyball court made the snow-covered ski slopes seem like a mirage. I had cleared the IIT JEE in 1996 with flying colours and was going to study Computer Science and Engineering at IIT Bombay.

Meanwhile, Amit had paid his dues at IIT Kanpur to pursue his master’s in Computer Science at his dream university, Stanford. He was attending classes in the same building where Junglee had incubated and Google was incubating. He was about to graduate in a year and wanted to join a start-up. Coincidentally, Amit was the cousin of Junglee

co-founder Ashish. Amit was considering joining his cousin’s company after graduating. The brothers had talked about it a few times over the course of Junglee’s evolution, thought that mixing business with family might get a little awkward, and decided against it.

Junglee was getting good traction selling their product to newspaper companies. When the team made a demo to Washington Post, the media company was blown away by the potential of the idea. The Internet changed

**For youngsters around the world, and especially at Stanford University, Yahoo! inspired the first generation of right-out-of-college Internet entrepreneurs to dream up a new business on the World Wide Web.**



everything and one of the first industries to transform was the media industry. Newspapers had been scrambling to go online, publishing their print content over the Internet so they could become the chosen source of news on the web. Just as they charge for a newspaper on the newsstand, they wanted to charge for their superior journalistic content online. As some media houses started competing for traffic by giving away content for free, and supplementing them with online ads, other media houses were left with no option but to reluctantly follow. The Internet had made journalism free. The newspapers used to make good money on classified ads, especially the jobs section. They used to charge a listing fee for every ad. They started up-selling the option to ‘post online’ so advertisers could reach out to the online readers as well. However, they did not have a separate ‘online only’ option. Unlike print, the Internet could accommodate unlimited ads. With Junglee,

media houses could automatically crawl the jobs sections of large corporate clients and post all the ads in the online classifieds section without being limited by space. This was a product they could charge the corporations money for. This would create a parallel revenue source that grew at the pace of the Internet. Washington Post became Junglee's first customer and invested \$5 million to buy a piece of the company. Over the next few months, Junglee was powering the classifieds

**When Stanford Computer Science Ph.D. students are faced with a life problem, they write code to solve it. A popular T-shirt on campus at the time said, 'Why write code, when you can write code to write code?'**



section of all major media houses of the US. For each category of classifieds, they created a Personalized Advisor Locator or PAL.

A PAL was a way for a user to search a large catalogue of job listings or other classifieds to find the one that best met their needs. The key innovation here was to go beyond keyword search – the only form of search available on the web to that point – to enable search based on criteria such as location, salary, education and other fields. The Jungles had their first office behind a hair salon in Palo Alto, close to the Stanford campus. But with the Washington Post investment and the team expansion to deal with the growing business, they needed a bigger office. And the best deal they could find was in Sunnyvale, further away from Stanford, prompting Anand to fret about moving to the depths of Sunnyvale – far away from their usual haunts.

The Junglee founders always wanted to meet Jerry Yang and do something with the

company that had inspired them to start-up. A week before Thanksgiving of 1997, Rakesh gave a demo of the jobs PAL to Mike Moritz of Sequoia Capital. Moritz saw something he liked and told Rakesh that he would have Jerry Yang come and meet him. Moritz was on the board of Yahoo! and Yang came to meet Rakesh the very next day. Rakesh gave him a demo of the computer PAL. Yang had been watching the growth of online shopping and was about to partner with Amazon to add their link on Yahoo.com for buying books and music. He asked Rakesh if they could build a books and music PAL. The Junglee team went to work over the Thanksgiving weekend. Yang and team liked the demo and asked Junglee if they could launch by December. By Christmas, Junglee was powering comparison shopping in the Yahoo! Shopping Guide. A few months later, Yang made an offer to acquire Junglee for \$120 million in Yahoo! stock. During the negotiations, the stock price doubled. As a result, they wanted to reduce the number of shares by half. There was a disagreement and the deal fell through. It is anyone's guess what may have transpired had Rakesh taken the deal. Meanwhile, Junglee continued to partner with Yahoo!

Junglee was now hungrier than ever to grow the company at the same break-neck speed as Yahoo!, Amazon and other Internet companies around them. Why wouldn't they? They had smarter people, an explosive idea, and an ambition to match. Junglee appointed a headhunter to find the best VP of Sales money could buy. Junglee wanted to sell its PALs to Internet companies like hot cakes, much like Netscape's Internet servers. Netscape's Internet browser was free, but their Internet server was not. It cost about \$5,000 a pop to buy, and then a few thousand a year for updates and support. Internet companies and offline companies alike were racing to get their bus on the information superhighway. The Netscape web server was a tool to get them there. Netscape's

VP of Sales, Ram Shriram, became the rain-maker of Silicon Valley. Junglee engaged Ram as an advisor to start. Ram invested \$25,000 in Junglee and started sitting in key meetings. Among other things, he was tasked with making Junglee the shopping button on Netscape Navigator.

Prof. Ullman shared with the Junglee board that his student Sergey's project had progressed well. The intuition about ranking search results based on how many other pages pointed to it had worked. They had changed the name from BackRub to Google<sup>5</sup> and hosted the search engine on google.stanford.edu. The engine had now started getting lots of searches within Stanford University, both due to the quality of results and the depth of results that the crawler had made accessible. Other engineering colleges in the world, including the IITs in India, had discovered Google and started using it as the search engine of choice. I remember doing my first Google search a few months after they had incorporated the domain google.com in September 1997. It worked like a charm. The results were stunning. It was as if the search engine read your mind. I was not the only person experiencing this 'wow'. Google created a quirky button called 'I'm feeling lucky', which directly takes you to the page of the first search result and still has a place on the Google home page.

Prof. Ullman shared with the Junglee board that the number of searches had started to increase and his students had now started soliciting money to get bigger and better servers to keep up. The whole thing caught Ram's fancy and he privately requested Prof. Ullman for an introduction with the Google founders. In early 1998, Ram was among the

first five people to write a 6-figure check to Google Inc. as the Junglee founders remained unaware of the development. Interestingly, there was no Google Inc. and no bank account to put the money in. A present day Google search for 'when was Google founded' shows a box that says 'September 4, 1998. Google, date founded'.

The checks were eventually banked and for an exclusive license for commercial use of the Page Rank patent, its owner Stanford Univer-

**Junglee was now hungrier than ever to grow the company at the same break-neck speed as Yahoo!, Amazon and other Internet companies around them. Why wouldn't they? They had smarter people, an explosive idea, and an ambition to match.**



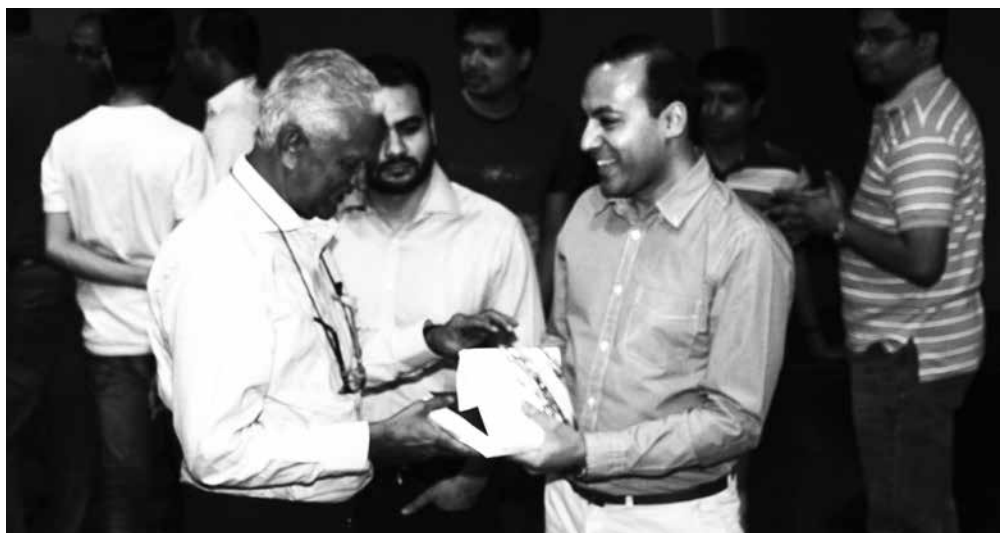
sity got Google shares. In 2005, Stanford University made \$336 million from selling Google shares. Ram made 10-figures. At the time, it was the highest returns on any angel check ever written. Ram joined Junglee in May 1998 as the President and Chief Operating Officer (COO). Rakesh continued as Chairman of the Board and Chief Executive Office (CEO).

The Amazon stock was flying like a kite. After the 2:1 stock split in June 1998, the company value had propelled by 3x in a month. The world was going nuts over Bezos and Bezos was going nuts over the world. He had launched music and DVDs as the next two categories. Amazon's new VP of Corporate Business Development in charge of mergers and acquisitions was keeping busy. Amazon bought the movie database IMDB.com and added the buy button to all movie titles. Amazon bought PlanetAll.com, arguably the first

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<sup>5</sup> Misspelling of the word googol, name for the number one followed by a hundred zeroes. Larry and Sergey were obsessed with the scale of the Internet and their crawler, and were looking for the largest number in the world that had a name.





*At a book reading session hosted by IITBAA Mumbai Chapter*

social networking site on the Internet, with 1.5 million members using it to stay in touch with each other. And then in July, Amazon called Junglee to buy them out. The deal closed really fast this time. The board was not taking any chances with the high momentum stock. By August 1998, Amazon had bought Junglee for 1.6 million shares of Amazon, valuing the deal at \$240 million at the time of acquisition.

Ram made another windfall. At the time of joining Junglee, Ram had negotiated an accelerated vesting of a year in the event of an acquisition. Within 2 months of joining the company, he was sitting on a good chunk of Amazon stock. As he continued vesting more, the Amazon stock multiplied by 5x over the next year and a half. In one of Bezos's camping trips to the Bay Area, Ram invited him to meet with Larry and Sergey for breakfast at his home. It seems that Bezos and Larry got into a little argument about whether they would ever put ads on their website. Bezos liked the argument and wanted to invest. Ram spoke with the Google founders and got Bezos in as an angel investor in Google, making it one of the more lucrative favours in the tech industry. Ram did not feel the need to share

these developments with the Junglee founders although the partnership had originally stemmed from a conversation about Google at Junglee. When Google went public 6 years later in August 2004, one of the filing documents mentioned Ram as co-founder and CEO of Junglee although he was neither. This did not go well with the actual co-founders of Junglee. The actual CEO of Junglee brought this to Ram's attention. He corrected the error, on paper.

After the acquisition, the Junglee co-founders were walking on water. For three Stanford Ph.D. students at the dawn of their careers, Ashish, Venky and Anand did exceptionally well to become millionaires and have their pictures on the cover of the Asia edition of Business Week magazine. For Rakesh, it was a career defining moment as a serial entrepreneur. Junglee was his third start-up and at the time of acquisition, he was 41. And as they say, when it rains, it pours. Within a year of Junglee getting acquired by Amazon, Rakesh's previous company Armedia was acquired by Broadcom for a handsome amount. At Amazon, Ashish went on to become Director of Engineering, Anand was Director of Tech-

nology, Venky made General Manager and Rakesh was VP of Business Development.

Over the next year, the Amazon team was watching the behaviour of users starting their online shopping with a search. They knew that product search would be key to the growth of the company. Rakesh, Anand, and Shel Kaphan met the Google founders in Palo Alto in the heyday of the Internet boom, April 1999, to make a bid for acquiring the company. Amazon was willing to pay \$100 million, but the Google founders imagined an extra zero at the end. The deal fell through.

### Notes

1. Michael Lewis, *The New New Thing: A Silicon Valley Story*. New York: Penguin, 2001.
2. Brad Stone, *The Everything Store: Jeff Bezos and the Age of Amazon*. London: Random House, 2013.  
*[To be continued in the next issue]*

*This piece The Internet Changes Everything has been extracted from Part 1: The Internet Wave (1994–2002) of the book 'The Golden Tap: The Inside Story of Hyper Funded Indian Startups' by Kashyap Deorah. The book was first published by The Lotus Collection, an imprint of Roli Books Pvt Ltd, India, in 2015. It is available for purchase on Amazon.in as a Hardcover and Kindle edition.*

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# The Restaurant at the Edge of the Reef

KADAMBARI DEVARAJAN

*“Island biogeography, I’m happy to report, is full of cheap thrills. Many of the world’s gaudiest life forms, both plant and animal, occur on islands. There are giants, dwarfs, crossover artists, nonconformists of every sort. These improbable creatures inhabit the outlands, the detached and remote zones of landscape and imaginability, in fact, they give vivid biological definition to the very word ‘outlandish.’”*

- David Quammen, *The Song of the Dodo*

All underwater photographs used in the article were clicked by Rohan Arthur

## Your Average Tropical Island

Islands around the world are special places for many reasons. With their unique floral and faunal compositions, and a high degree of endemism in species, they are live laboratories to watch evolution in action. The Andaman and Nicobar Islands are no exception. They have a wealth of wildlife that is largely unexplored, not unlike parts of the vast coastline of mainland India. The rocky and sandy inter-tidal coasts, mangroves, coral reefs, and deep sea harbour multiple habitats for unusual creatures, all fascinating and beau-

tiful. These habitats interact intimately with their organisms and are intricately connected with each other, frequently with cascading effects and unforeseen consequences on associated life. A walk on the beach is a lesson on life and adaptation. The mangroves are amphitheatres for waders, juvenile fish, and marine invertebrates, alike. The coral reefs are odes to diversity and complexity, and lessons on the fragility and interactivity of systems. The deep sea holds secrets and mysteries unsolved, as one ventures farther from the seashore. “Cheap thrills”, as Quammen puts it, include the dolphins and dugongs, sharks and rays, tropical fish and marine invertebrates. This is an attempt to recollect some experiences from the islands, and hopefully introduce the uninitiated to some of these habitats and their creatures great and small.

All is still. For a second. And then some. One cannot say when it will be still again. One cannot predict for how long it will last. None can tame the tide, it is said. Maybe, maybe not. One cannot say; I know that arguing with the tide is an exercise in futility. But some adapt to it, evolve around it, spend a lifetime enduring it. As they say, there is no ignoring



*Island's edge - Chidiatapu, Andaman Islands*

the tide. For long, anyway.

One walk is all it takes. To be intrigued and enchanted. To start stalking the tiny nomads of the coast. To set up a scope and watch migrant waders, year after year. To seek out unusual shells. Cockles and clams. Conches and oysters. Tread slowly and carefully, and barefoot. Oh, please be barefoot. Feel the sand crunch under your feet, a small bucket in hand, and all eyes on the ocean foam appearing with a swish and noisily receding. All senses awake, enjoy the blue crabs dance to the fiddlers' tune.

Oh, did you see that piece of rock lolling about with the waves? Do pick it up. The numerous pieces of rock and coral strewn on the beach are full of life. A live laboratory to learn from, if you will. Do you see that the mass is encrusted with barnacles and limpets of all sorts? One fist-sized lump so full of life, you will never see anywhere else. Flat worms and borers. Snails and foraminiferans. Tiny invertebrates and micro-organisms. I doubt if a rotting log in a rainforest can compete with this lump!

Writes EHA of the crab in his book 'A Naturalist on the Prowl', "He is, I think,

## A walk on the beach is a lesson on life and adaptation.



the noblest of his race. Living on the open champaign of the white sea-shore, he learns to trust for safety to the keenness of his sight and the fleetness of his limbs." His characteristic style and wit intact, he adds, "But, keen as is his sight and amazing as is his speed, he more than needs it all; for alas! he is very tasty and all the world knows it." Time seems to have stood still for some of the world's creatures, for this rings true for crabs, many shellfish, and a plethora of their marine brethren today, as it did in EHA's time.

The diversity and richness of marine life is staggering. Let us pick up some coral, rocks, and sponges – something small that gets washed ashore. Be responsible, that is earth in miniature that you are carrying with you in a bucket of water. Try carrying a specimen the size of a football back to your microscope or look through a magnifying glass and you will know the pain of a crumbling chunk that is filled to the brim with life. Tens of species, of myriad hues, mystifying shapes, and sizes great and small, all within that piece of earth



**All is still. For a second. And then some. One cannot say when it will be still again. One cannot predict for how long it will last. None can tame the tide, it is said.**



you are holding in your hands, begging to be observed under a microscope.

There is anticipation in the air. One can thoroughly enjoy picking the organisms out carefully and making slides. The joy of the mundane? Or maybe a labour of love? They look even more magnificent under the lens! Always collect those that are dead, or discarded – shells, crab molts, and such. Try not to go overboard in your enthusiasm, and rather than throw them in the garbage after observation, return them to the sea, if possible. If the organisms are alive then keep them in sea water, after bringing them in a bucket or container of sea water. We can make slides of the dead specimens and use petri-dishes with salt water for those alive. One feels alive and astonished by the sheer diversity of life on earth and underwater.

*Saltwater Crocodile Sanctuary in Wandoor*

On each walk, one is guaranteed a treasure-trove of shells of all shapes and sizes – conches, clams, oysters, cockles. On an average beach in the Andamans, one can see shoals of juvenile fish, sea dollars, shrimp, crabs, brittle stars, lobsters, adult fish, sea cucumbers, sea stars and even interactions therein, such as the bizarre gobi-shrimp mutualism.

The Andaman and Nicobar islands Environmental Team (ANET) field station at Wandoor in the South Andamans is paradise for researchers and naturalists. A stone's throw from the ANET field station is a pretty little beach that is perfect for exploratory jaunts and romantic strolls alike.

On a walk here, I saw my first shark. A shovelnose guitar-shark, it turned out to be. Part ray, part shark, it was the right mix of mystery and intrigue to get one interested! The researcher accompanying our small student group commented, "That is the marine equivalent of seeing a tiger!" Soon there were yells from every direction and after seeing two dozen guitar sharks, we were not so sure about the comparison! A special spotting nonetheless.



*Watching life at the micro scale*

The excitement of watching a starfish upright itself is a truly mesmerising sight. An exercise in yoga? A lesson on calisthenics by a gymnast? Both. Neither. It may be a rarity on the inter-tidal zones of the mainland, but is a guarantee on the islands. It should be a part of the tourism slogan for Andamans – “Be as fit, sun-kissed, and supple as the sea star. Visit India’s island star!” Or something just as cheesy.

To see an octopus is a delightful and yet meditative moment. And, to think one could see one standing knee-deep in the beach is surprisingly easy. All it needs is patience and watchful eyes, I suppose. The first thing I did was to try and count the tentacles. So obvious and unnecessary, but invariably what happens.

From the intertide and the beach, one progresses a little. Borrow some snorkelling gear and discover a whole new world amidst the coral reefs. Metres away from the shore on many of the numerous islands of the Andamans, one can follow brightly colored and spectacularly beautiful fish. Watch the ubiquitous butterflyfish, or follow some parrotfish. Wait as some sweetlips pass by. Ogle in rapt fascination at the cleaner wrasses busy at work in their cleaning stations.

**On each walk, one is guaranteed a treasure-trove of shells of all shapes and sizes – conches, clams, oysters, cockles.**



We progress some more. You have seen nothing yet, if you have never been scuba diving. The first dive may be nerve-wracking but one is guaranteed addiction after three dives anywhere in the world. One fine day during our stay on the islands, we visited this quaint dive site in the Indian Ocean called Allen’s Patch. It has some lovely reefs, a nice sand bed, and a wonderful assortment of organisms. The sea was very calm. Too calm for comfort. A lull before the storm. Still and clear like a mirror, occasionally turning into clear glass through which we could see a little under the water. We could see storm clouds ominously looming over the islands. There was adventure in the air, mingling with the salty breeze.

We set off into the ocean in a local boat made in the style of a canoe of sorts called a dunghi. The dunghis are typically made from a single piece of wood, usually something





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called Mahua or bullet wood. It is very hardy and is not usually affected by shipworms or borers which damage wood – ideal for the conditions here. Our *dunghi* was named Thi So Pa meaning Emperor of the Water in the Karen language, which is spoken by the Karen community, who are people of Burmese descent in these islands.

The day's first special sighting was a little before we reached the site – a sting ray. Just a brief glimpse, a ruffle on the surface breaking the still, somewhat ponderous water. It is always welcome to spot some black-naped terns, especially where one would least expect them. Oh, there goes one with fish in its mouth! And, did you see the needle fish that keep

*Clownfish amongst the anemones*

shooting out of water, flashes of quicksilver against a sapphire background. It is almost impossible to describe the diversity of life seen when diving, especially in the tropics. Ah, the thrill of seeing a school of squid! To see a single squid is quite rare; imagine seeing 50-60 small squid. If one manages to get a squid in a container, it is sacrilege to do anything but watch in rapt fascination.

Each outing to a dive site is accompanied by the possibility of spotting some dolphins, from the boat and when in the water. Or a marine turtle during a dive. There are four species of marine turtles that are found in these islands and their surrounding waters: the olive ridley, hawksbill, leatherback and green. An encounter with a turtle when diving, either when peeping into some crevice or seeing one swim up gently to the sunlight-dappled surface, is mesmerising. The soft nonchalance of the turtle swimming past, a school of multi-colored fish in the aquamarine background, in the interplay of light is awe-inspiring.

All our senses come alive when diving. The oranges and yellow of the clownfish weaving in and out of the varied browns of the anem-



*Mudskipper skipping through a maze of Teribralia* one. The explosion of blues, yellows, and whites when the butterflyfish hang suspended in the water. The multi-colored and iridescent pinks, purples, and cyan of the parrotfish. The dull but diverse surgeons and groupers, pufferfish and boxfish. The riot of colors of the corals and anemones, the tropical fish and the eels, the squid and jellyfish. The spectacularly coloured giant clams and starfish. The vivid colours are eye-popping and one does not know where to look. The strange dull sounds notwithstanding, it is usually quiet. A loud and chaotic silence when surrounded by life, and a calm lull when not. The feeling of being suspended, the ability to move up and down with just one's breathing, all bring a sense of liberation and freedom unlike anything else.

Skin diving is my favorite lesson from the islands. What is that, you ask? The ability to dive into the ocean with a single breath, either with or without a snorkel, and then surface again. The first time I saw someone skin diving, up close and personal, he just dived suddenly and brought up a perfect spider conch – it was alive and gorgeous! That experience was enough for me to learn and practice. It feels surreal, somehow. More intimate. Liberating.

**Everything starts with a walk on the beach. It all adds up, lessons and questions, chaos and peace, life and death. The answers come to you. One step at a time. One breath at a time.**



No strings attached. Nature raw but sublime.

Never try this without supervision but it is simple once understood, and worth the effort. It becomes second nature with some practice. One basically hyperventilates a bit, takes a deep breath with the snorkeling gear usually, and dives head down and pushing the feet up. This is the hard part. The lungs are full of air and tend to make the person rise. There is initial resistance, but once you clear that, you can go as deep as you can. It just depends on how long you can hold your breath. And once you feel you are running out of breath, you just start rising to the surface. You will have to keep equalising to clear your ears, as in scuba diving, and on surfacing clear the snorkel of water with a powerful blow into it. This



*A fiddler crab*

can also be done without the snorkel. When snorkeling, if one wants a closer look at something a little deeper and just dive quickly to explore or check objects out, this is a neat skill to pick up. And, that was how I encountered my first stonefish – an unattractive, superbly camouflaged species that is thought to be the most venomous fish in the world. A lesson in avoiding touching creatures – do not touch, if you can help it!

Sea cucumbers and sea urchins, sea slugs and starfish, an assortment of echinoderms, molluscs, and crustaceans abound the coral reefs of the Andamans. And one must not forget all the other marine invertebrates! Oh, the sheer diversity of corals and anemones and jellyfish ... Sea whips and sea fans, sea feathers and sea pansies, stony corals and branching corals. The diversity is staggering, and spell-binding.

From the ocean, we return to the seashore. To the mangroves to be precise. An area that is more adapted to the tide, overflowing with life evolved to deal with the dynamics of the flow, one would be hard-pressed to find. The mangroves behind the ANET fieldstation in the Andamans are a lesson in change, and in

adaptation. A scintillating outdoor classroom and laboratory for studying evolution in action. The propagules of the different mangrove species are a fascinating lot, bobbing about in the shallow waters.

The complex aerial root systems, called pneumatophores, are so well suited to life with the tide. They are dangerous things, these superb roots, one realises quickly, wading through waist-deep and murky water in the same area that was soft and gooeey a few hours ago. With the poor visibility, all one is left with are painful pricks in the feet from the pointy roots. The feeling of sinking feet in the clayey soil is therapeutic. Did you notice that faintly foul smell? Watch your step! Some patches have deeply compacted decomposed matter that when disturbed raises a stink. The difference between high tide and low tide is stark in a mangrove.

One hears the call of the mangrove whistler. And sees a crane or rail dash into the reeds. This is wader heaven and a birder's paradise. Islands around the world have really high endemism and the Andaman islands are no exception. Exploring the mangrove makes it an instant open-air classroom. And





*An aerial view of one of the islands*

amphitheatre. The hermit crabs are gladiators navigating intricate mazes in a hurry, while the snails take it slow. Have you seen a crab feed? Have you seen tiny trails of sand pearls, like a delicate necklace, on the beach? Have you seen the crabs scuttle in and out of their burrow homes, playing hide-and-seek with the waves?

A walk on the beach from twilight to midnight introduces us to a whole new dimension of life. Every piece of log, frequently bulletwood in the Andamans, is home to creatures great and small. Come night and the reptilian visitors make their appearance on the seashore. The most venomous snakes on earth have a history of almost never biting humans!

The beach is taken over by sea kraits, their alternating bands of black and white remind us of prison uniforms of yore. There are two species common in the Andamans, the yellow-lipped sea krait and the blue-lipped sea krait. Both can be found hidden in convoluted pieces of wood or slithering between the sea and the sand. Close to midnight, one may be lucky to come by some nesting turtles. If the time is right, as the wise say.

Back on the mainland, whether one is in Chennai or Mumbai, on the east coast or the

**A walk on the beach from twilight to midnight introduces us to a whole new dimension of life. Every piece of log, frequently bulletwood in the Andamans, is home to creatures great and small.**



west, there is always wildlife right in the backyard. A walk in the garden, beach, or creek is all it takes. However, there are issues aplenty. Marine creatures are sometimes ignored as wildlife, and unsustainable seafood consumption has affected many of the world's seas. Marine systems are impacted on all fronts – from climate change, pollution, fishing, sedimentation and whatnot.

The scene on the islands is not far off, fragile ecosystems that they are. There were notorious times when roads in the Andamans used to be lined with shark-fins that were exported to other countries in south-east Asia. Thankfully, this seems to be on the decline these days. Although, even today, a visit to the fish-landing jetty is gloomy and the air heavy



*Juvenile sea krait*

with death. Moray eels, long and small, and fish of various sizes, dead and washed ashore, grotesque with open mouths and glassy eyes gaze back at you lifelessly. Thankfully, the tide is changing. Awareness is on the increase, and sustainability seems to be catching on. There is hope still in paradise.

Everything starts with a walk on the beach. It all adds up, lessons and questions, chaos and peace, life and death. The answers come to you. One step at a time. One breath at a time. ■



### **Kadambari Devarajan**

*Kadambari Devarajan is an engineer-turned-ecologist (computer-scientist-turned-conservationist, if you will) and is currently a graduate student at the National Centre for Biological Sciences. She lives to eat, travel, and read, not necessarily in that order. She is a compulsive reader, unpredictable writer, data geek, insatiable traveler, adventure junkie, highly-excitabile photographer, ardent naturalist, borderline twitcher, enthusiastic FOSS evangelist/user, and food fanatic. The current piece was first published as an online article at [www.kadambarid.in/wildlife/andamans.html](http://www.kadambarid.in/wildlife/andamans.html). The underwater pictures used in this articles were photographed by Rohan Arthur.*

*Facing page: A feather star*

*Page 33-34: Stony coral on a patch reef*

*Page 35: Fishing Boats*













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## The Role of the Government in Publicly-Funded Institutions:

To what extent should the government be setting the agenda for activities of the institution or its faculty?

**Dr. Beheruz Sethna**

**F**irst, let me put this column in perspective. In the December issue of Fundamatics (2Q2015), I wrote a column entitled, “The Golden Rule, Balgram, Michelangelo, IIT, and IIM,” which basically made the case (I should never say such a thing to my fellow IITians – what I mean is that I attempted to make the case) that government bureaucrats are best advised not to be making decisions in the running of colleges or universities— particularly the IITs and IIMs. I quote below some excerpts from that article, though I encourage you to read it yourself at: <http://fundamatics.net/>.

Some may claim that governments (I am talking in generalities because this would apply equally to government-supported institutions in any country) should have control because they provide funding in small or large part. In the linked article, I made the point that having money in your pocket or having the authority to make budget allocations does

not, repeat not, make you an expert in higher education! We need to leave decisions to the experts who have spent a lifetime in that field, not some person in power who has never spent any time running an academic institution.

Now, having provided a little context, in the current article, let me continue to explore these ideas further. Let me give credit to Sudhir Sharma, from the first batch of IIT-B (MetE, 1962), who graciously wrote a comment on my article, and with whom I have set up a dialog on these weighty issues. He wrote to me just after I had started writing my first draft of this column and I was able to use those ideas to respond to him, and correspondingly was able to use some of our dialog to enhance this column! This is a learning process – each gaining from each – which I enjoy very much.

Sudhir wrote:

*“Hi Beheruz, just finished reading your article and enjoyed it!! I don’t know who,*

*besides the government bureaucrats, would disagree with your arguments against the government control on the direction of research or the future expansion/growth of IITs/IIMs just because they control the purse. That could stunt the growth of these great institutions. One can also argue that IITs have flourished in spite of government controls but maybe they could have done even better with total free hand given to IITs. But you will agree that in any case all these institutions need to*

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**Should a government – of any democratic country or state – be able to set the agenda of a public academic institution? Even one in which the government provides the vast majority of the budget. I would still say “No.”**



*work within a development framework for the needs of the country.”*

While I thank him for his kind words, I am going focus on the last sentence, because that was the focus of my rough draft of this column. Do institutions, do faculty need to work within a development framework for the needs of the country?

Here are my thoughts, which may be controversial, but that’s okay, because Fundamatics is a magazine that gets us to think, not just to follow a path carved out by others.

Should a government – of any democratic country or state – be able to set the agenda of

an academic institution? I would say “No.”

Should a government – of any democratic country or state – be able to set the agenda of a public academic institution? Even one in which the government provides the vast majority of the budget. I would still say “No.”

Why?

To repeat myself, having money to allocate does not make you an expert in higher education! We need to leave decisions to the experts who have spent a lifetime in that field, not some person in power who has never spent even one day running an academic institution.

One might get the impression that I am opposed to a public academic institution being an intrinsic part of society or a contributing partner to the welfare of society. Nothing could be further from the truth as some examples which follow will demonstrate. For the record, I believe that academic institutions should be contributing partners to the society of which they are a part. The viewpoint I express here is let them do it. Don’t use political power to force them and certainly don’t tell them how. They know their strengths and weaknesses and they know how best to get the job done.

But, no one should overlay a constraint that the sum total or even the vast majority of work done by faculty in an academic institution must follow some master agenda or “five-year plan” set by the government (any government). The government should not be in the position of managing activities of faculty or academic institutions.

In the language of academe, particularly in the US, there are three major activities of the Faculty: Teaching, Research/Scholarship, and Service. I will analyse these interesting questions along these dimensions.

In the Service dimension, I embrace the idea that a large proportion of the Service we do to the community, the state, the region, and the country should be geared to meeting their needs, particularly for a public institution such

as the IITs – and my own university here in the US – The University of West Georgia. We spend a good amount of time, effort, and energy – both institutionally and individually – to serve the society of which we are a part. We do everything from economic development, to working with schools, to hosting seminars to help the business community, to reading to little kids, and helping people who are in need of help. We work with industry, with the Chamber of Commerce, with the school systems, with social organisations in the area, with charitable organisations, and with the prisons, and have many other socially-responsible activities too voluminous to list. This is the right thing to do. We do this happily and willingly, and well. True; it is also in our enlightened self-interest in the long term, but we do this without government pressure to do so. We do this without government memos. We do this without a government-prescribed plan handed down to us. And, *that* is the way it should be.

In the Teaching dimension, I suggest that academic institutions should be sensitive to curricular needs of the society of which they are a part. For example, if India needs more Electrical Engineers for the foreseeable future, it is reasonable that to expect that IIT (and other engineering schools) should be responsive to those needs. Not because of a mandate from the government, but because the government has access to vast amounts of data that might reasonably be expected to advise and inform faculty and institutions.

To use an example from my time as President of UWG, in the late 1990s (I was President from 1994 to 2013), I was approached by the CEO of a local IT firm who suggested that our Computer Science program was not keeping up with industry needs, and if we were flexible in terms of considering substantive curriculum changes in needed programming languages, it would be beneficial for his firm in terms of recruiting talent.

This was a tough conversation for me. First of all, curriculum is a very serious issue for any institution, and I believe that the curriculum is the prerogative of the Faculty, not of the President. Second, it is not pleasant for a President to hear from a CEO that our curriculum was not current with industry needs. But, instead of getting defensive, I actually saw the potential of what he said. Rather than defining his proposal as benefitting just his firm, I saw this as a win-win-win-win-win-win for the University, the CS Department, our students/graduates, his firm, the IT industry, and for the entire region of which we are part. So, I immediately got the department chair and faculty of the CS department involved, and suggested that they have direct conversations with the CEO and his senior staff. After all, they (the firm and the faculty) were the experts and could talk the same language, while I did not know C+ or was it C++ (I forget how many pluses there were circa 1996-97!) from a hole in the ground.

To fast forward, those conversations went very well; there was some give and take and we changed our curricular and programming emphasis. The results were mind-blowingly great. The firm loved our graduates, they made major contributions to the firm and the IT industry in the area, our CS faculty, students, and alumni thrived (today our online graduate program is ranked ninth in the US in faculty credentials and training and 18<sup>th</sup> overall – see (<http://www.usnews.com/education/online-education/university-of-west-georgia-OCIT0241/computer-information-technology>)). The firm has done exceptionally well and has gone from a local firm to one listed on the New York Stock Exchange. So, my vision of a multiple win occurrence has in fact come to pass.

In spite of success stories such as this, I would oppose any requirement that faculty (at IIT-Bombay or UWG or anywhere) have to design their courses and curricula solely to meet the needs of the government or even of

local industry. Why? Because of many reasons, some of which are listed below:

- a. Many of these principles are universal, and cannot be constrained by what happens to be the immediate need of the country. When we teach fundamental principles (say Physics, Chemistry, EE, Chem. E., etc.) those need take into account – but rise beyond – immediate societal needs or even beliefs.
- b. In this point I will attempt to make the

**But, while we can understand the focus on today or the short term for industry or politicians, we cannot let that drive our teaching needs for students, who – let’s face it – will be just getting started 3-4 years from now. They will be in the work force for the next 40-50 years so, we have to keep a 40-50 year time horizon for them!**



case for the vast, vast difference in time spans of needs assessment. Academic institutions need to have a perspective that is approximately ten times as long as that of government or even industry.

Let’s have a little humility here (a tough sell for an IIT audience). We don’t even know what the needs of tomorrow are, either in the country or in the world, or (who knows) on the moon. You don’t know these, I don’t know these, industry doesn’t know these, and most of all – the government doesn’t know these. So, they should stay out of the business of telling academic institutions what to teach. With the focus on quarterly or even annual profits for industry and with the focus on the next election for politicians, perhaps we can-

not blame them for not looking beyond those horizons. But, while we can understand the focus on today or the short term for industry or politicians, we cannot let that drive our teaching needs for students, who – let’s face it – will be just getting started 3-4 years from now. They will be in the work force for the next 40-50 years so, we have to keep a 40-50 year time horizon for them!

So, what can the faculty do? I have written and spoken much on this topic (in countries ranging from the US to Saudi Arabia, from India to Japan), and it would take too long to insert that discussion here. But to condense those points into one sentence: In addition to teaching them rigour and content in their chosen field, we need to teach young people fundamental and timeless principles, and most significantly, teach them to acquire new information on their own and deal with unstructured situations, so that they have the ability to handle the needs of tomorrow. They should learn how to learn.

The bottom line is that the typical politician cares about the next election a few years from now, but a great academic institution has to care about the next half century. So, we cannot be driven just by the political mandates of the day.

- c. People elect politicians and so they have the right to determine what the priorities of the country are during their terms, but academic truth can never be guided by politicians, or – and this is really controversial – or even by popular opinion. For example, just because the leadership of the time and even most people at the time of Galileo believed that the Sun moved around the Earth, that did not make it so.

So, who should be making these curriculum and course decisions? The Faculty. They are the experts – not the politicians, not even society, not even governing boards, not even presidents of institutions. Of course, faculty should be responsive to input from outside, of

course faculty should be engaged – through research, scholarship, consulting, and conversations – with the outside world, so that they can make good decisions, but once one is satisfied that they are engaged and capable people, we need to leave it to them.

There was a line several years ago from one of these Internet sites (Shift Happens) that has stuck with me:

We are preparing students

- for jobs that do not exist ...
- using technologies that haven't been invented ...
- in order to solve problems that we don't know yet.

For example, regardless of one's politics, I suspect that most of us would applaud the vision of Prime Minister Nehru and the leadership at the time to create the IITs as world-class engineering institutions at a time when the country had many very fundamental issues to address. Consistent with what Tom Friedman says in his classic work, *The World is Flat*, no one knew that one day, Y2K would occur and India would come on the world stage in the IT field. Whatever the thought process was, the IITs did not define themselves as solving only the problems of the 1950s or 1960s. When the world needed IIT graduates, they were ready for jobs that did not exist in the 1950s, using technologies that hadn't been invented at that time, in order to solve problems that we did not even know of when they were created.

So, we cannot be focused exclusively on the current needs of the country when we teach students. We need to trust our faculty and academic experts to make decisions about institutional matters. And, this point carries over to the discussion of Research or Scholarship as well.

In the Research or Scholarship dimension, again, it may be desirable that some applied research be slanted to the current needs of the



country. And, of course, a government can offer competitive funds to encourage research to meet their needs. For example, in the late 1970s, very early in my career, and very early in the life of the United States Department of Energy (USDOE), I competed for and was awarded a grant from the USDOE to do research on electric cars. The agency – not in their own private bubble, but with the help of faculty experts from all over the country – decided on the parameters they wanted investigated, and several faculty from across the country (with no pressure to do research in this area) wrote proposals to the DOE. After review of proposals – again with the help of faculty experts – very few proposals were selected for this honour (among them was mine). I designed and completed (what I believe to be) good research to respond to the needs of that time period. As it happened, I was just about to leave for a year of industry leave in India by the time the approval came through, and so I applied for, and was granted, a delay until I returned to the US. The point I wanted to make here is that I controlled the methodology, the analysis, and the final recommendations, without any interference from the DOE – the provider of the funds. The government did not tell me what they wanted to hear, and I submitted no private communications to the program

manager giving him power to control my final report. I owed them only a progress report showing that my timeline and budget were on track and the final report (which was soon approved). Other governmental agencies such as the National Science Foundation follow approximately the same process.

But, let me be clear. While I see no problem with governments offering such funding opportunities with peer review of competitive proposals, if I were heading the

**I would say that, beyond funding selected areas of interest (which there should be no pressure to follow, and for which they should not control the methodology, analysis, or recommendations), the government should stay out of the business of setting the agenda for teaching, research, and service activities.**



institution or even a sub-part of it, I would be very uncomfortable saying that any particular faculty member should have an identical research emphasis to that of the government, let alone say that all faculty should do so. We should respect quality research and scholarship – “quality” being judged by one’s peers in the field (journal review boards, preferably international, and preferably blind reviews) – regardless of where it takes us.

Why?

Because, just like the discussion on teaching and curriculum above, we do not know today where tomorrow’s research needs lie. Just as governments should not dictate teaching and curriculum, so should they stay out of

the business of managing individual faculty research.

Basic research of course, is not geared to any particular need of the hour, but even applied research can – does not *have* to have – application to the immediate need of the country.

In fact, I would go further, and perhaps be even more controversial: Sometimes, good research may even run counter to the immediate desires of the government. The government has the right to fund desired areas of research but not, IMHO, the right to stifle alternative areas of research.

There was a case that stood out in my mind in the 1970s or perhaps early 1980s (I was a junior faculty member at the time with no ties with any of the actors or indeed the institution in the case, so I was completely unbiased). A faculty member in one of the state universities in the Mid-Western United States published research on the negative health effects of eating a lot of beef. (Please note that I am not getting into the ban on beef controversy in India! That is not the point of this anecdote, which did not call for a ban but simply suggested that an emphasis on eating less beef might be healthier.) To complicate this scenario, that state got much of its revenues from the sales of beef, and so there were calls for her dismissal. There were claims that her salary came to a significant extent from sales of beef, and she was an ungrateful person and should be fired. Regrettably, these calls came not just from politicians (who we have got used to behaving this way), but also from regular citizens who were offended at her research, and some media that wanted to get into the act. Well, as it turns out, in spite of all the political “noise” of that time, her research was vindicated several years later!

But, that’s not my point – my point is that research should never be decided by politics, by political expediency, or even by popular or media opinion (remember Galileo?). Inciden-





tally, I would conceptually have been equally supportive of a good research article contradicting her findings, of course.

I am a freedom of speech nut, and feel that part of the sacred duty of academe is to create and foster an environment in which different opinions (based on the scientific method) should be respected and encouraged, even if some people, or indeed many people, or indeed if even most people disagree with the results. The pursuit of truth and knowledge should not be enslaved by any one political viewpoint. I would respectfully suggest that the response to speech that one finds wrong or even offensive, should be *more* speech rather than gagged speech. What that means that others have an equal right to offer a contrary viewpoint. Of course, we know that all over the world there are countries where people have no speech rights at all. But, it should never happen in a democracy or a society that prides itself on principles of democracy, on freedom, and on human rights.

As another example, I happen to believe (with all the caveats of this not being my field of expertise) that climate change is real and is at least partially caused by our actions. But, my principle of freedom of speech trumps these beliefs – in other words, *of course* opposing viewpoints need to be heard and taken seriously. Unlike some people, I don't claim that only viewpoints with which I agree need to be heard!

Some say Voltaire said something like this, but whoever did, I agree: "I may not agree with what you have to say, but I'll defend to the death your right to say it." Some say we should credit Voltaire with this quote, and others disagree, but whoever said it, I agree!

Before I close, let me add one more example of the points I have tried to make above. I am indebted to Sudhir Sharma (from the first IIT graduating class) for this one, and he expressed it very well in a message to me, so I am quoting him below:

*Our batch on the occasion of Golden Jubilee celebration of graduation in 1962 set up a legacy chair in honour of Dr. PK Kelkar who was first Dy. Director and Planning Officer of IITB during the first year in 1958, and our batch loved him for a great person he was. So we collected funds from our classmates to set up a nano technology chair in his name -First Batch Dr. P. K. Kelkar Chair in Nano Technology in 2012. Dr Vasi of EE was the first Kelkar Chair professor, he has retired now and another professor in EE is holding this chair. As the name implies it was set to support research efforts in nanotechnology which we thought could be very beneficial to India. Everything is left to the chair professor to explore the wide field of nanotech without interference from us or anybody else, it's up to him, the expert. And of course IIT will not accept the funds if we were to micro-manage their efforts - this is similar to many legacy projects set up by other*

batches at IITB.

*So the golden rule here was just to specify the research area and leave the "driving" to the experts!*

Here is another example of my basic point. If you have money to give or allocate, please do it. Certainly, the donor or the government has the right to set broad parameters. IIT-B cannot take those funds and throw wild parties with them or use them without permission in ways not specified earlier. But

**However, correspondingly, the institution and its faculty should be aware of, and sensitive to, the needs of the society of which they are a part, but not necessarily be exclusively focused on or obsessed with meeting the need of the hour.**



after that, the donor or the government is best advised to stay out of micromanaging the way in which the research or teaching gets done. In Sudhir's words, we should "leave the driving to the experts."

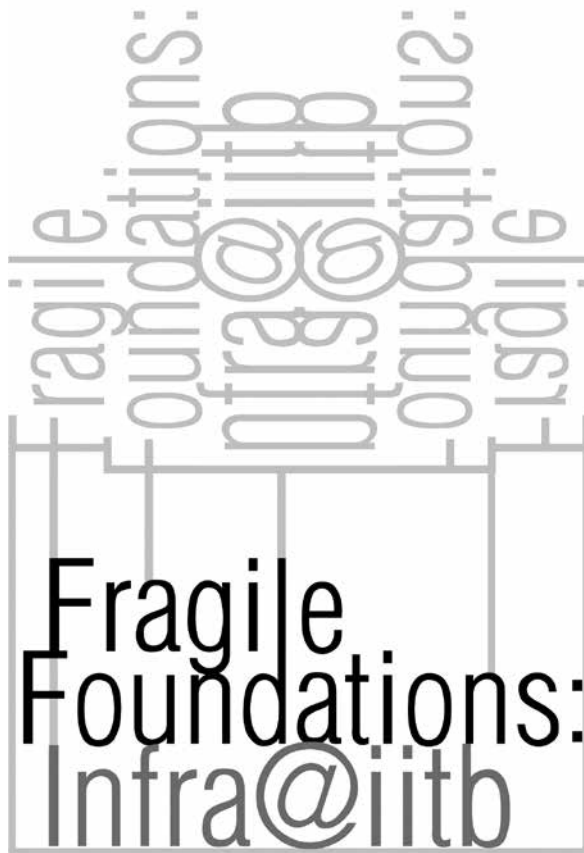
So, to answer my original question: "To what extent should the government be setting the agenda for activities of the Institution or its Faculty?" I would say that, beyond funding selected areas of interest (which there should be no pressure to follow, and for which they should not control the methodology, analysis, or recommendations), the government should stay out of the business of setting the agenda for teaching, research, and service activities. However, correspondingly, the institution and its faculty should be aware of, and sensitive to, the needs of the society of which they are a part, but not necessarily be exclusively focused on or obsessed with meeting the need of the hour.

Institutions and faculty have a more strategic and important role to play, and indeed a sacred duty – to prepare ourselves and our students to meet the (as yet unknown) needs of the future... ▣



**Dr. Beheruz N. Sethna**  
B. TECH, '71, ELECTRICAL  
ENGG, H4

*Dr. Beheruz N. Sethna is a professor of business and retired sixth President of the University of West Georgia (UWG). A distinguished alum from both IITB and IIMA, he is the first known person of Indian origin ever to become president of a university anywhere in America. He also obtained the University's first endowed Chair. Beheruz has published a book and 69 papers (30 since becoming UWG President), several case studies, and obtained externally funded research from the U.S. Department of Energy, IBM, AT&T and others. Amongst his many awards, he has been named among the 100 most influential Georgians. He has also been awarded Founder's Award the highest honor from the University of West Georgia.*



**Panelists:** Anees Vp, Anurag Chafale, Aprajit Lohan, Chandni Rajendran, Garry Ferrao, Himani Mehta, Mihir Bhosale, Sumit Shekhar

**A**s the institute struggles to deal with the growing number of students on one hand, and budget cuts on the other, the struggle is reflected in the infrastructure found herein. To add to that, Mumbai's weather is moderately hot and highly humid, and poses a significant challenge in structural integrity. Many structures in the institute, like hostels, VMCC, Workshop Bays, and Infinity Corridor face various problems, especially in the monsoon. It is essential that IIT-B's image as the premier institute of our country with the best of infrastructure be maintained and

all steps be taken by the authorities for this. We aim at exploring the causes and effects of these issues and institute policies formulated thence.

### *Crumbling Hostels*

Recently, in H9, the bottom layer of a patch of the room's ceiling fell down all of a sudden, dropping debris on a student's laptop (thankfully he wasn't present there then, and hence was not injured), leaving the reinforcing rebar exposed, which seemed rusted. Previously, an entire balcony in H2 had collapsed, with thankfully no injuries.

While it is understandable that these hostel buildings are pretty old and need and undergo maintenance, dangerous incidents like the ones above leave the status of the safety of hostels hanging in the mind of students.



*A picture of the result of the fallen ceiling debris. Courtesy Tushar Singh Thakur.*

Structural integrity is the study of the safe design and assessment of structures against the failure caused due to weather condition, external dead load, and design limitations and such tests need to be done on hostel buildings from time to time.

Major leakage issues were experienced within a year of construction in H15 and 16. There were problems with the drainage system, including improper slopes in bathrooms and easily clogging drains. Clearly, the contractor has not done a satisfactory job with respect to quality and overall finishing.

Presently, the hostels 4, 5, 6, and 7 have false walls in the rooms which will be soon converted to proper walls and major reconstruction work is going to be done in H4 and H8. It has been observed that the last wing of H7 has started to sink. H7 will be replaced by a building similar to hostels 17 and 18, which have received permission for construction and are awaiting sanction of funds.

Along with the structural issues highlighted above, there lies an even more pertinent problem - that of capacity. Accommodation

issues faced at the beginning of semesters have become a start-of-the-year norm. There are two reasons: firstly, the student intake has increased, and secondly, the temporary hostel arrangements which are made towards the beginning of the semester. This process takes a long time - till the month of September at the least - for the issues to be resolved smoothly. There is a need for proper planning methods/systems.

Since there are issues like limited space in the institute, coupled with increasing number of students, the only way to manage this situation is by going vertical with double loaded corridors. Hence all the new hostels henceforth will be made using this design unlike the buildings of H12, 13, and 14 which use up much more space.

It is estimated that the construction of hostels 17 and 18 will need 2 years to finish. It will be a 1000 single room building for students, along with 12 double room twin sharing basis with the intention of providing for parent's stay if required. One of these two hostels will be built between H5 and H9 and

one will be built between H8 and H7. The allocation to single rooms of the hostels and the new hostels will be done based on a Common Seniority List (CSL).

#### *How are contractors hired?*

Contractors for building hostels are selected on the basis of the lowest bid made by them after floating quotations. A team of Dean IPS, Associate Dean IPS, OSD and experts are responsible for overlooking the construction of new hostels. After the plan has been proposed, they review it and freeze the designs, send out quotations, and during the construction process too, they have regular site visits and review discussions. Efforts are being made to make all the new hostels as eco-friendly as possible, like solar heaters in H15, 16 etc.

#### *The VMCC Verdict*

The Victor Menezes Convention Centre was inaugurated in 2011 and is used as a venue for conferences and lectures. Considering that many of the dignitaries that are invited to IITB come to VMCC, it does not serve to create a good impression, given the PoP (Plaster of Paris) work deteriorating in many places, and the lack of weather protection on the side facing Hillside Road.

Top two floors of the building house laboratories of Civil Engineering. However, as per the opinion of many regular users of the building, it is not designed properly for the harsh monsoon conditions of Mumbai, and though the Institute is spending lots of money on maintenance, it seems to be futile.

The canopy, which was the architectural identity of the building, collapsed in last year's monsoon season, but till this date has not been restored. It was supposed to protect the building from heavy rain but it hardly served that purpose. Due to this, many of the laboratories on top floor get exposed to rain.

Heavy PoP work done on roofs of open foyers is deteriorating and some parts have already collapsed due to rain exposure. This has

already affected the ambiance of the building (the problem with external PoP work is also found in the refurbished PCSA, where the foyer shows stains already). Secondly, pigeons use this PoP work for shelter, which creates nuisance (usually PoP is used for interior decoration and not for exterior as it deteriorates drastically when exposed). To avoid these failures, the Institute erects temporary structures which stop the monsoon rain which is main cause for them.

The building also has a central air cooling system which fails to provide proper cooling at top floors and there is condensation leakage from its pipelines, leading to deterioration of the false ceilings in the rooms.

New CSE and Computer Center Building

While it is a good thing to match the infrastructural level of institute with the rest of the world, the environmental aspect of construction must not be ignored while doing this. The New Computer Center which is under construction has architecture which, instead of paint, uses white PVC cladding on the outer side of the walls, which makes the building attractive and also helps in maintaining optimum temperature inside the building across the year.

However, the use of such wall cladding generates more heat in surrounding areas due to high degree of reflection of sun rays. This might have an adverse effect on the surrounding environment. This building also seems to have very few openings and windows for sunlight to enter, and the result is a larger consumption of electricity and lighting during the day.

#### *Workshop Bays*

Workshop bays are few of the oldest buildings in institute. During monsoon, roofs of the buildings are covered with plastic sheets to avoid leakage from roof. It seems that these buildings are hardly ever painted and have not been made weather proof. Usually, buildings in heavy monsoon areas must be painted every

2 to 3 years to ensure that they are protected from damage.

### *Infinity Corridor*

Infinity corridor is one of the most iconic structures in the institute. However, the state of the corridor is extremely unsightly and seemingly dangerous. Many parts of corridor are supported by scaffolding of steel rods and wood which means this structure can collapse any time if the support is removed. The deteriorating condition of the corridor near Mechanical Engineering and also the library is fairly well known. The roof of the corridor is of the form of undulating triangles spanning the corridor transversely, and this may not be the most efficient design to get rid of the rainfall. Other than this, the corridor faces leaks during the monsoon and has also seen spalling in many places with the rebar visible. Again, direct exposure of structure reinforcement to weather is weakening the structure.

The floor of the corridor is very slippery during monsoons, and may cause minute accidents to pedestrians. Some tiles have also come off or have broken down in parts of the corridor. This has also made movement around there extremely difficult for students on wheelchairs. According to some of the institute's physically disabled students, the corridor is impossible and dangerous to use during monsoon.

However, this could change in some time. Plans for refurbishing the corridor have been made and comments on the plan were invited by Dean Planning in December 2015. Part of the plan - the corridor between Workshop Bays and Library as well as the new shed-like construction which shall house a coffee shop - are already in place. Further, this plan seeks to strengthen the Arch and perhaps rebuild the corridor around Mechanical Engineering department and the Library.

### *Poor Footpaths*

The condition of the footpaths at many locations is also deplorable. During the mon-

soon these footpaths become slippery because of moss, and the institute's solution is to use bleaching powder to reduce the slipperiness. This is a temporary arrangement, as well as being irritating with the heavy chlorine stench around the footpath.

Last year, new lamp posts were installed beside the foot paths on some streets. Near H7, however, due to poor foundations of lamp post, some of them began bending slowly from base and destroyed the adjacent footpath. No notice was taken by any official authority till the lamp posts actually collapsed on the paths.

Another problem with construction is debris being strewn on footpaths and not being picked up for long. This sometimes occurs near areas with heavy student footfalls (e.g. the road between LCH and PCSA-Civil) and can also be an impediment to safety, let alone being a nuisance.

However, the constructive work done by the Institute cannot also be ignored. IIT Bombay boasts of a significantly large number of footpaths with ramps which make them very accessible to students with special needs. New footpaths near SoM/Convocation Hall are being built as of January. New footpaths have also been built beside H10 and near H15 and it is hoped that the institute takes such examples ahead.

### *New Bus Stops*

The permanent bus stops were constructed which helped save money that was annually spent on temporary bus stops sheds. The newly built bus stop for Hostel-12-13-14 collapsed within a short span after the construction. The cause is still not known. However, this bus stop was reconstructed with similar design, thereby leaving no guarantee of a possible collapse in the near future.

### *Lack of facilities*

Not all the buildings are easily accessible to people with special needs. The entry to the SAC can be improved for better access



to people with special needs. There is also a prevailing lighting problem in the institute's premises. Many students like taking a stroll in the campus, and keeping in mind the general safety concerns of students, better lighting solutions need to be used, especially near places like IDC

#### *Issues with the construction process*

Construction causes severe noise which turns out to be distracting and a cause of hindrance. Reconstruction of labs and offices is not planned efficiently, which leads to research students and professors lacking the space to work. Often, safety precautions are not in place, with live electric cables are all over the place, for example. There ought to be signs in place indicating areas where construction is going on (especially with respect to minor construction and maintenance work), so that there are no accidents.

It has been seen that there are problems after a newly built structure is finished. After H15 was constructed, the work for H16 was going on. However, for an entire year there was no properly paved road leading to H16. Similarly, the road leading to H15's gate (the position of the gate of the hostel has now been shifted) was strewn with potholes, making walking to the hostel very difficult during the rains. The new Gymkhana building also has an improper finish with respect to the connecting road. Last year, large ponds of water had accumulated just outside the compound wall of the new SAC building, which clearly indicated a lack of sufficient drainage offered there.

#### *Building the institute's image*

While there is a large amount of work left to be done on various fronts as the Institute yearns for a spot amongst the top universities in the world, it should be known that crumbling hostels and corridors don't really go well with that image. The immensity of the task of maintaining such a huge institute is of course, a challenge. However, this won't help one

deny the situation on ground - further hostel collapses and leaky and creaky living spaces, more students inhumanely stuffed into hostels, and a general lack of aesthetic.

It's not all hopeless, though. With the new H10 being constructed, UG girls can finally look forward to single rooms in their last year just like the guys, while the new IITB-Monash Centre looks extremely pleasing. These are just a couple of examples where the institute has taken steps, and it would be great if good infrastructure is something one could look forward to in the near future. ■

**insight**  
the third eye

#### **Insight Team**

*This article was contributed by the Insight team. Insight is the official student media body of the IIT Bombay. Insight is currently the only active official media body in the institute run voluntarily by students. This article was originally published in 18.3 edition of the Insight magazine.*



## The Six Intelligent Men at Kitzbuhel

Raj Nair

Six world leaders hold an emergency summit at the Austrian ski town, Kitzbuhel, to discuss how the ISIS crisis, oil, commodities and China's slowdown could drown the world in 2016 unless they jointly did something. They ended up merely sharing some data to justify what each one was up to. The Indian PM Modi, on his way back gets his advisor to explain to journalists on board his aircraft, what all that data that he got at the summit, really means for the world and to India in particular. 2016 will be a tough and volatile year, in which oil prices will drop further. At some point however, oil price will creep up. Some parts of the world would be worse off than last year, especially OPEC, Russia, etc. Disturbances would affect Latin America. The ME could be a tinderbox that could send oil prices up again. China will be in transition, not likely to lose its global market share but some domestic market 'explosions' will keep China in the news and the global stock markets on tenterhooks. This will affect India's bourses as well despite the Indian economy pulling upwards because FDI starts finally kicking in,

inflation remains under control and fortunately, decent monsoons and low oil prices help Modi to keep the GDP a little above the 2015 rate despite fall in exports. Who will the winners and losers be? Will speculators exploit the vulnerability of the situation to trigger a crisis?... Read on for more.

*Disclaimer: This is a fictional story with real characters and the views expressed are entirely those of the author and not of the persons named in the story.*

The world had become an uncomfortable and fearful place not just for ordinary citizens but even more so for the leaders of nations. There is talk about war, terrorism reaching the most unlikely of places, a global crisis because of China's slowdown, global stock market meltdown and an impending financial implosion due to huge debt burden led by the unprecedented crisis in commodities, and countless other unhappy thoughts, making 2016 a very worrisome year. The heads of state realised that the world was at a crossroads and that they had to pull

together in the right direction. The leaders of some of the most populous countries decided to achieve that by meeting at a small Austrian ski-town called Kitzbuhel. The US, the UK (yet to decide whether they want to be in the EU or not), Japan, China and India got automatic entries. The US got Russia be tossed out. Since the heads of the five biggest countries in the EU were very busy due to their Christmas-New Year commitments, they opted to be represented by Jean-Claude Juncker, the President of the European Commission who would do an admirable job of providing dispassionate inputs and of carrying the message back to each member of the EU, not just to the Big 5. This group of '6 Intelligent men at Kitzbuhel' on December 28, 2015 was aptly named, KI 6 for obvious reasons, and also because KI 6 happens to be the acupuncture point just below the ankle, which if pressed would rid the body of fear, and fear is what brought these six men together.

Each of them was required to present the key issues from their own perspective so that the common threads linking all of them could be treated as the world's real problem to be solved. Obama was quick to explain that he down in the last year of his term. Since he wanted to leave his Presidency in a blaze of glory, he said he did not appreciate the crash in stock and commodity markets, followed by potential real estate price crash. Likewise, he wanted the Russian supremo, Putin, to be caged to bring peace to Europe (and increase fuel supplies from Russia too) by keeping the price of crude oil below \$50 per barrel.

Jean-Claude wanted to know why \$50 when many speculators were expecting sub-\$20 prices; at which point, Obama referred to his iPad and rattled out the oil price at which each country's national budget would just about get fully funded. Russia clearly needed \$60 and if the price stays at below \$50 long enough, there was even a possibility of Putin getting ousted. President Xi quipped that

before that happens Putin will get terribly belligerent. Intervention in Syria is just the start.

The Indian PM, Modi immediately said that Putin may open more military fronts in oil producing countries not just to fight back but also with the intent of creating uncertainties in oil supply. That would automatically push oil prices up. Obama then remembered that he was under pressure from the Jewish lobby to raise oil price a bit, to protect the struggling US shale oil industry that pumped

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out nearly 5 million barrels of oil per day in 2015. Some shale oil companies are on the verge of economic collapse which could send shock waves in the US financial sector. After all, since shale oil helped US reduce its dependence on Middle Eastern oil, the shale oil industry and Junk bond holders wanted help to push oil price north of \$45, preferably close to \$65 in 2016. If the shale oil sector collapsed due to unaffordable oil price, it would cause a shift in the US stance towards the Arabs. Obama had assured the lobbyists that they had nothing to fear because the Saudis may reduce oil supply since he had offered to invest in Saudi Arabia to help it diversify its



oil dependent economy, when King Salman visited the US in September. David Cameron pleaded that, the US should talk quickly to the Saudis about reducing oil production to 9 million barrels per day which would suck out some surplus oil from the market. That would save the US shale oil industry (and what he left unsaid was that the UK had issued 93 licences for 159 onshore blocks, just before Christmas, to explore for shale gas/oil and coal bed methane. He desperately needed them to become viable). “No” said President Xi, whose country’s slow-down in 2015 was cushioned to a great extent by cheap oil. Looking at Obama, “My country carried the burden of the world’s growth for the past 15 years and at the start of that cycle the price of oil was only \$23 per barrel. Even after taking into account inflation, there is no justification

for more than \$50 per barrel”. Modi smiled because he was saved the need to resist the UK suggestion. But he decided to add his spin to it. He was against oil price hike at this stage because a \$30 per barrel increase would make the ISIS richer by \$16 billion per year which they will happily spend to hit Western and probably, Indian targets. Further, the UAE and Saudi leaders whom he met in 2015 had urged him to influence world leaders into not letting Iran open its oil spigot (potentially 2.5 million barrels per day) which would double the global oil surplus. ‘No market share and no price rise benefit for Iran’, the GCC demanded.

Xi then told Obama that if USA were not greedy to earn more than \$30 billion each year by exporting arms, the world would be a better and safer place, and oil prices would be at a price that is fair to producers and users.

Table 1

*Highlights of China's 12<sup>th</sup> Five year Plan  
(2010-15)*

- Achieving an average real GDP growth rate of 7% and ensuring that incomes rise at least as fast as GDP;
- Promoting the services industry (with the goal of expanding service sector output to account for 47% of GDP – up four percentage points from the current level);
- Welcoming foreign investment in modern agriculture, high-technology, and environmental protection industries;
- Turning coastal regions from ‘world’s factory’ to hubs of research and development, high-end manufacturing, and services;
- Lengthening high-speed railway and highway networks;
- Increasing expenditure on R&D to account for 2.2% of GDP;
- Expanding non-fossil fuel to account for 11.4% of primary energy consumption;
- Cutting water consumption per unit of value-added industrial output by 30%, energy consumption per unit of GDP by 16% and carbon dioxide emission per unit of GDP by 17%;
- Increasing the minimum wage by no less than 13% on average each year; and
- Building 36 million affordable apartments for low-income people

Also if the Western world’s financial wizards were to not indulge in speculation, not just oil but all commodities, would be in the market at a fair price. In fact, speculators, according to Xi are the biggest challenge to be addressed by the KI 6.

An annoyed Obama said that he would like the others to explain their problems. The noncontroversial but adventurous Abe stood up, bowed and then explained that Japan’s basic problem of ageing population,

**He was against oil price hike at this stage because a \$30 per barrel increase would make the ISIS richer by \$16 billion per year which they will happily spend to hit Western and probably, Indian targets.**



etc. cannot be solved by the world and half seriously, enquired whether the world could at least consider exporting some inflation to Japan. “My country has an ageing population, low domestic demand and a huge debt mountain. My country’s situation is such that a mere slowdown in exports in 2015, especially to China has almost derailed my plans to coax Japanese companies to increase wages in Japan. I need to reflate the Japanese economy. Hence I don’t want any discussion today on the bad impact of QE in Japan on the global economy. I need to QE or negative interest rate for a while irrespective of what you gentlemen may have to say about the debt-led global crisis.” President Xi assured Abe that he will send Wang Yang, his Vice Premier in charge of economic relations and trade very soon in 2016 to start a dialogue to increase trade but also talked obliquely about the need to sort out the old wound, the ‘comfort women’ issue. A relieved Abe agreed to meet Wang

personally in Tokyo.

Modi piped in and offered to make it easy for Japan to invest in India to manufacture products for the world. That will also mean that India will import more from Japan in 2016. He reconfirmed his decision to get Japan involved in a massive investment in Indian Railways. He also explained steps to speed up Japanese investments in select economic corridors in India which according to Modi will be a win-win for both countries. It was

**Since Xi knew that no one, not even his own Polit-Bureau trusted Chinese economic statistics, he decided to make his points with as few statistics as possible.**



now the turn of the visibly stressed Chinese President to explain the problems from his perspective. Since Xi knew that no one, not even his own Polit-Bureau trusted Chinese economic statistics, he decided to make his points with as few statistics as possible. The short term concerns that he was prepared to admit were, pollution, food price inflation, endemic corruption, high expectations of his citizens for a better life, etc. His Government was capable of handling them. Even the problem of ageing population will get sorted out in a couple of generations because the one-child policy has been done away with. He claimed that the reported financial mess that Chinese SOEs and Local Governments are in, were exaggerated (everyone knew that he was being economical with truth on the shadow banking crisis) and that the serious financial problems being faced, the periodic call for democracy, the Tibetan and Uyghur issues, etc. are part of the bigger Western conspiracy to prevent China from breaking into the league of

developed nations in the next two decades. Xi emphasized that the US-inspired Trans Pacific Partnership (TPP) is primarily aimed to group various Pacific-rim countries that account for 60% of the world trade against China. “We have, for far too long, picked up the crumbs from the rich man’s table. No more of that, gentlemen”. Turning to Jean-Claude, he said that China was prepared to even part-fund his ambition of re-industrialising the EU with Euro 300 billion of investments. That settled it for the former Prime Minister of Luxemburg and current EC Chief who needs this promise to be fulfilled for Left support in the EU parliament during his 5 year term. That China fuelled the economic growth of the West for the past 15 years is a fact. Xi clarified to the KI 6 that while China’s growth has slowed down a fair bit, it has happened by design. He gave a hand out (see Table 1) about China’s 12<sup>th</sup> Five year Plan (2010-2015) which clearly stated that they wanted the average GDP growth rate during this period to be only 7% starting from a double digit rate in 2010. It is hardly surprising that the growth rate in 2015 is probably sub-7% (the actual being lower than the official estimate of 6.8%). Wage inflation was not a surprising consequence but a stated objective of the plan. So also was the conversion of much of SE China from the ‘factories of the world’ to ‘high end manufacturing and R&D Centers’.

Xi added that wages would be made to double in the next 5 years in order to attain inclusive growth. This got Modi thinking about what he needs to push for in India.

He extended an olive branch to Obama to work together on improving bilateral trade relationships and Chinese investments into the US. What he really wanted was protection from being shorted by speculators.

Juncker shared the EU’s belief that Europe would perform a shade better in 2016 but he clearly outlined the challenges posed by refugee influx and the fact that relief policies were





getting stunted by the popular notion that opening the gates to refugees makes it easier for terrorists to slip in. The KI 6 discussed many more issues but did not agree on the problems that need to be tackled collectively nor even whether there is an immediate credible threat to the world because of some economies being driven to the ground by speculators; hence no strategy to deal with the impending crises was discussed. The leaders agreed to meet again before spring when things could be clearer.

#### *The on-board briefing*

Prime Minister Modi's team had poured over the reams of data presented by the KI6 and had prepared a comprehensive briefing note. Modi informed the journalists accompanying him back to India that he and his economic advisor would answer only the following relevant questions that his team had

selected from the many that were posted by them, and that would pretty much cover all that needs to be discussed.

- Will the oil prices dip below \$20 per barrel and will that make the world a better place?
- Will the Chinese economy collapse as is being feared by many?
- Will we see a global financial crisis again?
- What will happen to the US and Europe in 2016?
- How will all this impact the Indian economy?

#### *Will the oil prices dip below \$20 per barrel?*

"I don't know whether the oil price decrease will make the world a better or worse place, but the oil price will impact the global economy", said Modi. He went on to explain that no one can predict the exact oil

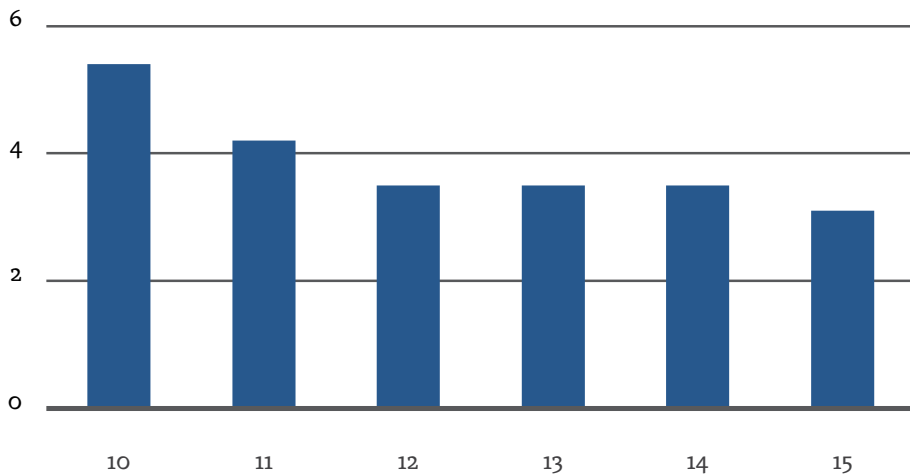


Table 2: Total GDP Growth (IMF)

price but it is clear that even as the New Year dawns, there will be a further dip. But soon, he realised that it would be improper for a PM to get into the specifics because of the sensitive polemics associated with oil prices.

Dr Z, the only non-government member of Modi's team took over and explained that the views he is going to express are his own and not that of the Government.

He was sure that the current sentiment of economic stagnation and the Saudi desire to retain its market share will ensure surplus supply. The almost certain lifting of sanctions against Iran in January, will also cover up the likely fall in shale oil production in the US at the current low oil price levels. It will also make it possible for Iran to weather its budgetary shortfall because of the likely unlocking of nearly \$100 billion of Iran's legitimate wealth stuck due to sanctions. The price drop might happen immediately in January and there are many who predict oil price below \$20. If that happens there will be a huge reaction in countries that cannot sustain themselves at those prices. Russia, many ME oil producing countries, Nigeria and Venezuela, etc. will get

hit hugely because their national budget at the current level of expenditure requires oil prices to be North of \$100. Iran needs \$87 but can manage for a while. Algeria and Libya which require a price of \$96 and \$269 respectively are big problems brewing very near Europe. They could be the next big trouble spot because there is not much their Governments can do. Russia needs a price of \$60 per barrel and without that Putin will have to cut back on Government spending only to register the second year of negative growth. Saudi Arabia, the rich boy in the suffering lot, needs a \$106 price to balance its spending, else will have to cut its 2016 Budget (already announced) and sell more of its Sovereign Reserve, dilute its holding in some of its crown jewels like SABIC, ARAMCO, etc., cut down subsidies on petrol, gas, water, animal-feed, etc. to keep its deficit manageable. But by some of those unpopular moves, it could be setting itself up for exploitation of Saudi citizens' sentiments by the ISIS which wants to ultimately wield power in the land of the two Holy Mosques. ISIS wants high oil price because it is dependent on oil that it ferrets out of Iraq to fund its

war on the world.

“Will a further oil price dip make the world a better place? For some yes, but not for the locals and expatriates working in the ME if construction and infrastructure building slows down as it did in 2008. Indian workers may have to head home. Imposition of new levies like corporate income tax in some guise or form, in not just Saudi Arabia but in many parts of the Middle East is likely.

In some OPEC countries there could be attempts by locals to destabilise their Government. For some actors, it would be imperative to disrupt oil supply, start wars and create unrest in the oil producing region to push oil prices up. This situation is cut out for the press to conjure interesting scenarios. It is my personal view that for these reasons, oil prices will rise again sometime during 2016 or early 2017 but the average price for the year will still be low enough to favour oil importers, like China, India, the EU, etc.”.

#### *Will the Chinese economy collapse?*

On China, Dr Z said confidently, “China will not collapse and that it is just an economy struggling in the transition from investment-led growth to consumption-led growth which has never a predictably smooth glide path. Personal consumption will not rise fast enough unless somebody puts money into people’s pockets.”

He said, “China will soon announce its 13<sup>th</sup> Five Year Plan in which you will see its intent to double wages between 2015 and 2020. The Polit-Bureau is aware that it has to convert China from the factory of the world for low cost production of toys and lingerie to a hi-tech manufacturing country with a strong R&D base (since the Western world will be in no particular hurry to supply the much needed intellectual property). China will continue to further push the share of services in its economy, as it did in the 12<sup>th</sup> Five Year plan to increase the share of services in its GDP to

48% in 2015 at the expense of the share of manufacturing. The obvious reason is that pollution levels had become unsustainable because of the old type of manufacturing. The overall sentiment in manufacturing reflected in the sub 50 manufacturing PMI is related to this and the drop in demand for exports to the global economy. “Let me tell China watchers who missed the details that China’s share of exports actually increased in 2014 and 2015 despite drop in actual exports. There will be a slowing of growth rates to below 7% or even 6% for 2 or 3 years. In the meanwhile, their

### **Dr Z, the only non-government member of Modi’s team took over and explained that the views he is going to express are his own and not that of the Government.**



Government is encouraging their manufacturers to not only go up the value chain but also move their labour intensive manufacturing to other countries. If India Inc. gets its head together, it may be possible to buy non-polluting manufacturing plants at low prices.”

#### *Is another global financial crisis in the offing?*

“According to the IMF, 2015 was the worst year for global growth since 2010 (Table 2).

They, the World Bank and several economists expect 2016 to be unspectacular but a tad better but a few like the Royal Bank of Scotland feel that 2016 is likely worse than 2015. Most economists’ estimates are in the range of 2.6 to 3.2%. Those statistics don’t matter in a bi-polar world. The mood in the US and Euro zone is positive with expected growth rates of 2.5% and 1.7% respectively. Japan is still uncertain. Both, Japan and the EU, will do more Quantitative Easing or have

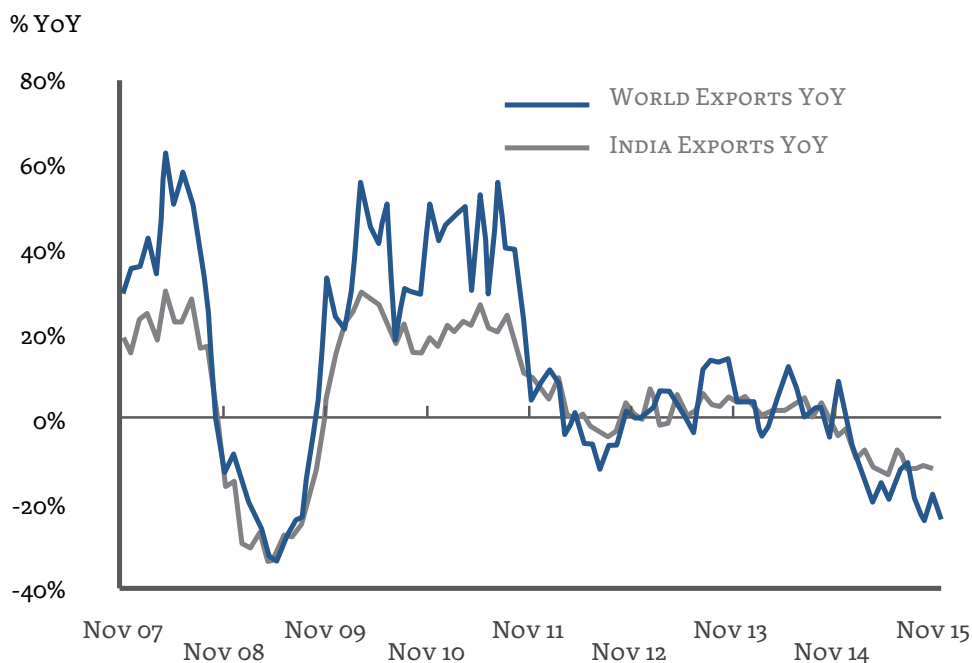


Table 3: Trends in exports - India and the World

negative interest rates to bolster their economies. Germany can expect to grow at 1.75%, France and Italy at 1.3%, etc. Don't look at the world through the developed countries' lens but understand it from the emerging markets perspective because in the last 5 years, they accounted for 56 percent of the global GDP (PPP basis) and 79 percent of all the global growth came from them. That will not just reduce in 2016, but there will be serious unevenness within emerging markets including some shocks. China's slowdown should have been expected, according to President Xi. For long, China prevented the global economy from shattering through its insatiable demand for commodities and other goods but this time around, such help is not forthcoming. Hike in interest rates by the US will lead to more outflow of money from emerging markets which add to the misery of low commodity prices. Devaluation of the Yuan and strengthening of the Dollar will upset the best laid plans of emerging markets. China accounts for 25 to

50% of the exports of most African nations, about 33% for Australia, etc. There has to be an impact on them as also on the US, Germany, Japan, South Korea, Brazil and Malaysia whose annual two-way trade with China is between \$100 to 500 billion each. Thailand, Brazil and South Africa are big worries because of high short term debt. If everyone plays safe, it could lead to a global slowing down in 2016. These and the anxious situation in the ME, Iran's likelihood of pushing oil into the market, etc. have become a planner's nightmare. Speculators thrive in such situations. Don't forget what George Soros did in the 90s. The situation is again ripe for a big punt. Dr Z wistfully said, "Borrowing demand from the future to make the present look better is kicking the can further down the road. That is what China may do to soften its landing in 2016 if things go out of control. Some other countries will try to bolster their economies, by borrowing money to create de-



mand, hoping to repay from future earnings. That is going to be toxic if one depletes the ability to service the debt in the future without more borrowing - a Ponzi game at best. This is an opportunity for a serious move by moneyed speculators to short the economy. I am not saying that the opportunity will be seized but it could be.”

“In the Global Financial Crisis of 2008, some prior warning signals were visible. The KI6 met at short notice because some of them could read some smoke signals.”

#### *How will this affect the Indian economy?*

The press was eager to know about implications of all this on India. Dr Z was clear that 2016 would not be a trailblazing year for India though it would be a bright star in a dull global economy. He lightened the atmosphere with a quiz on the likely fastest growing economy in 2016 but disappointed the audience by saying that it would be Turkmenistan and not India. He said, “This is the year in which we need to get global businesses around the world to invest in India and thankfully, Modi

had spent the better part of his 20 month reign, marketing India to other countries. Sadly though, the Indian economy is going to do only slightly better in 2016, than it was in 2015. The failed monsoon in 2015 has reduced the spending power of rural India although agriculture per se accounts for hardly 30% of the rural income these days. FMCG companies will continue to hurt for the next few months. We can expect a decent monsoon this year because El Nino would have petered out by then. In fact, for added effect, he said that El Nino is currently at its strongest in recent times, causing the eastern part of the Pacific Ocean to warm up. The California coast is likely to get rains. It is expected to peter out by spring 2016 and if it does, we may have adequate SW monsoon in India. India will do well in the second half of FY 16-17 especially because food inflation will moderate by September, even if it rises earlier.”

“The biggest upside for India will be the low oil price. It will have a major impact on the current account balance and the GDP. The other good news is that the Insolvency & Bankruptcy Code 2015 will make a much bigger impact on ease of doing business in India than people realise. It will also make it tough for wilful defaulters and pave the way for more funding of businesses eventually.”

He said, while handing over Table 3, “But the bad news is that India’s exports will be sluggish. Since India’s export basket is mostly comprised of commodities and non-innovative manufactured goods (barring some IT/ITES), India’s international trade is very closely mirrored by global trade trends.”

“We know that global trade will suffer in 2016 and so will India’s exports. Already in 2015, export of several products like petroleum products, gems and jewellery, cotton yarn, fabrics and made-ups, handloom products, electronic goods, plastic and linoleum, spices, fruits & vegetables, handicrafts excluding handmade carpets, oil meals, other

cereals, iron ore, tobacco, tea, etc. have been hit. Exports to the GCC in particular will be hit.”

“Further, one should expect dumping of commodities and manufactured goods in 2016, as China, desperately tries to deal with overcapacity and slow growth in its domestic market. The tyre industry in India has been affected in the current year. Cheap imports from China may cross 8 million tyres unless the Government of India acts quickly. The Government is, indeed on the alert on various products being dumped including steel though there are signs that China will cut back on some unproductive and polluting capacity for steel production.

“The quality of asset portfolio of banks, especially some public sector banks, is a concern and the system needs more Tier 1 capital which will be hopefully addressed in the next Budget. The low oil prices and reduced LPG subsidy will give some headroom.

If nothing unusual happens, India should register a real GDP growth of 7.5% +/- 0.2% in FY 2016-17, and the Rupee could be close to 70 to the US\$.”

One of the journalists asked, “If the Global economy is rocked by speculators who bomb the currency market seeing the opportunity in China’s woes, will India get caught in the maelstrom?”

“If that happens, China, many emerging markets and some European countries will be hit,” said Dr Z, “Let me assure you that India’s balance sheet is strong, so it will not collapse but its Profit & Loss account is weak, causing it to get hurt when partner countries are hit.

Let me explain. India’s net debt to GDP ratio is hardly 0.65. It can absorb some shocks. External Commercial Borrowings have increased this year but thankfully 39% of it is hedged as opposed to only 15% a year ago. However, India’s revenue to GDP ratio is a dismal 0.3, meaning that the Government is very



ineffective in raising revenues despite direct plus indirect tax rates not being low because there are huge inefficiencies and leakages in the system. This makes the fiscal balance vulnerable. Low oil prices will help, as will the possibility of lower gold imports due to some success in the Gold Monetisation Scheme launched some months ago. But gold prices could go up because of economic volatility.”

Turning to the Prime Minister, he said, “I am hopeful that the Government will deal with some issues like the huge subsidy bill, GST, Bankruptcy Code, the irresponsible bad debts of some big borrowers who hide under the cloak of politicians, etc.”

“Will it be good to invest in equities?” asked another journalist. “I am not a ‘stock-market expert’”, said Dr Z.

“But why would you want to play in such a volatile market unless you are a speculator? Just invest in strong, well governed Indian scrips with a 3 year horizon.”

On being asked whether technology stocks would do well, he proffered. “The 21<sup>st</sup> century darling, Google, is finally going to become the most valued company in this world in early 2016 by getting past Apple. Both companies are valued upwards of \$500 billion.

You should be following many emerging applications of block-chain technology (the underlying technology that makes Bit-Coin possible) which will spawn interesting new opportunities in 2016. You should also follow the trend in crowd sourced debt financing which will in a few years challenge the right of conventional Banks to exist”.

Evading the final question on whether there will be a Big Financial Crisis in 2016, Dr Z quipped, “There is fear of that. Therefore, the KI6 was pressed into action in Kitzbuhel.” ▣



**Raj Nair**

B.TECH, '71 MEMS, H6

*As a strategy consultant, Raj Nair has helped companies across diverse industries in India, USA, Europe, and the Middle East to develop strategies, align strategy to vision, grow in competitive markets, restructure to make companies more customer focused etc. In his current role, Raj serves as – Chairman: Avalon Consulting, Director: OC&C Strategy Consultants India, Chairman: Ugam Solutions, Avalon Global Research and Germinait Solutions. In his previous roles, Raj has worked as a Merchant Banker with Grindlays Bank and has also worked in the Consumer Durables industry. Raj has studied at two of India's top institutions, engineering at IIT Bombay and business management at IIM Ahmedabad.*

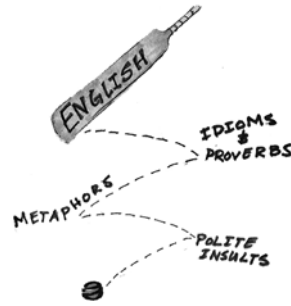
# Englōishē vānglōishē bunkulobēḍ

I am Bankim Biswas and what I write is a lot of bunkum and wishwash.

Once upon a time, there was a language named English language. It was an *intellectual property* of, and therefore under the ownership of the British Empire. The fact that the intellectual property and ownership words did not belong to the English language and were later day embellishments, inserted by takeover tycoons is another matter and the subject matter of this article, more on that later down the page. If you're on the same page, that is.

So this English language told its worldwide subjects, "Come! Learn me. If you learn me and master me, you'll wear shoes and pantaloons. You'll have porridge for breakfast and supper for dinner, not a tiffin and certainly not anything that sounds like *masala dosa*. You can devour a banana and not 'have a plantain'. You'll be counted amongst the elite and learned. You'll still cut ribbons at inaugurations even if you've not discovered radium or invented the electric chair. And above all, you'll discuss weather like no one can. After all, how many people know the difference between fog and smog? Only English can teach you that."

So this English, which allowed you to be snooty and stiffen your upper lip, ruled the roost all over the world. In order to make it *learnable*, English unleashed its agents, known as teachers. There was an *infrastructure* of lex-



icons, linguistics, phonetics, Wren & Martin, adverbial clauses, past participles, and a nice social mix of comely vowels *mixing* sociably with macho consonants, unlike the Oriental counterparts which kept the vowels secluded above the line in a zenana kind of isolation.

One such agent of the English language was the pretty Peggy D'Prazer. Her orange skirt had pink flowers printed right up to the hem which stopped a few inches above her knee. She was a good teacher, but for some reason, kids scrambled to sit in the first row and drop pencils, sharpners and erasers (thanks to Ma'am Peggy, we do not say rubbers anymore) and bend down eagerly to pick them up and stay bent down for eternity. It was only when Peggy wore sarees, yes—still orange and still carrying floral imprints—that kids sat silently and listened to rules that would make them *proper*. You cannot say, "your name is what?". You have to say, "what

is your name?” Stop saying, “why you are not eating?” Say, “why are you not eating?” What do you mean by “rats are running in my stomach”? Ok, maybe your dad says it, but in English, rats run behind the pied piper of Hamelin or scurry into rat holes and do not take over gastric systems. Oh God! Stop saying “he did not lift the phone.” As in *phone nabin uthaya*. Your servile servant may lift the phone to clean it. But you have to answer the phone, not lift it.

**So this English language  
told its worldwide subjects,  
“Come! Learn me. If you learn  
me and master me, you’ll  
wear shoes and pantaloons.  
You’ll have porridge for  
breakfast and supper for  
dinner, not a tiffin and  
certainly not anything that  
sounds like *masala dosa*.**



English was ruling. And under no threat to its existence. Hence it continued with its haughty ways. With idioms and proverbs. With metaphors and polite insults. Much like a fellow intellectual property known as cricket. In cricket, you needed to sculpt a willow into a bat and season it with linseed oil. You had to play it in the grass that was grown right and proper. A *dot ball*, formerly known as a good ball, had to be played with a *stance* that was proper. Despite a no-run, you would be rewarded with a standing ovation for being proper. And if you scored a *boundary* with what was known as a cross-bat shot, you would be heckled and boo-ed even when the scoreboard ticked forward. Strange were the ways of those who thought in multiples of 11. Ball weighing 5.5 ounces, team numbering 11 players and pitch measuring 22 yards. All masquerading as British propriety.

Is it any wonder that socio-economic forces in the world would force a change one day? It started with Kapil Dev. Still wore starched whites, but he was sure that he was a Jat from Haryana. He was a *ballebaaz* and not a batsman. His ambition was to swing the bat and belt the ball in any which direction, propriety and strokeplay be damned. Crossbat-frossbat... it did not matter. Palmolive would pay him fancily if he got runs, never mind if it was not proper, not British and not in English. This takeover of cricket from the Brits by its erstwhile serfs was the motivating point for the rest who decided to take over the language and the institution itself.

Just like the neo rich builders lobby took over decaying and crumbling Nawab’s.... oops... Nabob’s palaces (we’re British) and turned them into heritage hotels and built restaurants in the style of *designer dhabas*, there were a few mafia lobbies waiting to take over the English language. The IT lobby struck first. They invented modems and broadbands that travelled faster than paperbacks and London Times. So they started *pinging* the Brits with gay abandon. (Nota bene: we’re talking about the old Brit word gay and not the one that’s travelling through chromosomes now) They started googling for words called search. They *photoshopped* the Lord’s stadium into a respectable edifice and hid its wrinkles and *faultlines*. They crusaded for paradigm shifts that were probably *nuanced*. They had a take on several issues which was a *low hanging fruit* and a *bang for the buck* for all the stakeholders. They took a call (BTW, Peggy also took a call from my furious Mom who wanted to know “why you’ve given my son only 82% in English, he will speak best ma best English.”... coming back to the story, these IT Mafiosi guys took a call whenever they had issues with the English language. (BTW again, Peggy never had any issues. We gave her such a strong headache, it lasted right through her hubby’s attempts to sire issues.)

# ENGLISH

The Management Gurus struck next. And ended up as secondary partners to the IT world in this business of mergers and acquisition of the English language. They sought some *actionable items* from this new global confusion. The cricketing Kent and Lancashire had moved to Mohali and Begaluru. So it was but natural for them to seek some *deliverables and key takeaways* from English. They wanted a *buy-in* from those who could *think outside the box* and design *cutting edge technologies* that could deliver *state-of-the-art* environment to *solve problems* created by English.

English needed to *get back to the drawing board* to realise why it was faltering and crumbling like all its edifices built upon its name. People were playing better cricket in Dhanbad and also eating idlis in English, so where did the Earls and Viscounts get it wrong? Why did spreading yield to? Why were we inventing new ball games? (BTW, Peggy walked out of the ballroom when Hindi Sir Pande told her that he had two balls) Guys wanting to *turn English around* ask you “what’s new?” knowing very well that nothing is new in this *trending world*. The i-phone you bought last week has *trended-out* as has your laptop, your villa and your wife. The *What’s up* question can only get you an answer that sounds like onion price or dollar rate; will not evoke dirty lewd answers anymore.

We’re living in an *impacted* world that needs to be restored to its *default setting*. Did the default setting start with primness and properness of the land of the Yorkshire

pudding? Actually, No. Let me be bold enough to say No Re! Default setting lies in the land where the mind is without fear. And the head is held high. Where knowledge is free. Where the clear stream of reason has not lost its way to narrow domestic walls. Into that heaven of freedom my Father, my country shall surely awake. ■



## Bankim Biswas

*Bankim Biswas has verbal diarrhoea disbing out his opinions on almost anything and everything under the sun. Most of it is a lot of bunkum and wishwash or should it be bunkum and dishwash?*



# CHEMPLAY

## *The Play-way Method to Introduce Chemistry*

**NITIN BHATE**

Chemistry is one of the fundamental subjects introduced in Secondary and Higher Secondary School curriculum. The traditional way of teaching chemistry involves theoretical and visual tools. The experimental kits available focus more on the observations or the effects which at times fail to address the fundamentals. Moreover, unfortunately, the course content in standard texts is not well connected. High school students consider chemistry as one of the dry subjects which requires lot of cramming and memorizing. A play-way approach works best not only to address the fundamentals but to make the subject more interesting. Use of innovative, cost effective tools like board and card games can make the subject more interesting and easy to understand. Tata Centre for Technology and Design (TCTD), IIT Bombay, under the domain of 'Education' is working on a compendium of board and card games to make the teaching-learning process for Chemistry meaningful, well connected, and fascinating. The objective is not to replace the traditional teaching pedagogy but to complement it. The present focus is on standards VII and VIII where chemistry is introduced. A part of this compendium is a card game CHEMPLAY which addresses two important aspects of chemistry viz.: introduction to first twenty elements and formation of simple compounds.

CHEMPLAY comprises of 56 cards with

**The objective is not to replace the traditional teaching pedagogy but to complement it.**



10 Wild cards. The card layout includes an image highlighting the application, chemical symbol, atomic number, atomic mass, and valency of the element (Figure 1). Additionally, it includes three salient features pertaining to physical and chemical properties and common applications. The Wild cards include famous scientists who have contributed to the field of chemistry (Figure 2). The graphics wizard at TCTD – Ms. Mrunal Phansalkar has given an attractive outlook to the cards. It not only lures the players but is also relevant to the theme (Figure 3).

The first game focuses on arranging the cards in the sequence based on the atomic numbers and is played with 4-5 players. The cards are shuffled and six cards are distributed to each player. The players rearrange the cards to form a sequence based on the atomic number. The player can take the card from the top of the discarded pile or draw it from the pile. In either case the player has to discard one card in return. Wild cards can be used as a replacement for the missing cards in a sequence. The player who is done with a sequence first is the winner. Points are based on atomic masses. Each Wild card has 50 points and the



Figure 1

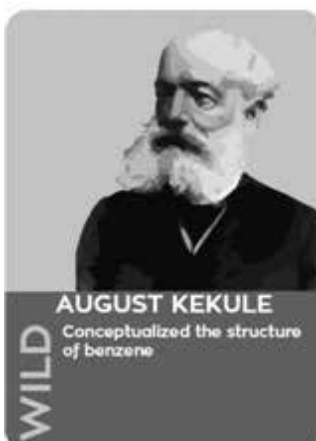


Figure 2



Figure 3

winner gets 200 points in addition to the ones calculated in the sequence. This game is not only fun to play but also helps the students remember the atomic numbers and atomic masses of the first twenty elements.

The second game is based on formation of simple compounds between metals and non-metals. The game is played with 4-5 players. Six cards are distributed to each player. The players have to pair up the cards to make a compound. The player can take the card from the top of the discarded pile or draw it from the pile. In either case, the player has to discard one card in return. The players are supposed to get rid of the Inert cards. Wild cards can be used as a replacement for the missing card in the compound. The player who has formed a compound first is the winner. Points are calculated based on the atomic masses and the criss-cross rule. This game introduces the students to the concept of forming simple compounds and also highlights the significance of valency.

These games were tried out in New Era Senior Secondary School – one of the elite schools of Vadodara, Gujarat, in three sections, each comprising of 40 students. The feedback obtained from the students and the teachers was excellent. TCTD plans to try it

out in few other schools before freezing the design. Dr. Nitin Bhate, Mrs. Pradnya Gokhale, and Mrs. Shalini Kumar have conceptualised these games. ■



**Nitin V. Bhate**

PHD, CHEM. E, 2008, HI

*Nitin started his career as a project engineer in a consultancy firm. He then moved on to become a Lecturer in Dept. of Chemical Engg., M.S.U. Baroda. Currently, Nitin is an Associate Professor at M.S.U. He has authored books in the field of Chemical Engineering. Nitin is passionate about acquiring new knowledge and developing new skills.*





**T**he situation in Syria is very complex and difficult to comprehend. An analysis of the country, region and global factors (beyond usual suspects of oil and arms industry) could help in drawing some lessons. For this, it would be useful to step back from the trees and observe the bigger picture of the forest. The resulting analysis is not prescriptive or critical, and given the complexities of the subject, no analysis can be comprehensive.

When viewed through Adam Smith's framework, Syria does not have an abundance of productive land, labour and capital, while having small reserves of oil and natural resources. Aleppo (north) and Damascus (south) are the two major commercial centres. Much of the land in the eastern half is not conducive to agriculture. The north-east has the Euphrates and its allied rivers, and is the main agrarian region. Restricted access to the Mediterranean via the Homs gap, distance from the Suez and Persian Gulf and a very weak navy imply that its ability to interdict supply chains of commerce is not a serious threat. By itself Syria would not be a critical area for those interested in trade in the region. The country does not have significant comparative advantages. Low indices for education

and gender inequality limit the ability to develop competitive advantages.

In 2012, the Gini coefficient of inequality was 0.36, per capita annual income was about \$5300 and population living in poverty was about 17%. These indicators and the (relatively low) HDI score compare favourably with many other developing countries. Syria has been admirably secular in its religious outlook. Despite such favourable indicators, scholars have pointed out for decades that it is a potential tinder-box of the Middle East. It is a dictatorship, and a multi-ethnic/multi-cultural country in which significantly greater than half of the population was deprived of political opportunities. It is collapsing like some other countries (notably Yugoslavia, Iraq and even the Soviet Union) have collapsed earlier. One of the common features in these collapsed multi-ethnic states has been that they have not been politically inclusive. Regardless of economic welfare and equality, when a number of ethnicities/sects believe that they do not have opportunities for equitable political representation (like one person one vote), the stage seems to be set for failure of the nation-state. Supply follows demand, whether for guns or for textbooks.

Syria has been on the path of almost every empire going from east to west (or vice-versa) for two millennia. These empires extend in time from the Egyptian, Persian, Macedonian, Roman, Byzantine, Abbasid, Ottoman, to the British-French and USSR. Its location in the Levant makes it important to the “south-eastern” edge of Europe across the Mediterranean. A country on the travel path of empires was generally subjected to suffering in the past. In modern times, Singapore (smaller and less complex clearly) has used its location on the maritime pathways to build itself into a prosperous country from 1962. Its success highlights the importance of focus on development, equality among ethnicities and a “win-win” approach overall. Mr Lee Kuan Yew’s autobiography highlights the challenges for small developing countries located in strategic spaces and bereft of natural resources.

The multipolar region has four key players: Saudi Arabia, Iran, Turkey and Egypt, and a fifth one if Israel is included. The interests of these players do not seem to coincide, and may indeed conflict. These rivalries draw in external players who have interests in the region, or who come in to support one or more of the regional players. After WWII, multi-polarity and centuries of conflict ended in Europe, and the system became bipolar with a land power (USSR) in balance with an overseas balancer (USA). The resultant stability facilitated the development of western Europe. Multi-polarity seems to contribute to making a region more unstable and conflict prone. The Middle East does not yet show structural stability, as seen through the Liberalism and Realism lenses. The thoughts of Kenneth Waltz and John Meirsheimer in their works are illustrative.

The conflict prone ASEAN region grasped the opportunities of regional (1977) and global changes (1991), and evolved a regional vision of co-prosperity. They have partially succeeded in developing co-operative institutions, despite countries being at widely vary-

ing stages of development. By 2050 ASEAN can potentially develop to collectively have the 3<sup>rd</sup> highest GDP in the world (there are early signs of political challenges in ASEAN now which may need to be managed). In contrast, the region in which Syria lies has not focused on co-prosperity and all round regional development, despite receiving trillions of dollars from proceeds of oil sales. In a region with many countries with high per capita incomes, Syria received about \$12 per capita in develop-

**Syria has been on the path of almost every empire going from east to west (or vice-versa) for two millennia. These empires extend in time from the Egyptian, Persian, Macedonian, Roman, Byzantine, Abbasid, Ottoman, to the British-French and USSR.**



mental aid in 2011.

The inexplicable war of 2003, whose strategic rationale (if any) is unclear, has been a driver and catalyser of serious regional instability. The fledgling “Arab Spring” has been another seminal event whose prospective effect on the region should not be underestimated. Starting from late 1947, the European region (and occupied Germany) made rapid progress enabled by a vision of shared prosperity and security, and institutional arrangements (Marshall plan, NATO and European communities). One of the features of the success of Mr Yew (Singapore) and Sultan Qaboos (Qatar) has been their commitment to institutions of governance. Despite 70 years of independence, Syria (like many developing countries) have not yet built adequate institutions or have degraded them. The thoughts of Daniel Acemoglu on the importance of institutions in his



Image source: [www.hd.unsplash.com/photo-1455368109333-ebc686ad6c58](http://www.hd.unsplash.com/photo-1455368109333-ebc686ad6c58)

work in “Why Nations Fail” are illustrative.

President Obama came to office with the expressed intention of not getting involved in overseas conflicts and gradually pulling back from existing commitments. The reality now is different and the chorus is growing within the region for increased commitment. The actions of leaders are dictated by imperatives, constraints and capabilities. Intentions can change quickly, while capabilities change over the long-term. These long-term imperatives are elaborated by George Friedman in his work in “The Next Decade.” Henry Kissinger highlights that, in such contexts, the choice for a decision-maker is always between the lesser of evils, and a good choice is most often not available.

An underreported problem in Syria has been the impact of water (and food) challenges. By 2030-35, the global demand for water may exceed freshwater supply by 40%. Brahma Chellaney in his work has highlighted the risk of conflict driven by water shortages. “Global warming” could thus lead to more instability in various parts of the world, giving urgency to efforts related to climate change.

Finally, as businesses face a “vuca” environment, countries face an anarchic (implying lack of hierarchy) world. The observations of Ian Bremmer in “G-zero Worlds” are illustrative.

The international system is based on the Westphalia “sovereign-state” since ~1680 AD, and the breakdown of the nation-state system in the Middle East is one of the major changes unfolding. Asia is celebrating the dawn of the Asian century in 2014, like Europe did in 1914. In the 2020s, despite economic growth, Asia could potentially face serious political turmoil which will test its political leaders. It may be useful for its citizens to keep some of the above lessons in mind. ■



**Vivek N. Joshi**

**B.TECH '86, CHEMICAL  
ENGG., H5**

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# *It Wasn't Too Long Ago...*

**TEJAS SHYAM**

It wasn't too long ago...

That we met on a bright, sunny afternoon by the sea,  
Those beautiful lips breaking into ever-widening smiles,  
Those deep brown eyes drowning me in their merriment,  
The silence conveying more than any voice ever could...

It wasn't too long ago...

That we spent those joyous evenings together,  
Knowing each other a little more every second,  
Sharing our feelings, holding hands, planning our future,  
And hoping that the evening would never cease...

It wasn't too long ago...

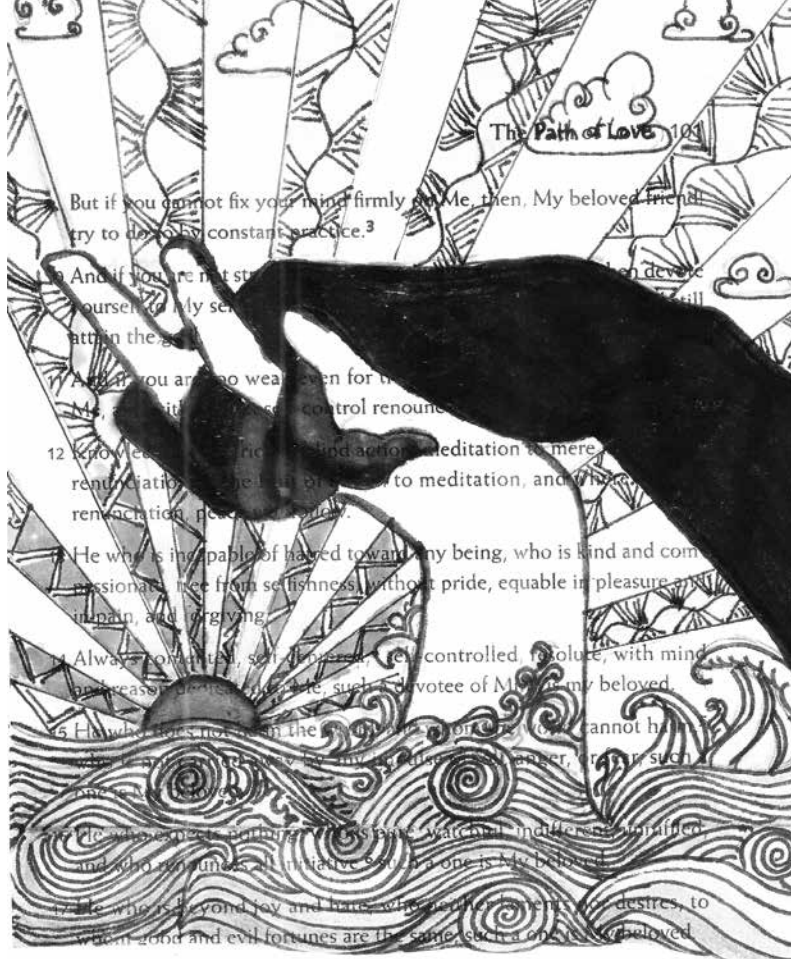
That I proposed to you, asking you to be mine forever,  
Going down on one knee, cheered by family and friends,  
Asking you to take that leap of faith from you and me to WE,  
And swooping you up in my arms just as you barely uttered "Yes"...

It wasn't too long ago...

That I wept with joy on seeing our newborn in your arms,  
Savouring the moment, kissing you passionately,  
Holding our little bundle of joy for the very first time,  
As he smiled at me, his tiny hands clasping mine...

It wasn't too long ago...

That you and I sat by the fireplace, gazing into each other's eyes,  
As the clock ticked slowly – reminding us of years bygone,  
And yet there we sat – in the dusk of our lives – still madly in love,  
Enjoying each other's company, growing old together...



And today, when you're no longer by my side,  
 All those memories still keep my heart beating for you,  
 Cherishing every moment of our lives together,  
 I slowly fade into oblivion, as you lay waiting on the other side,  
 The wait, my love, won't be too long now..



**Tejas Shyam**  
 DUAL DEGREE, ME&MS,  
 C'12

*A teacher by choice and a poet by chance, Tejas is a passionate 'Edupreneur' who seeks to make learning an application-oriented process and inspire students to excel. His inquisitive mind seldom accepts anything without proof- English included! He has, in the past, worked as a freelance journalist with the Times Group.*





## Trek to Kuari Pass (The Curzon Trail)

Jogesh Motwani

### *The Journey*

*September 21, 2002, Mumbai – New Delhi*

The twelve of us left by the Golden Temple Mail (10:20 pm, Mumbai Central). A group of climbers, attempting to scale the Kedar dome, were also on board. We intersected till Haridwar, where they took the high road.

September 22, 2002

The train journey took us through surprisingly verdant Rajasthan. Past Mathura, was fortunate enough to spot a pair of Sarus cranes (playing hookey from Bharatpur?), their maroon collars in sharp contrast to an otherwise grey plumage. The wire squatters – doves, rollers, drongos, etcetera, were visible throughout. As we neared Delhi, peacocks and peahens could be easily sighted.

A tedious switch from New Delhi to Old, to catch the overnight Mussourie Express to Haridwar (the Rishikesh bogey is shunted at Haridwar, and stays put for three hours before being picked up).

*September 23, 2002, Haridwar - Nandaprayag*

A 26-seater GMOU bus to Badrinath was leaving at 8 am, and we were conned by Gaylord Travels into paying Rs. 170 for a Rs. 135 seat to Nandaprayag. Beware the smooth talking Gaylord Travels proprietor, who makes a living ripping-off the devout.

Haridwar to Nandaprayag is a 7-hour journey along the Ganga and its grand





tributary, the Alakananda. The road takes one past the four great sangams, Deoprayag, Rudraprayag, Karnaprayag, and Nandaprayag. (Of the four, only Nandaprayag is worthy of a second glance. The other three are typical, yatri-centric, Hindu hell-holes). The captivation begins with the air turning clean and crisp, the sky turning a striking electric blue, and the river humming an ancient pahadi dhun. As one gains height, the lazy majesty of the lower Himalayas slowly begins to hypnotise, and the first sight of a snow-capped peak far in the distance promises of days of enchantment.

At Nandaprayag, we were booked at the GMVN guest house, but of course, they had not received word from the Mumbai office (where we had booked three weeks ago). Luckily the dorm rooms were empty, and Gyan (our guide) and his men provided us with tea and biscuits.

We spent the evening at the Nandakini-Alakananda sangam. Alakananda meanders, roars, and merges with the gently rippling Nandakini. Our trek will take us east, upstream the Nandakini for a while, and then we shall head north-northeast.

The trek - Nandaprayag to Joshimath (Tapovan) via the Kuari Pass

The route is also called the Curzon trail, in honour of the Brit viceroy Curzon, whose

expedition ironically did not make it across the pass. An irate bunch of native bees foiled this relatively modest attempt at colonial domination.

I personally think that the height of a mountain is among the most asinine of statistics – numbers certainly have their place, but shouldn't they be limited to expressing the distance between railway stations, or one's dimensions while getting a pair of trousers tailored? However, for the linear minded, the heights of various points have been included.

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*September 24, 2002, Nandaprayag - Chefna*

Morning spent packing, checking provisions, etcetera. After lunch, we left Nandaprayag by jeep for a 19-km ride along Nandakini, to Ghat. (Ten years ago, transport on this road was not easily available and the trek began at Nandaprayag.)

Ghat – Chefna: a delightful 5-km level walk. The soothing roar of Nandakini accompanied us all the way to Chefna, where we camped for the night. We had one halt at a Shiva temple by a bridge, and appropriately enough, Shiva's divine plant was growing unhindered all along the way.

*September 25, 2002, Chefna - Ghuni*

Awoke at 6. A porridge breakfast. Began walking at 8. A long ascent to the village of Ghuni, visible far in the distance. Nandakini leaves us, as we head northwards (she originates at Homkund).

First halt at 9:20. First sighting of Nanda Ghunti (the Devi's veil) and other snow-capped peaks. Ascent continues through several villages to Ghuni. Reached at 11:45. Cold, even at noon (Ghuni is at 2500 m). Camped near the school, under a grove of conifers. Magnificent vistas all around. (Ramni, the neighbouring village, was the halting place for Madhu's trek ten years ago).

On reaching village Ghuni, passed their paan-chakki (water-driven mill), which is used to grind grain. A wonderful example of appropriate technology and collective living. Was spectator to a stunning display of advanced

aerodynamics by shikras – their wings flap so rapidly that they freeze in mid-air, before diving gracefully towards their prey.

Noon to 2 was lunchtime at the school, and the older kids played volleyball. The younger ones lazed in the sun, and found the antics of us aliens, like pitching tents and unpacking, most fascinating.

Our mules rested beneath the pines. The evening was spent listening to the India – SA semi-finals (ICC Champions Trophy in Sri Lanka). Walked to a nearby vantage point to watch the sunset and the changing hues on Nanda Ghunti. The route to Roopkund via Sutol was also visible.

Thirty-two 9<sup>th</sup> standard kids from Navjot Singh Sidhu's school in Mohali camped nearby. They left a trail of aluminium foil wrappers all the way to Kuari Pass (and all the way back to Mohali, no doubt). Shetal and Madhu did their best to mitigate the effects of our nation's elite educational institutions, collecting what they could. If someone could just wrap Sidhu up in aluminium foil, wouldn't that be a significant contribution to society!

*September 26, 2002, Rest day at Ghuni*

Luckily the school was closed too (so we were spared the relentless curiosity of the congregation). Watched the sunrise from the vantage point. Did some eye exercises, while Uddhav and gang photographed to their hearts' content.

First bath in an Himalayan stream – applied the Waghulde Theorem of Bathing by Parts. Wash the head, dry it. Then the torso, dry it. Then finally the limbs. Excellent method to avoid hypothermia. Make sure the sun is up, so that the body can warm up after the chilling, head-shrinking dip. Always one of the more enthralling moments on a Himalayan trek, when one immerses one's head into a sparkling, chilled Himalayan stream. No trek is complete without it.

Pre-lunch walk to Ramni via a horticulture centre. The village was deserted, as the entire



population was working in the fields.

*September 27, 2002, Ghuni - Jhinjipani (Sem Kharak)*

Started at 7:45 a.m. Two ascents from 2500 m to 3010 m (Chechni Vinayak is the highest point, providing stunning views). Then a descent through a thick forest, with streams abounding. Shikras and hawks hovered during the ascent. Camped at Sem Kharak (a clearing above Jhinji) enveloped by trees, which we reached at 1:15 p.m.

Spent the afternoon eating walnuts and listening to the Lanka – Aussie semis. A pack of langurs frolicked nearby. The sun vanished behind the hills at 4:30 p.m. Clear, cold night.

*September 28, 2002, Sem Kharak – Panha*

One hour descent to Jhinjipani village.

Walk past the school to a stream. A long pause as a river of sheep flows past. Mother sheep bleat frantically, running against the flow, sniffing all to identify their young ones. Bringing up the rear are the tiny tots, some barely able to walk, and some stuffed in saddle bags, with their tiny heads peering out in newborn bewilderment. It is the onset of winter and the shepherds are returning to their villages from the buggials (grazing grounds) higher up. Rugged men leading tough lives – six months of wandering in the mountains with their flock.

*Past the stream, we crossed the suspension bridge across the Birhai Ganga. Madhu, the*

*science teacher, measured the drop to the river to be 4-5 seconds. That's around 300 feet (for the superstitious, the mantra is  $d = 16 t^2$ ).*

A sapping ascent to Panha-Irani (twin villages). The sun was blazing down, and it took us 2½ hours to reach Panha. Camped a bit above a delightful waterfall.

Rained heavily all afternoon. The tents were being tested for the first time and were found wanting, so some delicate repositioning of sleeping bags and sacks was required. Gyan and Ashok dug trenches around the tents to prevent flooding from below, but fortunately the skies cleared towards evening. Another cold night.

*September 29, 2002, Panha - Sartoli - Domabiti*

The trudge began at 8, as usual. Panha cultivates Chuha (Ramdana) in this season – a millet with striking red stalks. These red carpets accompanied our ascent, and provided a lovely contrast to the assortment of greens. Reached Sartoli after 3½ hours of winding ascent.

Sartoli is a buggial from which one gets the first sighting of Kuari Pass. We rested at an overgrazed hillock (it's the end of the grazing season, and all buggials are in a state of overuse), snacked on the dry-fruit mix, which is a wonderful high altitude pick-me-up, and gazed at our destination, beyond the treeline



on the next range.

An hour's walk through deep forests (including thick bamboo groves) brought us to our camping ground (Domabiti). A group of shepherds, on their way home, had occupied the spot. After some sweet-talking by Rahul (and a peace offering of aachaar to go with their lunch), they consented to move to Sartoli. This was extremely considerate of them, since it entailed decamping, rousing their dogs, re-saddling their ponies, and moving their flock of several hundred sheep.

While the parleys were in progress, two rams were locking horns – rushing at each other and battering heads in a skull-splitting collision. (A renowned naturalist has claimed that this is a mating ritual devised to protect the combatants from serious injury. The blood-splattered foreheads certainly convinced me of the truth of that theory!)

It began to rain as we pitched tents (around 1:30 p.m.). Lunch was Maggi noodles in the big tent (a 6-sleeper, with modified fly-sheet to withstand Indian rains). Experienced hail for the first time. The heavens kindly relented by late evening.

*Trekking tip:* Finish your walking by 1 p.m., and be settled for the night by 2 p.m., since it usually rains in the afternoons. Walking in the rain is not advisable – visibility is poor, and the temperature falls rapidly.

Very beautiful clear night, but too cold to be appreciated. Clear nights are accompanied by stunning skies. The Milky Way is easily visible, it's that clear! We stayed indoors, playing Black Queen. Seeking a scenic squatting spot to commune with one's digestive nature was difficult, since the Bicchu Butti (a vicious ivy) were prolific.

*September 30, 2002, Domabiti-Dhakwani*

Dhakwani was on the next range. We had to descend, cross a gully, and ascend.

Began at quarter-past-eight. A winding descent to a stream took  $\frac{3}{4}$  of an hour (it was severely cold till we met the sun around 9:30 a.m.). Crossed it, and continued the descent through a landslide-marred path to a beautiful stream (the gully) flowing amid strawberry patches. A delightful waterfall fed this stream. The brave ones had a bath – Lakshmi and Shetal experienced their first Himalayan-dip high.

After crossing the stream via a judiciously placed tree trunk, we began the ascent to Dhakwani, a field of bamboo at the base of Kuari Pass. Met a shepherd heading for Tapovan (he had started from Panha that morning, and would reach Tapovan by evening). The ascent took less than an hour. Sartoli was visible, and seven layers of ranges behind it.

Dhakwani is an important acclimatising halt, and we rested a day before heading





for the Pass. The water source was a stream running through a gorge close by. On the other side of the gorge were caves where the ponies rested. Kuari Pass wasn't visible from Dhakwani, as the rhododendron just above us obscured it from view. Clouds threatened all afternoon, but dispersed as they came over the nearest range. The flickering fires in the caves made a pretty sight to fall asleep to.

*October 1, 2002, Rest day at Dhakwani*

Lazed. Eight members went to the Pass and photographed away. In the evening, Deepak conducted an impressive Acupressure class. He's been working on my sprained back and Shetal's damaged knee throughout the trip, with good results.

*October 2, 2002, Dhakwani - Kuari Pass - Khullara*

Left at 8 a.m. for the pass. Spotted a flock of grey-and-white pigeons flying in unison. The ascent is scree-ridden. Reached the pass at 9:30. Symphonic first view – an orchestra of snowy peaks.

A flat walk for half an hour (with the major arc of mountains on our left), crossed a trickle, and perched atop a rocky outcrop (junta named it Panorama Point) to drink in the view. Hathi and Ghoda Parbats, Nilkanth, Nanda Ghunti, Chaukhamba, etc. A raging debate on whether Nanda Devi was the one afar – sadly, Bill Aitken says it isn't visible

from Kuari Pass.

The painted marker at Kuari Pass reads 3565 m. The height in the official GMVN map is over 4000 m. So much for the unerring accuracy of this, the scientific age.

Continued on the flat walk, then an hour's descent to the treeline along a lush, carpeted meadow (Khullara). A path laid in stone leads down to Tapovan. We camp a half hour into this route, in a clearing among pines. Madhu and me suddenly feel the effects of the altitude change, and the fatigue hits us as we reach camp around 1 p.m.

Trekking tip: Altitude sickness can affect one anywhere beyond the treeline (if trees won't hang around there, surely we shouldn't either – after all, they're much smarter than us). Hence the advisability of acclimatizing periodically, as at Dhakwani.

The campsite provides a wonderful view of Nanda Ghunti, with the veil being itself veiled and unveiled by clouds. A gentle stream flows nearby, with grey wagtails cavorting. Tents are placed to face the ever-changing moods – opening eastwards.

*October 3, 2002, Khullara - Tapovan*

The night was freezing cold. Awoke to find ice condensed on the tents. The sun arrived early, and one could thaw. Until then everyone huddled around the fire provided by the muleteers. They keep the fire going all night and



take turns minding the mules.

Began the knee-jerking, toe-crunching descent to Tapovan a little after 8. (I did this descent in 1983, and recall rushing down in youthful abandon. I paid for my folly nineteen years later – even two knee-bands and the crutch of a bamboo stick couldn't mitigate the agony.)

The path runs along a stream, through a glorious pine forest. Huge root systems create a natural stairway (the roots also prevent soil

**The painted marker at Kuari Pass reads 3565 m. The height in the official GMVN map is over 4000 m. So much for the unerring accuracy of this, the scientific age.**



erosion – if it wasn't for them, Tapovan would be buried in silt). The forest ends at village Regdi. It was 11:15, and we began our last leg to Tapovan. Inhaled the stench of civilisation at 12:45. Had chai and biscuits and juicy apples (courtesy the foraging Keri) at the jeep stand, and switched to sandals for the rest of the trip. The Dhauli Ganga flows past Tapovan, which also boasts of a hot water spring.

Three jeeps to Joshimath (Rs. 150 for us tourists, though Rs. 100 is the usual rate), with a halt outside Tapovan to gaze at Nanda Devi. At Joshimath, we parked at Hotel Sriram, next to the GMVN office. Haggled 12 beds for Rs. 1000 (4 rooms). Said our goodbyes to Gyan and Co.

*October 4, 2002*

### *Epilogue*

Eight leave for Haridwar early. Four of us (Deepak, Uddhav, Lakshmi, me) stroll around Joshimath for a while, and take a 10 am savari jeep for Chamoli (Rs. 35 per). Road widening slows us, and we reach Chamoli at 12:15. L and I switch to a Gopeshwar-bound jeep (Rs.

10 per), while D and U head for Shrinagar (their destination is Uttarkashi, where they plan to team up with Gyan and head for Gaumukh-Tapovan). L and I will do the Panch Kedar, culminating at Chopta and Tungnathji (the highest Shiva temple in the world). ■



**Jogesh Motwani**

**B.TECH '86, COMPUTER  
SCIENCE & ENGG., H4**

*Jogesh did his B.Tech in CS from IIT Bombay and returned to do his PhD in Pure Mathematics after his MS and a brief stint teaching at Risbi Valley School. He currently runs True North, a premier coaching institute for exams like the SAT and GMAT. His enduring interests are sports (playing, not watching), trekking and travel, reading, writing and listening to music. He lives in Mumbai with his spouse and two children.*

## I am a Positive Person

SUSHIL BHATIA

**O**ur dining table was getting old, so my wife went and bought a new dining table. It was very nice. It had a very shiny, glossy surface and I would get immense pleasure just by looking at it.

Now, you see, I am a positive person. I appreciate nice things. So it was but natural for me to thank my wife every day for bringing in such a beautiful item to our house every time I saw the table.

A few days passed, and one day I noticed that the table was covered with a table cloth. My wife explained that she did not want the table to get dirty and so she bought the new table cloth. It was hand-made, with a very artistic embroidery design and I just plain enjoyed watching it

Now, you know, I am a positive person. I appreciate nice things. So it was but natural that I agreed and also complimented her on the choice of the table cloth and told it to her every time I saw it. She enjoyed the compliments, which made me even happier.

A few more days passed, and I noticed that our new table cloth was covered with a clear plastic sheet. My wife explained that we were using our dining table to sort fresh vegetables and the table cloth would have gotten dirty. To protect it, she bought the plastic cover. The plastic cover idea was good. It had designs of its own. I was able to see the original table cloth design and it would be protected too. What more can anyone ask for!

**Watch out Sushil. If you appreciate these paper plates it will not be long before these paper plates are protected by wax paper or old newspaper. And you definitely do NOT want that.**

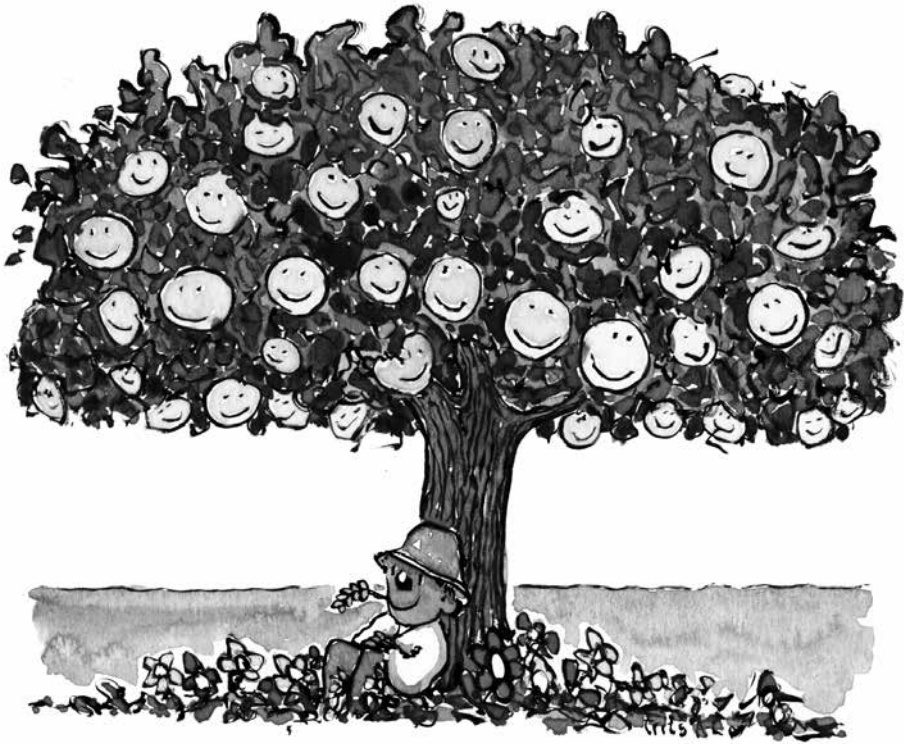


By now, you know that I am a positive person, I appreciate good things. So it was but natural that I complimented her every time I saw it. She enjoyed the compliments which made me even happier.

A few more days passed, and I noticed that my wife had arranged some very nice placemats on the plastic cover. She explained that she did not want the plastic cover to get dirty when we put our hands on the table while eating. So to protect the plastic cover she had bought these placemats. The placemats were good. They have very nice scenes printed on them and were very pleasing.

By now, I am sure that you know I am a positive person. I appreciate good things. So it was but natural that I complimented her every time I saw the scenic placemats. And she enjoyed the compliments which made me even happier.

Few more days passed and I noticed our china plates were replaced by paper plates for eating dinner. My wife explained that china



*Image Source: [www.bikingartist.files.wordpress.com/2015/11/man-under-smiley-tree-illustration-by-frits-ablefeldt.jpg](http://www.bikingartist.files.wordpress.com/2015/11/man-under-smiley-tree-illustration-by-frits-ablefeldt.jpg)*

plates were heavy and were leaving marks on the placemats. She did not want the placemats to get spoiled. After all, I enjoyed watching them so much. The paper plates are nice and thick. They have very nice designs and I liked the idea of protecting the scenic placemats.

By now, I am absolutely sure that you know I am a positive person. I appreciate good things. So it was but natural that I wanted to compliment my wife for her great idea. But something inside me SCREAMED, “Watch out Sushil. If you appreciate these paper plates it will not be long before these paper plates are protected by wax paper or old newspaper. And you definitely do NOT want that.” So I just nodded in amazement. I did NOT compliment her and did not praise her. I just sat there, silently, pondering over what had happened over the last few days.

No more admiring the table top, no more admiring the table cover, no more appreciating the plastic cover, no more complimenting the placemats and definitely never ever appreciating the paper plates. This is where the buck stops.

But you see I am still a positive person, I still appreciate things. But now, I also think before I appreciate, before I speak. ■



Once upon a time (I am told that if one begins a story with these words it becomes an instant success. I will test this hypothesis here) a young Bhatia family came to the U.S. in search of greener pastures. The time goes so far back that there were neither Indian restaurants nor any Indian grocery stores anywhere within 50 miles of where they lived. So, if they ever wanted to eat any Indian delicacies like samosas, Batata Vadas or pakoras, they had to be made at home by the people themselves.

On a particular Sunday, it was drizzling and the weather had turned just a bit cold. Our young family was reminded of their days in Bombay when they would have samosas, pakoras and hot masala chai on such days. As the image of this scenario grew stronger in their minds, the juices began to flow in their mouths and stomachs and, suddenly, they were all hungry for the same. The only option of course, was to start making them themselves.

It was midmorning by this time when husband and wife entered the kitchen. Since samosas were their favorite, they settled on them. So maida was kneaded into dough and potatoes were boiled, mashed and spices added to them to make the filling. Soon the kitchen was filled with the aroma of hot, fried samosas. And it was not long before a good batch of samosas were done - ready to be consumed and enjoyed after all the work that

**“On a particular Sunday, it was drizzling and the weather had turned just a bit cold. Our young family was reminded of their days in Bombay when they would have samosas, pakoras and hot masala chai on such days.”**



had gone into it.

But there was a problem. A bit of the mixture of potatoes was left over. Now, everyone knows that one cannot leave potatoes - they begin to taste bad after just a few hours. After some thought, a brilliant idea emerged - why not mix some besan and make Batata Vadas with the remaining potato mixture?

So the besan was mixed and all the spices added. Frying of Batata Vadas began and the kitchen was once again filled with the aroma of frying, this time, Batata Vadas. Both husband and wife went about doing these things enthusiastically, knowing that a good meal awaited them as soon as the cooking was done. And soon, a good batch of Batata Vadas were done - ready to be consumed and enjoyed for all the work that had gone into it.

There was still a problem though. A lot of besan was left over. Now everyone knows that one cannot leave besan out for long. It dries



Image Source: [www.unsplash.com/photos/tUb95ZFdZN4](http://www.unsplash.com/photos/tUb95ZFdZN4)

out and the pot becomes difficult to clean. After some thought a second brilliant idea emerged - why not cut some onions and make pakoras with the remaining besan?

So off they went- cutting onions, mixing in spices, wrapping them in besan and deep frying them to make pakoras. Soon, the kitchen was filled with the aroma of hot pakoras and they just could not wait until all the frying was done so that they could enjoy the mouth-watering meal of samosa, Bata Vadas, pakoras and hot masala chai. .

At long last, the frying of pakoras was done. There was only one problem though. Some of the sliced onions were left over. Now everyone knows that one cannot leave cut onions out for long. They lose water, go bad and the whole house begins to smell.

They both looked at each other. No words were spoken, like they both knew what the other wanted. They were both tired of standing and working in the kitchen for so long. Their nostrils were saturated with the aroma of frying oil. Their hunger had evaporated - they could hardly contemplate eating any of the stuff they had made. They simply threw the remaining onions in trash can, slumped on the sofa, turned on the TV; and surrendered to the channel that happened to be on. Samosas, Bata Vadas, pakoras and hot Masala Chai would have to wait for another time. ■



### Sushil Bhatia

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## JuNUun&RoSeS

BUMBLEBEE

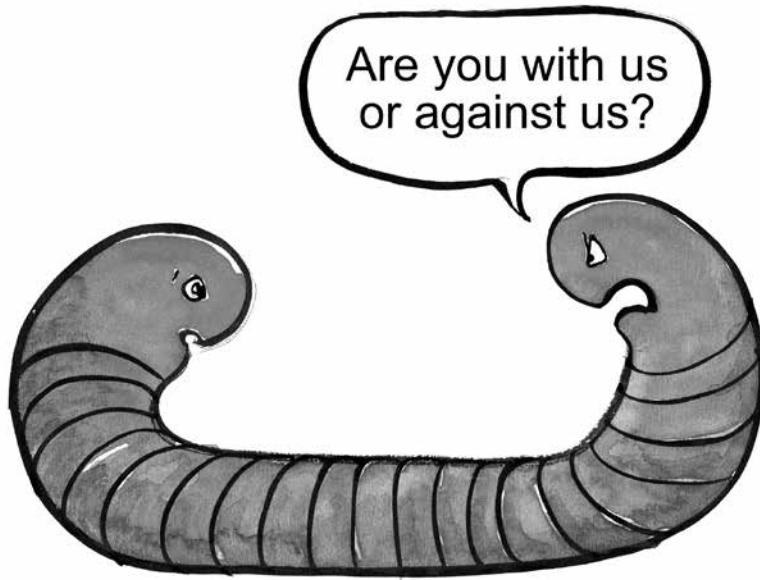
Once upon a time, there was a universe called JuNUun. That's because its inhabitants wreaked their *junoon* on anyone who was right. In the view of the JuNUunites, right was wrong and left was right. It was a sprawling green campus, though the inhabitants were mostly red. Most colours were permitted in this universe, but saffron and *khakhi* were a strict no-no. The red *Kanhaiahs* and the evergreen *kanyas* that abounded in this universe were poets of sorts. They organised "cultural festivals" where they rhymed *azadi* with *barbadi* and *zinda* with *sharminda*. Famous for historians, this campus was now into geography mode. So, in this cultural event, they took to a public drawing of geography maps where Cashmere was relocated and allotted to the country on the left of Indigo. You see, these guys had their own notion of a nation and guys who did not conform to their views were anti-notional. This cultural lot was also into celebrating birthdays and deathdays. So on this all important cultural day, they danced the dance of death in memory of their Guru named Offzeal. Someone forgot to bring the cake, so they cut up the country into thousands of pieces and distributed to all the *Kanhaiahs* and *kanyas* gathered there. After all, these guys were scholars interested in securing high Marx and what better way to secure good Marx than to declare your independence and draft your own rules to live by, separate from the lowly

**In the view of the JuNUunites, right was wrong and left was right.**



Indigo-ians who lived just outside this exalted universe? These guys were also into abstract logic, having honed their skills by reading up Nietzsche, Kierkegard and Hegel in the JuNUun library. That's why no one else other than them could fathom why a magistrate implicating Meaty Shah and Marauder Moody was right, but a Supreme Court convicting Offzeal Guru was wrong.

Be that as it may, this cultural event was a runaway success. Its organisers ran away to a hideout while a whole lot of new fans came to this campus long after the event was over. As it turned out, Cursingwal came there because the JuNUunites has said "*Jung rahegi, Jung rahegi*" and Cursingwal was in no mood to let Naseeb Jung stay in the neighbourhood of this universe. Rollover Aandhi missed out on a university education and to atone for this lapse, he was now into aspiring for degrees from various universities. He started with a degree in drama and theatrics from FTII, attempted one on social engineering from IITM, tried one on anthropology and caste studies from University of Hyderabad. But the one from JuNUun would be the best. History, Geography, Political Sciences, arts, drama, sociology... this was the best one-stop-shop for all degrees



*Image Source: [www.hikingartist.files.wordpress.com/2012/06/worm-with-or-against-us.jpg](http://www.hikingartist.files.wordpress.com/2012/06/worm-with-or-against-us.jpg)*

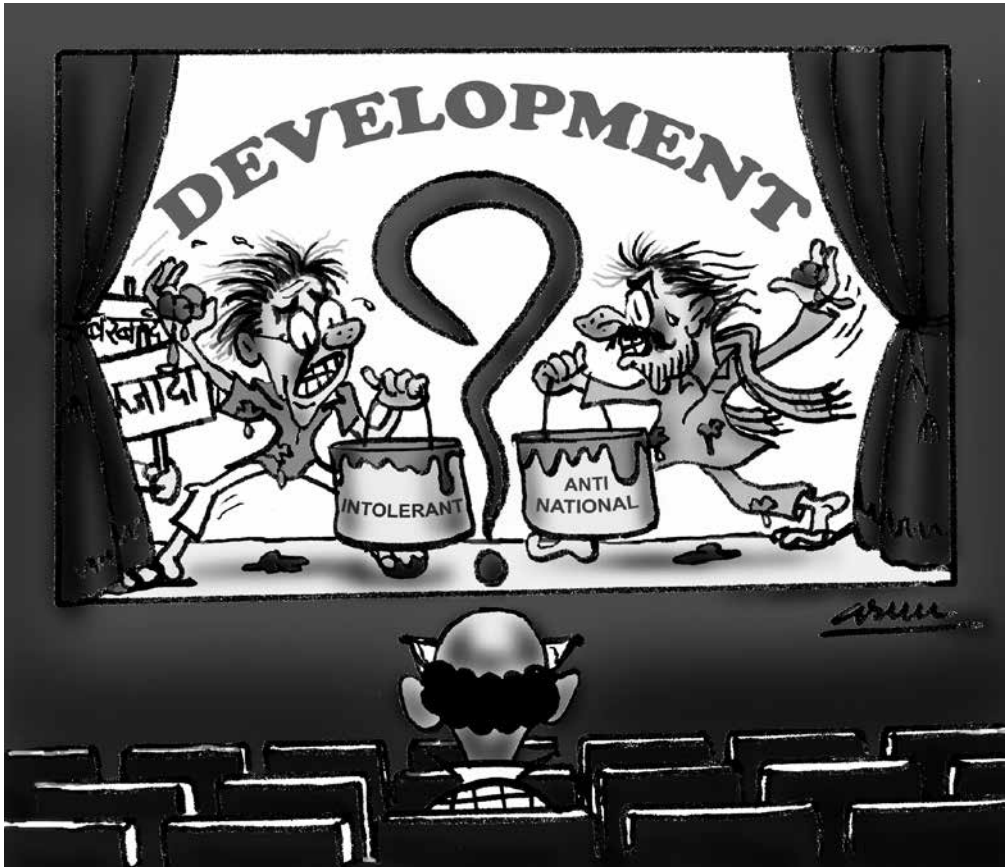
that would make him erudite enough to cock a thumb at all those primitive minds who did not know the latest Oxford dictionary meaning of sedition.

But Marauder Moody and his team had a different take on nationalism and notionalism. After all, they were all trained in a Nagpur university named RoSeS. RoSeS hated red and green roses and tried to grow saffron and khakhi coloured lotuses. Wind in RoSeS blew right while wind in JuNUun blew left. RoSeS did not like the fact that JuNUunites wrongly accused them of believing in Godsepel truths. And they were Manoharwadis, not Manuwadis as accused by the JuNUunites. Something must be done to call the bluff of the cultural event. So Rajnut Singh from RoSeS sent his bad cop Bossy to go and pick up a few of these rednecks. But Bossy was bossy. And a tad lazy. Did not want to search in remote hideouts and he thought that picking the first Kanhaiah who came to sight would please Rajnut.

So while Bossy led Kanhaiah to the Pagalia House court, the lowers there had a field day.

Lowers were called lowers because they indulged in all lowly acts like lying and bashing up people including presstitutes who asked them too many intellectual questions like, "Define nationalism. Why are you resorting to archaic British laws like sedition? I do not approve of the slogans, but I respect another's right to chant them. What is wrong in an academic discussion on capital punishment? Who authorises you to be judgemental about me? If Godse, why not Afzal?" etc., Overzealous lowers from the Bar association, who wanted to bar JuNUun and Kanaiah, spoilt Rajnut's party with their uncalled for meddling. As did Bossy. So Bossy was dispatched to go and pick the right guy...rather, the wrong guy. Guy who was wronger than Kanaiah. Some Omar non-Sharif.

The event was getting more popular, thanks to the bungling by the RoSeS team. But RoSeS guys were dogged fighters. They unleashed I. Smart Rani into the fray. Breathing fire and brimstone, she blazed into the scene like Goddess Durga and slayed dozens of demony Mahisasuras, first in the Shock Sabha



with the green carpet and later in the Rosy Sabha with the red carpet.

Presstitutes too were playing their own game. Some pulled left and some pulled right. But they were both pulling wrong. People with closed minds were writing “open letters” to Moody. Award *wapasi* gang was in turmoil. They had already returned their awards and did not have another to return. It is believed that are likely to petition Moody to return the returned awards to them so that they can return them all over again in full glare of cameras.

This see-saw battle took a toll on the poor hapless Indigonians. They had bought a ticket for a different play. They wanted to watch “Development”, but the actors were playing

“JuNUun&RoSeS”, sung to the tune of Guns & Roses. This is a drama that does not want to stop. But fortunately, we can exercise our right which is as precious and special as our right to freedom of speech. Best of all, this right does not have any “reasonable restrictions” attached. It is our right to walk out of this play.

I’ve already walked out. Why don’t you? ■

# Creative Bees at Fundamatics

## ILLUSTRATION



**Shreyas Navare**

M MGMT, SJMSOM, '08,  
H-13

*Shreyas Navare, Mumbai, Senior Manager, Marketing and Corporate Communications at a private bank. He freelances as a Editorial Cartoonist for Hindustan Times. He has covered elections in 6 Indian states through the eyes of a cartoonist on behalf of HT. Shreyas has held many cartoon exhibitions, two of which were inaugurated by Dr. A. P. J. Abdul Kalam. His first solo international cartoon exhibition was held recently at Bangkok. His second exhibition was held at Nehru Centre recently. Cartoons featured in this issue are from the exhibition.*



**Arun Inamdar**

*Arun Inamdar is an example of the breadth and depth of talent in IITB. A geologist by training and a professor at the Centre of Studies in Resources Engineering, he is a perceptive cartoonist and caricaturist with a soft corner for the campus and its ecology. His caricatures have brought smiles to an array of celebrities who have visited the campus and his cartoons hold up a mirror to our follies without causing offence. An alumnus of C76, he can be depended upon to come to the rescue of the ACR office and IITBAA with his talent at very short notice.*



**Teesta Chakraborty**

*Teesta Chakraborty earned a degree in Graphic Design at Cal Poly Pomona. Her love for the arts grew from her Bengali family roots thus becoming the ultimate Bong Hipster. When she is not on her laptop working or sketching, you can find her in bookstores reading, or singing in the top of her lungs. See her work at [www.teestachakraborty.com/](http://www.teestachakraborty.com/)*



**Abhishek Thakkar**  
B TECH, CIVIL E, '03 H-5

*Abhishek Thakkar or just 'Thakkar' as he was known throughout campus is an alumnus of H5 from '03. Having a lot of it, he loved throwing his weight around, and escaped many a bumps which he'd have got for his PJs. Now he channels all that creative energy in designing beautiful, scalable web and mobile interfaces.*



**Anand Prahlad**  
M DES, IDC, '07, H-8

*Anand Prahlad is an independent graphic designer and artist. When not designing books, magazines, logos or illustrating, he is an active gardener, culinary expert and amateur musician. He runs [www.magic-marinate.com](http://www.magic-marinate.com), a food and travel blog, and also [www.thenewvitruvianman.com](http://www.thenewvitruvianman.com), where he writes and illustrates articles on design, gastronomy and music.*



**Saurabh Kolge**

*Saurabh Kolge is a self taught illustrator and graphic artiste. His informal education in design happened simultaneously with his formal education in dentistry in old and dusty Aurangabad. Hiding in gardens and shady nooks during classes, he learnt to fine tune his craft which filled his notebooks instead of anatomy and pharmacology. Over time he has developed a unique style that fluently adapts to the requirements of his now chosen career, whether corporate identity, branding or digital paintings. Apart from design, he is passionate about felines, fantasy fiction and farming.*

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the computer speak what I type.  
But there are times when my computer is inaccessible – for instance, when I wake in the morning, when I am in a hospital or when the computer inevitably crashes.

Without my software, I resort to facial expressions that signify “Yes” (raised eyebrows) and “No” (eyes, mouth or head moving slightly side to side).

I can spell words, letter by letter, by answering “Yes” when the letter is spoken by another person, don’t ask me an alphabet board because I often need to communicate at night when my eyes are closed. I can still communicate with my eyebrows but not with my gaze on an alphabet board.

Instead, I memorized a multiple letter word in which the alphabets are distributed into five numbered rows, each row starting with a vowel.

- 1-A-B-C-D
- 2-E-F-G-H
- 3-I-J-K-L-M
- 4-O-P-Q-R-S-T
- 5-U-V-W-X-Y-Z

The person to whom I’m “talking” slowly counts: “1 2 3 4 5, 1 2 3 ...” and all I say “Yes,” by raising my eyebrows, to select one of the five rows. The person then recites the letters of the row I selected until I raise my eyebrows to select a letter. By repeating this process, I can spell words and sentences.

Without my computer, my communication is restrictive, tedious and slow communication methods are frustrating and pre-

First, without my computer, I can only answer questions to which “Yes” and “No” are the only possible answers. I can’t answer multiple choice questions. “Do you want water?” is good. “Do you want food or water or anything else?” will be answered with my expressionless face. When I do answer, the questioner must repeat my answer, and I will respond “Yes” if it is correct, to confirm that

highest facial expression isn’t interpreted. I also have a problem answering questions posed in the negative, as in “Do you want water?” If I do want water, the syntactically correct answer is “No,” but many people expect “Yes.” If the question were, “Do you want water?” Actually, I’ve learned to answer “No,” and native English speakers expect “Yes.” I must remain expressionless or pathetically and mechanically spell, “No negative questions.”

Helpful people sometimes attempt to speed up communication in several ways that almost always fail. One, asking many questions too quickly, so by the time I can answer, my answer to the first question is misinterpreted as my answer to the second or third question. Two, asking questions for implied answers and not waiting for me to answer, such as, “You want water, right?”

Three, assuming they know the word or concept. I’m typing or spelling and not waiting for me to finish. For example, assuming the let-

