JANUARY '18

The ELINCIR

Editorial Team

Binny J. Cherayil Editor-in-chief

> Brij Kishore Lakshay Kathuria Nandini Mukherjee Somarupa Sahoo K. Srividya H. C. Sudeeksha

Design Team

Aman Jindal Dipak Kumbhar Tarun Gera A. Vaishali

Indian Science 2: Ignoring The 01 Good, The Bad And The Ugly

A Passage to India

05

09 **Popcorn Patriotism**

Stranger in a Strange Land

17

13

The IISc And The IACS **Defined India Before Independence!**

20 The Elixir Crossword

Acknowledgements

Financial support for The Elixir has been provided by the Department of Inorganic & Physical Chemistry, I.I.Sc.

Contents



Indian Institute of Fictional Science and Department of IPC to Bring Back Shaktimaan

07

Twentieth Century Electrochemists of the IPC Department. Part I

11

Welcome Freshers

15

Agatha Christie – The Queen of Crime

19

Special Lectures & IPC in the News

21 A Tête-à-Tête with IPC's Newest **Electrochemist Chinmoy Ranjan**





one reason why Indian science has tended to languish files, and they do not fit into any of the numbered or in the doldrums (as R. A. Mashelkar, ex-DG of the alphabetized categories that science administrators CSIR, has suggested¹), another might well be the can comfortably tick off without much thought. singularly Indian quality of do-nothing passivity, the kind that could produce this startling admission from P. Balaram, a former Director of the IISc:² "Administrations must follow the policy of benign is the answer to the question that Arvind Rajagopal,

If uncritical reverence for the company line is competent enough to summarily dispose of their

So it makes perfect sense - to a science administrator, anyway, someone who's typically a scientist himself and who believes his real job is not neglect with respect to high performers, even while to administer science but to do it - to then adopt turning a blind eye to the significant dead wood an ostrich-in-the-sand policy, and take no notice accumulating in our institutions". Here, in a nutshell, of either exceptional accomplishment or egregious failure. The policy is easy to rationalize; everyone a professor of media studies at New York University, knows, after all, that honours and awards don't asked in a recent op-ed piece in The Hindu³: why really act as incentives to path-breaking research; all does India ignore some of its best intellectuals? Well, they do is encourage the people who don't get them, apparently because it's the easy and expedient thing to and who don't deserve to, to insist - noisily and do. The common herd of scientists, the ones of only relentlessly - that they should, on the principle that fair to middling ability, present no special challenges what is sauce for the goose is sauce for the gander. to the administrative system that caters to their And everyone also knows that penalties don't really wants. Their progress through the system follows a act as deterrents to poor performance; all they do is pre-determined course that science administrators encourage the victims of punishment to take their need pay only the most cursory attention to. But case to the streets - or online media - where any scientists whose work falls outside the standards number of sympathetic colleagues can be counted of mediocrity that our sarkari establishment on to pressure the administration into a volte-face. both expects and is most familiar with (being an In both these situations, science administrators exemplar of mediocrity itself) are a bureaucratic face the prospect of needless, incapacitating headache; their cases are not discussed in Swamy's trouble. Under the circumstances, what better Handbook, there are no "competent authorities" way to nip it in the bud than by benign neglect.

Except that neglect is seldom ever benign.

to the fellowship of one or more of our science academies, on the grounds that letting them in the very first time their names come up for consideration would upset the candidates many of lesser distinction but greater seniority who've patiently been waiting in line to get in themselves. It means not taking up their case



for out-of-turn promotions, on the grounds that sense of purposelessness, which might later someone who's clearly good enough to be considered produce exactly the kind of underperformance for such a promotion will obviously get it in the that it should be the job of science administrators normal course of events, so why bother to hasten to try and eliminate in the first place. the process by a couple of years. It means sweeping under the rug all evidence of shoddy, incompetent Benign neglect, in short, can lead in only or even fraudulent work, on the grounds that to take one direction – towards mediocrity. Which is pretty sterner action against it would be to invite litigation, much where Indian science is at the moment. court cases, or unwanted scrutiny from funding And where it might well remain in the continued agencies, Arnab Goswami and nasty RTI activists. absence of progressive administrative leadership. And it means making sure that no practice that might produce some measure of accountability into the present system is ever allowed to take root, so that the privileges that now effectively make academic positions lifetime sinecures are not threatened.

References

And what becomes of the recipients of all this Consider what it actually means to be "benignly institutional indifference? Well, if they happen to neglectful". It means, for instance, denying star be frauds or cheats, nothing, effectively giving them performers the funds for a high-risk but otherwise carte blanche to continue plying their trade without potentially transformative research proposal, on the fear of dismissal, demotion, censure, or loss of pay. grounds that it is better to divvy up the financial kitty The same goes for underperformers, who need never equally amongst as large a pool as possible than give worry that their non-productivity will jeopardize it all to one person. It means delaying their election their standing or their careers. As for the star

performers, one hopes that they too remain similarly untouched by neglect, and that their passion for science, if nothing else. remains undimmed. But in their case, there is the possibility that lack of recognition leads to demoralization and a general



^{1.} The Elixir, Vol. 2, July 2017.

^{2.} P. Balaram, Current Science Vol. 102, Jan. 10, 2012 9

^{3.} A. Rajagopal, The Hindu, Tuesday, Dec. 19, 2017.



BREAKING NEWS!

Indian Institute of Fictional Science and Department of Inorganic and Physical Chemistry to Bring Back Shaktimaan Brij Kishore

BENGALURU: Over the past few years, institutions number of interdisciplinary centres at a time when of higher learning around the globe have seen cuts to their funding from government agencies. Against this backdrop, it may come as a surprise that one of the oldest buildings in the campus of the Indian Institute first superhero, Shaktimaan, back to life or at least of Science (IISc), now housing the Department of Inorganic and Physical Chemistry (IPC), has Ministry reasoned that the only way to accomplish received approval from the Ministry of Fiction to serve as the Indian Institute of Fictional

Science (IIFSc) once the Department is successfully relocated in 2018 to its new site (a move that many doubt will actually happen.) Various wings of the IPC Department are to be converted to five new interdisciplinary centres, each studying one of the five elements of nature: air, water, fire, earth and space. These centres will have the following names: Interdisciplinary Center for Air

Research (ICAR), Interdisciplinary Center for Water Research (ICWR), Interdisciplinary Center for Fire Research (ICFR), Interdisciplinary Center for Earth Research (ICER) (not to be confused with centre of the same name at the IISc) and Interdisciplinary Center for Space Research (ICSR).

existing institutions were facing a severe shortage of funds, they were informed that the Centres would be actively involved in research that either brought India's developed a prototype that had similar powers. The

this goal was to set up five centres that were devoted exclusively to the study of the five elements that make up the human body: water, air, fire, soil and space.

The Elixir has also learnt that the newly appointed Director of IIFSc has roped in eminent scientists from the IPC Department to recreate Shaktimaan's glittering red suit. The scientists were persuaded to undertake this job after the Director cited the work of several well-known writers of science fiction,

noting in particular that if Jules Verne had not conceived the idea of using a space gun to launch people to the moon, NASA would never have managed to land Neil Armstrong on its surface. The Director had also pointed out that with research on artificial intelligence progressing at a very fast pace, the day was not far off when the doomsday When The Elixir contacted the Ministry scenario of Terminator 2 would become a reality, seeking reasons for the opening of such a large making it imperative to have a Shaktimaan around to save the human race. While the five centers at The inside of the red suit will be coated with IIFSc would be involved in making the robot/ a self-healing nanomaterial, for which a US patent human prototype, the work of developing the suit has been filed. The material's formula is a secret, itself would be handled by the IPC Department. but The Elixir has learnt that it was prepared in the laboratory of Prof. Mugesh. The Mugesh group claims The IPC professors working on the project that the memory effect of the nanomaterial will not have divided themselves into groups, each group only heal the suit but also its wearer. Furthermore, responsible for a certain component of the suit. The IPC's laser spectroscopy group has armed the suit first group is being led by Prof. Ramakrishnan and with a device that will emit powerful lasers capable Prof. Cheravil. The Ramakrishnan group is preparing of obliterating hostile targets. The whole suit has

the suit's polymeric material, while the Cheravil group is figuring out theoretically what qualities of texture, elasticity, strength and fire-proofing it should have. They are making sure that their calculations will also allow the inclusion of other components, like glamour and charm. The newly designed polymer will be named "NANYIL" (the word is copyrighted). The actual fabrication of the suit will be carried out in Prof. Jagirdar's lab, which just happens to house a beauty parlour for his students. Prof. Jagirdar told The Elixir that he had a tough time convincing the students assigned to the project to stick to the suit's original red colour instead of pink, which they believed would add a cuteness factor to the suit.

also been provided with an invisible protective shield The phosphorescent material to be consisting of high energy electrons that revolve applied to the suit will be developed by the Boron around the suit in various stationary Bohr-like orbits. group. comprising Prof. Jemmis, Prof. Thilagar The department's two other renowned theoreticians, and Dr. Geetharani. Prof. Jemmis's calculations Dr. Sai and Dr. Upendra, were the ones to figure have determined which molecule will produce out how to place these electrons in just the right electron-triggered phosphorescence. It turns out orbits, in defiance of Heisenberg's uncertainty principle. When asked how they had done this, Dr. Sai offered the following explanation: "Working on fiction is very similar to doing theoretical research. We hypothesized that the electrons would have a nice time sitting at those places and we accepted the hypothesis. While people fight over Schrodinger's cat, wondering whether it's dead or alive, we just made the safest option - that there is no cat! And in any case, the Department is more worried about dogs.'



The still-incomplete suit is presently being tested under adverse conditions in Prof. Nethaji's fume hood and Prof. Arunan's shock tubes. The chairman of the Department, Prof Umapathy, was delighted to report that most of the test results were that the structure of this molecule does not follow positive and that the prototypes would soon be ready. When The Elixir asked what the suit's fate would the usual "Jemmis mno rules", but Prof. Jemmis takes pride in having found a molecule that be if the IIFSc failed to make the robot or human actually violates his own rules. And amazingly, prototype, he said, "This Department has suffered the molecule has already been prepared by the enough of a dog nuisance in the old building, joint efforts of Prof. Thilagar and Dr. Geetharani. so we will use it as a "scaredog" in the new one."





A German exchange student in Prof. Umapathy's lab sets down her impressions of her Indian sojourn



I'm often asked why I chose to come to India to study. Well, there are many reasons for my decision, which I now know was a good one. I'll discuss some of these reasons and tell you about my experiences in this huge and diverse country.

Before coming to Bangalore I was travelling in North where India, encountered range of different peoples cultures, and environments. Wherever I went, I

was welcomed with warm

with people helping me out if I seemed lost. There are enormous differences between Germany and India, and German friends who've been here have often told me that they experienced a great deal of cultural shock. For me the experience has been more like a cultural explosion. I haven't been so much shocked as fascinated; how could a country be so diverse?! Every 500 kilometres you see changes in people, weather, nature and traditions. In the Himalayas, for instance, time seemed to have stopped. It was tranquil and

peaceful. In Delhi and Mumbai, in contrast, it was noisy and crowded, but Mumbai had great nightlife. In Haridwar and Varanasi I saw different kinds of rituals and lots and lots of worshippers. In Rajasthan the weather was hot, and I would suddenly find myself surrounded by camels and dancers and music. Goa had a laidback beach life style. And in Bangalore, the IT hub, I experienced the worst kind of traffic. Each state has its own rich heritage and cultural treasures, and it would be impossible to see them all in a single trip. At the same time, not all my experiences here were great and wonderful, and there were many things about this vibrant country that I found strange. For instance, I have never seen anyone travelling in a train with a complete lunch and dinner. But I'm really glad to have done so because not only do I love food, I also love the nice atmosphere that's created when everyone sits together for a meal. Oh, and about the food itself, which I have to talk about...it's so good here, even though in the beginning it was tough getting used to all that spice. (And all those bacteria, which my gut didn't really like!) But when my stomach did get used to the food, I found I enjoyed it to a certain extent. Another thing I had to learn was how to shake my head in the proper Indian way, and also how to cross streets, because it seems like there are no traffic rules here at all. As for public transport -- it is totally confusing and hopelessly overcrowded. If I had been on my own, I would have had a very tough time. Moreover, it's not just the trains or buses that are crowded; it's everywhere else too, so much so that if I didn't pay

attention, I found I could easily caught on someone's mobile phone. In fact, having my picture taken unawares got to the point that it really annoyed me. And it takes a lot to annoy me. At places crowded with Indians (especially monuments and tourist spots)

I've had so many requests for "Ma'am please just one selfie, please!" And selfies: if I didn't watch out, I could be dragged by my arms and have a mobile phone stuck in front of my face...

be

hospitality,

After travelling around for a while, I eventually found myself at the IISc, where I spent most of the first two weeks running from one office to another with various papers. It was only when I was done that I could finally join Prof. Umapathy's lab and start studying and researching. I had to learn a lot about Raman spectroscopy, and I also had to for example, I couldn't play frisbee or cricket, since adapt to life on campus, which took me roughly neither was well-known. Having a bicycle, I also two weeks. Campus life here is quite different from realised how huge the IISc campus is, and how little that in Germany. First of all, in Germany, only a few of it I had seen till then. The bicycle also let me go students stay on campus; the rest rent shared flats in outside the campus for dinner more often, something the city centre. Also, a German campus sometimes I needed to do because the mess food - which I loved spreads across the city, so some students have to travel initially – was sometimes too repetitive for my tastes. from one place to another (but usually not for more In Germany we also have a mess but most students than about 20 minutes). I can't imagine doing that in bring their own food to the university. It was only Bangalore – it would take hours to get to a lecture on if they had to be there the whole day that they at

the other side of the city. And in Germany, most weekends are off; there are no lectures, no meetings, and only in rare cases are there exams. But here, as Prof. Umapathy told me, there would be Saturday group meetings that everyone had to attend. That was new to me. But to compensate, there was also a group excursion to Goa at the end of October, which I also joined. That was a great time! The atmosphere was relaxed, and everyone was happy and excited. We went by train, playing lots of card games along



the way, and laughing a lot. The moment we reached South or the North, the food is absolutely delightful. Goa, we went straight to the beach and into the sea! And on campus, I also got to experience Diwali, the We had a really fun time, spending a lot of it on whole programme for which was super nice and very the beach and the rest visiting places in South Goa. well-conceived. The candle-light dinner at the mess and the diyas in the main building were also great ideas.

After returning to the IISc, I started to try some of its sports activities, including frisbee and In a nutshell, studying here in India is a are quite different from those at my university. There, excited about what my last month will bring.



eat the mess, and usually only for a single meal (lunch or dinner), not four. And the mess at my university opens only at lunch time (around 11 am), and closes by 7:30pm. On Saturdays it's mostly closed, and on Sundays it may not be open at all (I'm not too sure.)

During my time here, I was able to see my first Indian wedding, and I soon realized that there's a huge difference between North and South Indian weddings. South Indian weddings aren't all that exciting, but those in the North are really awesome, with lots of dance, music and ritual. But in all the weddings, whether from the

KungFu. And I finally got hold of a bicycle. There totally different experience, but a great one, are plenty of sports activities here, and some of them and I'm super happy to have done it, and I'm



Twentieth Century Electrochemists of the IPC Department. Part I In a two-part article Prof. Munichandraiah recalls the many scientific contributions of IPC's distinguished roster of electrochemists.

Electrochemistry is regarded as a green science with the IISc during the period 1939-47, having earlier several applications. According to the written evidence been associated with Calcutta University and Dacca available now, the subject was born accidentally when University. He was the second professor from the Galvani (1780) observed a flow of electronic charge Chemistry department to become the Director of through two different metallic wires that had been the Institute, the first being Morris Travers, who brought into contact with the muscles of a dissected frog and shorted at their other ends. Galvani's concept IISc in 1947, after the country's independence, of animal electricity was disproved by Volta (1790), to become the Director General of Industries and who demonstrated that an ionically conducting Supplies (1947-50), and later to become the first medium – and not animal matter – was essential for the flow of charge. The "voltaic piles" he fabricated were a scientific curiosity, but they were employed by Carsle and Nicolson (1800) to electrolyse water and Member of the Planning Commission (1955-59). generate H₂ and O₂ gases. Following these seminal JCG was well known for his research on the theory discoveries, the subject began to be understood of strong electrolytes, which had been proposed in at a fundamental level through the contributions 1918 to explain the abnormal properties of these of several leaders in the field. The Department of systems. This research was recognized by a number Inorganic and Physical Chemistry has been the of noted scientists, including W. H. Nernst, M. beneficiary of the legacy of a number of eminent Planck, W. L. Bragg and G. N. Lewis, and it elicited professors of electrochemistry. These include J.C. Ghosh (1894 - 1959), T.L. Rama Char (1912- 1975), R.S. Subrahmanya (1922 - 2000), A.K.N. Reddy (1930 - 2006), S. Sathyanarayana (1931 - 1992) and a simple electrostatic force which obeys Coulomb's S.K. Rangarajan (1932 - 2008). A brief account of law, it becomes merely a matter of terminology to



their contributions –

I. C. Ghosh

(JCG) graduated Calcutta from University in 1915 and received a Ph.D. University from College, London, in 1921. He was the Director of

was also the Institute's first Director. JCG left the director of IIT Kharagpur (1951-54). He went on to assume the Vice Chancellorship of Calcutta University (1954-55), before finally becoming a this comment from Lewis and Randall: "If we agree that a strong electrolyte is one which is completely polar and that the ions are held to one another by decide whether we shall say that a certain fraction divided into two parts of such electrolyte is dissociated or with Ghosh that - is sketched below. a certain fraction of the ions is free or outside the sphere of mutual attraction." The Debye-Huckel theory of strong electrolytes and Debye's concept of the ion atmosphere were, in fact, based on many of JCG's ideas and observations. JCG also pioneered investigations on the Fischer-Tropsch synthesis of liquid fuel from CO and H₂, and the synthesis of ammonia from N₂ and H₂. He was knighted during the second world war when he was Director of the IISc.¹

T. L. Rama Char (TLR) was a pioneer in



group alloys, and aluminaircrafts. He was a

tions among electrochemists in India and abroad, and opened an India chapter of The Electrochemical Society (ECS) of USA, which operated from his laboratory in the IPC Department. As the secretary-trea-Department. At its annual meetings the ECSI holds sue. RSS used to attend the department's tea parties,

the Prof. T. L. Rama Char Memorial Lecture, in support of the IPC Department and as a tribute to TLR's contributions to electrochemistry. But electrochemistry wasn't TLR's only passion: he was also interested in classical music and cooperative movements, becoming a founder member of the Malleswaram Co-operative Society and a member of the Malleswaram Sangeetha Sabha.²



R. S. Subrahmanya (RSS) started his research in the 1940s, work-

Acknowledgements: The author thanks P. Sridhar (student of RSS), T. Prem Kumar (student of SSN), The ECSI and Brij Kishore for their help in providing requested information. References

1. Subodh Mahanti, Jnan Chandra Ghosh: Pioneer of Technological Education in India, Dream 2047, 2008, 10, 34. 2. ECSI Brochure on Prof. T.L. Rama Char Memorial Lecture.

3. A.K. Shukla and T. Premkumar, A short history of electrochemistry in India, Ind. J. Hist. Sci., 2015, 49.4, 424.

the fields of corro- ing under the supervision of Sanjiva Rao of the IPC/ sion and metal elec- department and K.S.G. Doss at the Central College, trodeposition. He Bangalore, on problems related to the effects of an and his large research electric field on light scattering by a sol. In 1954 he contrib- started a research programme in the new field of pouted extensively to larography, publishing his first paper on the subject the study of elec- the same year. This was just a few years before the trodeposition baths, 1959 Nobel Prize was awarded to Heyrovsky for his electrodeposition in discovery and development of the technique. RSS binary and ternary continued to study polarography for the rest of his career in the department. The field was still in its ium corrosion in infancy around the world, so RSS was probably the first in India to work in it, and he devoted considerstrict disciplinarian in the lab, but his research train- able effort to advancing polarography as an analytical ing produced a large number of scientists who went technique, using it not only to study metal complexes on to occupy top positions in industry and academia. but organic molecules too. He also contributed to its He foresaw the importance of encouraging interac- theoretical framework, modifying the famous Ilkovic equation (on the limiting diffusion current of polarographic data) by including the effect of the growing mercury drop, which reduced the thickness of the diffusion layer through an increase in the surface surer of this chapter and its Indian Correspondent, area. RSS guided a large number of research scholars, he was able to organize meetings, seminars and spe- one of whom, S.K. Vijayalakshamma, became a faccial lectures for India's pool of electrochemists. In ulty member of the department, contributing signifi-1963, he converted the chapter into an independent cantly to its analytical and electroanalytical research society, the Electrochemical Society of India (ECSI), before retiring in 1988. Another student, Manisha serving as its founder President, and also as the editor Mukherjee, from the period 1970-76, was a recent of its newly launched journal. The ECSI present- visitor to IPC, and gave an interview to The Elixir, ly functions from the building adjacent to the IPC an account of which appeared in its July 2017 is-



but only as a silent spectator, never partaking of the refreshments. He maintained a very simple, disciplined and orthodox life. In the 70s and 80s, he was easily recognized as the elderly figure in a dark blue coat and matching cap cycling around the campus. He retired in 1982, but used to be a regular visitor to the Institute and IPC till his death in 2000 at the age of $78.^3$

To be continued in the next issue...



Popcorn Patriotism

A movie buff makes a light-hearted plea for a flag-free cinematic experience Hariprasad KM

raise the cost of packs. What we get instead is a

that "when the scroll comes, attention goes to it rather than the scene". But leave aside artistry, and widely seen and that this tiny print at the bottom then why not include a disclaimer every time a rape occurs on screen? Or every time a man stalks a woman, trying to get her to reciprocate his love? Or every time thieves hatch a plan to rob a bank?

that the national anthem must be played in cinema halls across the country before a film is screened, and for a minute, the arguments about personal choice, Sorkin put it best in these lines he wrote for the

Why is it always the movies? Take smoking. accusations of a scaremongering demagogue. "You There are many ways to bring it down. You can want free speech? Let's see you acknowledge a man stop the sale of single sticks, force people to buy a whose words make your blood boil, who's standing pack every time they feel like lighting up. You can centre stage and advocating at the top of his lungs that which you would spend a lifetime opposing at disclaimer during a film show that no one in the the top of yours. You want to claim this land as the show actually promotes the habit; we see it every time land of the free? Then the symbol of your country the villain's henchman is caught chomping on a bidi. can't just be a flag; the symbol also has to be one of its citizens exercising his right to burn that flag Woody Allen refused to allow Blue Jasmine in protest." That this Utopia is becoming (or has to be screened in India with this disclaimer, saying become) a pipe dream is no longer seriously contested.

Had Nobel laureate Rabindranath Tagore just consider logic. If the reasoning is that films are been around, he would have been among the first to criticize the Supreme Court order that makes is an educational measure against a harmful act, it mandatory for movie halls to play the national anthem. The court order would not have been music to the poet's ears. If his views on patriotism serve as an indicator, then Tagore pitched humanity above patriotism. In a letter written way back in 1908, he wrote: "Patriotism can't be our final spiritual shelter. I And now, the Supreme Court has ruled will not buy glass for the price of diamonds and I will never allow patriotism to triumph over humanity as long as I live." Whether Tagore had bargained for the everyone present must stand to pay respect. Forget, Jana Gana Mana becoming synonymous with Indian nationalism will always remain debatable given that about freedom in a democracy. Screenwriter Aaron he was clearly critical of overstating nationalism. His views, if read in the present day context, could easily scarily prescient The American President, in which be dubbed as anti-national. And if the interpretations an Obama-like liberal finally rises to respond to the of the current dispensation led by the BJP are anything

to go by, then the probability of slapping a sedition about being "commercial". In other words, after case on Tagore would, indeed, be quite high. Tagore standing up for the anthem, you're going to be made known the distinction between worship and sitting down for a cleavage-baring item number, loving one's country: "I am" he once wrote, "willing The national anthem is not unlike a bhajan. It's an to serve my country; but my worship I reserve for expression of one's reverence for the country. It stirs the Right, which is far greater than country. To worship soul, makes us feel patriotic even when things around my country as a god is to bring curse upon it," He was us make us angry about the state of the nation. But against love for a country becoming a sacred obligation. enforced patriotism is simply transforming a private emotion into a tokenistic public spectacle. You stand But why movies? There are many up not necessarily because you want to, but because if circumstances that warrant the playing of the you don't, you're likely to be labelled a traitor, or worse, national anthem, if the purpose is indeed to teach screamed at or assaulted by self-styled nationalists.

people its words. It makes sense to play the anthem every day at school and college. (Catch them young.) - this is, after all, news about the nation. It may make sense when our cricket team beats England. But how can the compulsory presentation of the

To expect "pride" from a ticket buyer who you watch Rajinikanth beat up a hundred bad guys. wants nothing more than to forget his troubles It is these Indians, the ones who don't necessarily with overpriced popcorn and soda, and a mindless wear their patriotism on their sleeves, who demand movie, is even more of a pipe dream. One could a simple answer to the following question: "Where make the case that we are, in fact, disrespecting do I place my food tray and popcorn when I the anthem by associating it with a medium stand up to listen to the national anthem?". that — nine times out of ten — makes no bones



There are many ways to prove your love for It perhaps makes sense before television news your country. You could contribute to flood relief or volunteer in a tsunami-stricken area or ensure the domestic help has enough cash till she gets used to plastic — all of this is a form of loving, caring for, and national anthem before a Sunny Leone or Salman respecting the nation. Because a nation is its people. Khan-starrer be considered a form of respect? Love Indians, and you love India. But that, apparently, isn't enough. Now you have to prove it every time



Stranger in a Strange Land

A visitor from Nigeria looks back on her five long years in Bangalore as a student of IPC

Aderonke Adeyemo

week of July 2012 when I landed in a city not much fence, and I'm looking forward to receiving more.) different from the one I was coming from, except for

the people. The mixed feelings I had of what I'd left behind in Ni-I didn't notice the tall African man was on the lookout for the African girl coming to the IISc. Hearing my name shouted out jolted me back to reality, and as I turned in the direction of the sound, I saw a smile wide enough to tell me this was a home away from home. The young man's

him in Yoruba - meeting someone from the same looking for a research problem. A departmental trip to background was clearly a big deal in a foreign land.

same beautiful weather we have in South-West Nige- and it made me feel part of a big family. Although I university, where I did my MSc, except for the unstop- trip, it remains an indelible part of my journey here. pable rains, and later, the cold. To me, everyone looked the same, and I couldn't even distinguish someone I'd my first Indian meal at lunch time in the B-mess, and

beautiful smile by Prof. P. K. Das, acting on behalf ernment visa policies became my biggest headache. of the then chairman, Prof. A. G. Samuelson. I learnt from Prof. Das that my boss, Prof. P. S. Mukherjee, was out of the city, but I did meet my other labmates. when my boss asked about my research, but later we After settling down in the ladies' hostel, Ashwini, on Friday, I had a few hours of inconsistent sleep, the result obviously of the time difference. This pattern continued for about two months. Mantri Mall hosted me on Saturday, and I could see a bubbly part of the city away from the serious faces in the institute. I was hosted by my boss on Sunday morning in his office with that wide PSM smile that you don't get too ing. Well, not really suddenly, since it only happened

It was a sunny Wednesday morning in the last often. (I got another one recently, though, after my de-

geria and of what I was about to ex- "IPC has been a learning ex- here; it was difficult for me to plore here so overwhelmed me that perience for me, and it re- cope with the volume of work in the arrivals terminal at the Ban- mains very dear to my heart. be completed. I must commend galore International Airport who My sincere appreciation for all the nature of the student-faculty

of you; yes, you!"

Jai Hind to my **Incredible India!**

Coursework was one of the toughest parts of my journey and the rate at which it was to relationship that exists here, and that I had never experienced before; it gave me the freedom to walk into a professor's office and

ask him questions. With the help

of God, two lab seniors and a few

course mates, I got through the joy could not be quantified when I conversed with coursework, only to face another phase of the race: Wayanad in December 2012 provided a well-deserved break from the stress of academics and the extreme As we headed to the Institute, I marvelled at cold weather of the previous months. It was a memothe greenery along the airport road, and I savoured the rable and relaxing trip with a lovely group of IPCians, ria. The institute itself was similar to Nigeria's premier had to be practically dragged by my senior to join the

Having resumed lab work immediately after the met earlier from someone I'd never met at all. I had coursework ended, I had no illusions about the challenges that lay ahead in my research. Time seemed to I can still clearly remember the taste of dal, plain rice, slow down, but it moved fast enough to remind me boiled egg and ladies finger - all quite strange to me of all the departmental milestones that I had to cross. at first. The IPC office was my next stop of the after- The first seminar rolled by and the comprehensive exnoon, and I was warmly welcomed there by the office amination came calling. I felt a little relieved when staff. I truly felt like a celebrity on my first day in IPC. they were over, but then the second seminar showed its face. And then the knowledge that I had to fin-On Thursday morning, I was received with a ish my degree within a fixed period because of gov-

> For a while, I was able to plead "No results" both became a little worried, my boss more than I (At least that's how it seemed from our conversations during his morning, afternoon, evening - and sometimes night - rounds in the lab.) I must appreciate his kind and unwavering support during this time, even though his "Try and work harder" became a constant refrain. Then expected results suddenly started com

matographs. The NMR machine became my best friend at the time, informing me what products the mixtures from my endless columns contained. Special thanks to all the synthetic labs in IPC that let me use some of their chemicals.

IPC has been a learning experience for me, and it remains very dear to my heart. It could not be what it is without its students, professors, and technical and office staff. The people I have met here have always been willing to go out of their way to help, and they created a warm learning environment in the department. I mean learning in all its forms: academic, social, cultural. Although I did experience some nasty situations here, the good easily surpasses the bad. Until 2017, there were some departmental activities like the freshers' welcome and the IPC Day celebrations that I didn't find too relaxing, mostly because of the stress of work, but more because of the freedom they gave me to use the NMR machine without interruption. For everyone else at these events, food was the highlight of the day, but not for me. However, I did ask for the names, descriptions and recipes of everything on the menu. This led me to cooking South India biryani myself several times. I'm hopeful that before I leave, I'll be able to cook Bengali biryani too, since I'm obviously Bengali by my IPC lineage.

There are a few places here where I tend to forget my work troubles. One of them is a friend's home, maybe because of the joy of sitting together with loved ones and the pleasures of home-cooked meals. I especially enjoy home-cooked Bengali fish fries and curries, as they draw me closer to my own home in Nigeria. Another place I find relief is on the streets or in the malls, where the swalpa swalpa Kannada and the thoda thoda Hindi that I speak to the elderly locals elicits beautiful smiles that I find therapeutic. My efforts gained me friends in the malls and in the fruit and vegetable markets of Yeshwantpur and

> 3. We are very selective in the junk food we consume. 4. "We are the Cinderellas of IPC - We must be back before 9:00 am·"

after many sleepless months of running column chro- Malleswaram. I should set aside a day to say goodbye to all these wonderful people. Conversations with my African brothers and sisters also gave me

> much needed relief from work tensions and failed experiments. They were (and still are) my very strong support system at the Institute. My appreciation of nature and tourism has greatly increased

my stay here. I've been fortunate to during have visited a number of cities across India, each with its own aesthetically unique features and culture. Train travel was not as nice as I4nvisaged, but it taught me a

lot about life in general. One thing I cannot take away from Indians is their welcoming smiles and warm receptions, which I still receive even though I often don't understand what's being said. I've found that a Nigerian girl wearing a saree at a village wedding is a big deal, many times shifting attention away from the couple to the foreigner. My love for the saree these days truly knows no bounds, espe-

cially now that I can drape it myself. I hope my people back home will also appreciate it. All my sarees except one have been gifts - that is the beautiful Indian spirit I am talking about.

As I look forward to leaving my home here for my home there, I would like to express my sincere appreciation for all of you; yes, you and everyone I've met here who made my stay convenient, beautiful and memorable. As a Nigerian and an African, I've been given a rare opportunity by IPC to learn a variety of research techniques from the best. For this I will be forever grateful. My lab has been my nuclear family, IPC has been my extended family, and IISchas been the village nurturing my growth as a PhD student. I hope one day to come back to India and especially to IPC with my children, and show them the beautiful family I have here. Till then, Jai Hind to my incredible India and her beautiful people.



Agatha Christie – The Queen of Crime

The inventor of Hercule Poirot and Jane Marple receives a glowing tribute from this ardent fan

A. Vaishali

a young teen first stumbled Agatha upon Christie at a book fair, and she naturally replaced the Enid Blyton's that had been devouring till From then. that time Chrison, became tie my constant companion and companied me everywhere

ac-

- at home, to school, in crowded buses or long train journeys, even to dull and weary weddings. I was obsessed and hooked, likes scores of people before me, enchanted and enthralled by her stories on crime and adventure. Crime, for Christie didn't mean petty thieving or planned burglary, not even high-level abductions or international smuggling. These were mere sideshows, sporadically spread across her books that acted as props for the only crime that mattered, a crime that spelt 'gruesome-cold-blooded-murder' in her dictionary.

Murders are central to her books, and they mostly follow a set pattern - a scene is set up with seemingly good, well-natured individuals, and suddenly one of them is murdered. A so-called detective emerges, investigates the crime, finds inconspicuous clues invisible to the police, scrutinizes the people involved and delves deep into their minds to identify their fears and secrets, exposing the reader to detailed charac-

ter sketches and plot theories that lead him or her to suspect everyone as the murderer. Meanwhile a second or even a third murder occurs, and yet the reader is confounded by the identity of the killer. Although all the facts are presented, the book seems to end with no clarity in the reader's mind. Ultimately, in the last page the detective recreates the crime, backs up his case with logical reasoning and psychological insights, and finally unmasks the murderer. The amateur sleuth in you is completely stumped, you smack your forehead for having missed that one, seemingly unimportant teeny-weeny clue staring you in the face, and you wonder why you didn't connect the dots earlier. You vow to be sure to identify the murderer the next time you read a Christie. But lo! You fail at it every time you read her books, and are amazed b the sheer ingenuity of her strikingly familiar yet dissimilar plots.

Like many other writers in the murder mystery genre, Christie created iconic detectives, two of the most famous being a retired war-wounded immigrant - Hercule Poirot - and a frail elderly village spinster - Jane Marple. Her sleuths, at first sight, are unbelievably comical, and resemble your average simple next-door neighbor, but they are keen observers of human nature who use their little grey cells to unravel the mysteries they confront. They do not run around the place measuring footprints or assessing cigar ashes, they simply solve the crime by talking to and analyzing people, understanding their psyches, and paying attention to small details. Her villains can be anyone from a seemingly innocent child to a crippled old man to an aspiring writer, or even a police officer, and the scene of the crime can be as varied as a deserted library or a fully packed theater. Nobody is spared, no place left untouched. Her books may not contain high drama, but dumbfounded. I was once again overwhelmed by her 4 they are definite page turners, and when you finish the brilliance ... but after all she is the Queen of Crime. last page they leave you admiring her skill and brilliance.

If you're still not convinced of Christie's Recently, I laid my hands on one of the Chris- genius, why don't you try one of her books yourtie books that had escaped my clutches in my youngself. I bet you'll be as amazed as I was. For starters, you could try any one of the following er days. I was now no more the naïve thirteen-yearold who could be easily hoodwinked by her they're part of my collection of Christie's best:

JAHA CHRISTIE

wiles, but a mature adult with a scientifically trained mind. thought it would be difficult for Christie to surprise me, and I was determined to solve the crime myself. I carefully perused the book, read



between the lines, and dismissed all the obvious outcomes by collecting facts and organizing

> for in the last line was a twist, and the identity of the killer it revealed left me



1. And Then There were None 2. The Crooked House 3. The Murder of Roger Ackroyd 4. The Murder on the Orient Express

5. The Mysterious Affairs at Styles

While you're going through them, if you them in my head, just the way Poirot did. I had find yourself becoming captivated by her characters a clear idea in my head who the potential or getting entangled in her plots, or if you notice murderer was, and I was ecstatic on the world around you turning hazy and indistinct, seeing his name at the end, on the or if you feel like you're suddenly embarking on a very last page. My heart pounded spine-chilling roller coaster ride, or if you're jolted by with joy for having finally defeat- bursts of euphoria that cause you to hunt frantically ed Christie at her own game, and for her books in the library or to desperately down-I assumed that her charm would now load them from the web, don't worry, you haven't wane. Oh boy! Was I wrong! How pre- turned crazy; you've simply been afflicted by what I call mature it was to celebrate my triumph, Christie fever. Well, don't tell me I didn't warn you.

THE INDIAN INSTITUTE OF SCIENCE AND THE INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE **DEFINED INDIA BEFORE INDEPENDENCE!**

Prof. Arunan asks an interesting question about the relation between nomenclature and national identity

ulty and staff of the Indian Institute of Science received an email from the Director that started with this Tata as an entrepreneur could do to help the country, message: "Today is the 27th of May, on which day in 1909 the vesting or-der for the establishment of the Indian Institute of Science was issued."[1] Coincidentally, on the same day in 1964, Jawaharlal Nehru, India's first Prime Minister passed away! Nehru is credited with founding, in the period between 1951 and 1961, the five Indian Institutes of Technology, which have since become institutions of national importance. In a parallel development, Sardar Vallababhai Patel, India's first Defense Minister, man-aged to bring the many separate states and kingdoms that existed prior to 1947 into a single unified Indian nation.

How did the Indian Institute of Science get its name in 1909, nearly four decades before India itself existed as an independent country? At that time, Bangalore, where the Institute was established, was part of the Mysore Presidency, which was then ruled by the Mysore royal family. It was the Mysore Maharaja, H.H. Sir Krishnaraja Wodeyar IV, who donated the 371 acres of land on which the Institute was set up, and who also provided partial financial sup-port. So why wasn't the Institute named the Maharaja Institute of Science or the Mysore Institute of Science?

The Institute was actually envisioned by the Guja-rati industrialist, J. N. Tata. Tata happened to be



travelling in a ship from Japan to Chicago with Swami

On the 27th of May, 2017, all students, fac- Vivekananda, who was originally from West Bengal. Both these eminent personalities were discussing what which was yet to become independent. One of their plans was to establish an institute of science, in India. Sadly, that plan only materialized a few years after Ta-



ta's death. But the institute that is its embodiment is even today referred to by the locals as the Tata Institute. For some reason, the contributions of the Mysore King were not recognized, although now, a century later, his bust rests on a column in the foyer of the Institute's iconic tower building. And directly opposite it is a statue of Tata himself, which was installed in the early days of the Institute. So with some effort, the two of them, King and entrepreneur, can greet each other. :-)

Even as I was wondering how a new institute could be named the Indian Institute of Science in 1909, I was reminded of another anachronism - the Indian Association for Cultivation of Science, Calcutta, which was founded even before the I.I.Sc., in 1876 itself! There are several interesting linkages between these two establishments, apart from the "Indian" in their names. The first Indian Director of the I.I.Sc. was C. V. Raman, who had earlier worked at the IACS. The first Direc-tor of the very first Indian Institute of Technology, in Kharagpur, West Bengal, was J. C. Ghosh; before mov-ing to West Bengal, he had worked at the I.I.Sc., in our own I.P.C. Department, in fact. And a Best Thesis award in physical chemistry is named after him.

Unlike the I.I.Sc., the I.A.C.S. received no support from either a King or the Government. But it did produce a Nobel Laureate - the same C. V. Raman who later joined the I.I.Sc. And who himself received a grant of land from the Mysore king to start the Indian

Academy of Sciences in Bangalore. The Academy is lolighting contributions of an individual from that group cated on that land, which is also the location of another science institute, one that Raman himself built and ignoring more significant contributions from others. that he also named after himself. The Raman Institute While the institutions founded in what later and the I.I.Sc. are about a mile apart, on a road that became the states of Karnataka and West Bengal were is now called C. V. Raman Avenue. The I.A.C.S. was named "Indian", two other universities that came up in established to carry out basic research, and its founder, Uttar Pradesh were named the Banaras Hindu Univer-Mahendra Lal Sarkar [2], was public-spirited enough sity (BHU) and the Aligarh Muslim University (AMU)! to call it "Indian", despite the lack of outside support. The AMU has its origins in the Muhammad-an An-Those were the days! Now the trend is to name a lecture glo-Oriental College that was founded in 1877 by Sir hall, a building, or an institution after a founder or a Syed Ahmed Khan in Aligarh. In 1920, after a period of donor. Clearly, the founders of IISc and IACS had a expansion and growth, it became the university it is tomore broader vision for education and the nation than day. The BHU has its origins in the Central Hindu Colthe donors of today. lege that was founded in 1916 by Pandit Madan Mohan While Sarcar as founder of IACS and Tata as Malaviya in Banaras. It also expanded, and eventually founder of IISc were well known, somehow, the con-tribecame a university, the BHU. Both the AMU and the BHU are perhaps the only Indian universities to have butions of the Mysore king to the formation of IISc were not as well known. And even now they are not. If more than 25,000 students each, and to cover all fields you search Google for images of "Tata statue at I.I.Sc.", of study, including science, engineering, medicine, law, you will get back thousands of images. I tried "Mysore literature and the social sciences. And though they have king bust at I.I.Sc." and I got back nothing. become model universities, they have restricted them-It turns out that the Mysore king was actually selves by their names. In a way, these names reflect the feelings of the local population.

a minor when the decision to give the land was made by the Maharani. However, he not only honored the Finally, I am glad I am working at the Indian Institute of Science and not the Mysore Institute of Scidecision when he became a major, he continued to support the Institute afterwards. I was indeed inspired by ence or the Maharaja Institute of Science. I do think one of his speeches, where he said the following: "I can-Indians should avoid regional feelings, since borders benot help feeling that the Council will be well advised to tween states and nations are arbitrary. My views on this keep an open mind on the scholarship question until can be seen in the article I wrote for the previous issue they are satisfied by actual experience that scholarships of The Elixir [4]. However, I do hope that the contriare not actually needed."[3] Apparently, the Council butions of the Mysore King are better recognized in the had decided that there was no need to provide finanfuture! cial assistance to poor students, as they were unlikely to gain much by learning Science!

Given his enlightened views, maybe the Mysore Maharaja would have been a better choice to name the 1. http://chep.iisc.ac.in/IISc_History.html (Accessed Institute after! All those involved in establishing IISc on 28 May 2017). did not have such narrow vision. Recently, I heard from 2. https://en.wikipedia.org/wiki/Mahendralal_Sarkar. a resident of Mysore that IISc should have been named 3.https://archive.org/stream/SpeechesByKrish-Mysore Institute of Science! Perhaps, this thought was nara-jaWadiyar/SpeechesByKrishnarajaWadiyar_djvu. the result of the long neglect of the contributions from txt (Page 128) Mysore Maharaja. India's diversity naturally leads to re-4. The Elixir, Volume 2, 2017 gional and local feelings based on state, language, reli-

8. Arise, awake and stop not till the "cow" is reached. 9. "I certify that the present chairman Prof. Umapathy is very active and is doing a good job."

gion, and caste. Often one sees a particular group high-

References





Special Lectures

Name of the Speaker	Affiliation	Торіс	Date
Prof. Shaul Mukamel	Department of Chemistry, University of California, Irvine	2D-Spectroscopy: NMR to X-rays.	02-07-2017
Prof. Peter Comba	Universität Heidelberg, Anor- ganisch-Chemisches Institut and Interdisciplinary Center for Scientific Computing (IWR, Im Neuenheimer Feld 270, Heidelberg, Germany	New reactions and new reaction channels with nonheme iron oxida- tion catalysts.	14-09-2017
Prof. Eric Borguet	Department of Chemistry, Temple Univeristy, Philadel- phia, USA	Ions and ultrafast vibrational spec- troscopy and dynamics at mineral-aqueous interfaces.	6-12-2017
Prof. Elanganan Arunan	Department of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore	Intermolecular interactions/bonds.	11-12-2017
Prof. Alan Goldman	Distinguished Professor Rutgers-The State University of New Jersey, Department of Chemistry, 610, Taylor Road, Piscataway, New Jersey, USA	Catalysis by pincer-transition-metal complexes, breaking C-H bonds and various combina- tions thereof.	13-12-2017
Prof.Ajayan Vinu	Global Innovation Chair Pro- fessor for Advanced Nanoma- terials, University of Newcastle, Australia	Advanced Funcional Mesoporous Materials and their Applications	26-12-2017

IPC in the News IISc team fabricates nanomaterial to treat Parkinson's

The material protected cells against neurotoxin-induced cell death by scavenging excess ROS

R. PRASAD

A team of researchers from the Indian Institute of Science (IISc) Bengaluru has fabricated a metal oxide nanomaterial that is capable of mimicking all three major cellular antioxidant enzymes, thereby controlling the level of reactive oxygen species (ROS) inside cells. Based on in vitro test results, the nanomaterial appears a promising can-didate for therapeutic ap-



neurotoxin-induced cell death by scavenging the ex-cess ROS that was artificially generated inside the cells

"Inside the cells, the nanomaterial was able to substitute the cellular enzymes effectively when the enzymes are inhibited. Due to high pore size and volume, it was able to achieve better activity. So we don't need much of the nanomaterial inside the cells." savs Prof. Patrick



Test your wits against this IPC-related puzzle

Created by students from KLS lab



Across

- No more drunken revelries in this sit-out. 1
- UGC scholars' paymaster. 4
- 7 New occupant of an old address.
- 11 Baadshah of polymer chemistry.
- 13 Shock jock.
- 14 Marathon Man.
- 16 Mahassapatam, once upon a time.
- 19 Sunshine's seafood speciality.
- 20 Bill Gates's postal service.



2			3	
	9			
		10		
	11			12
	3			
		14	15	
	17			

Answers on the last page

Down

2	Bard of boron.
3	Magnetic susceptibility.
5	Three phosphorus atoms make this journey.
6	Mineral of the vertebrae?
8	Initially no Spanish fleet on this Indian river.
9	Silver sulphide in human form.
10	Divisional chairman's initial arsenic obsession.
12	Winter crop spins at this frequency.
15	Element number 89.
17	Experiments conducted here.
18	Cure for battery depression.



The Elixir's roving reporters (Srividya Kumar and Vaishali Arunachalam) subject another captive IPC professor to the third degree. (Edited for length and clarity.)

The Elixir: Tell us something about your childhood. Physics also tends to become very mathematical later

Odisha, but I mostly grew up in a border region of esting things. I got to know how they thought about MP and UP, a place called Singrauli, where my father research problems. When I left for Cornell, I thought worked for the public sector. So I basically grew up in I would do some protein-related stuff, but then I saw a Hindi-speaking area, and if you listen to me speak- that the people doing such work were mostly just ing Hindi you will not be able to make out that I am standing around and pipetting. I didn't want to do Odiya. After finishing school in 1997, I joined IIT Kanpur for pursuing a degree in M.Sc. (integrated) in chemistry and theory. I can look at 3D structures for Chemistry and after that I left for the US to pursue a hours, trying to understand their behavior. PhD at Cornell.

TE: What was your favorite subject in school or col- mired? lege?

was a child, textbook chemistry wasn't very systematic. It was mostly memory-based. I liked physics more, especially mechanics. And I liked its drawings. If originally, you'd let me be whatever I wanted to be, I would have probably been a mechanics guy, drawing-designing something, somewhere!

TE: So was that your dream?

CR: There was no dream. My dream was mostly to play cricket!

TE: Did you plan to go to IIT and Cornell, or did was really eye-opening in many ways. that just happen by accident?

CR: The only plan was to first get through the JEE. you adopted energy conservation in your life? After I got through, I chose mathematics as my subject in preference over chemistry, but I didn't get it! CR: My wife takes more steps than me, like switchand I am so happy that I didn't. Later I realized, I ing off the lights when I forget. But sustainability is don't really have the aptitude for pure mathematics. more complex than that. We need to understand the

on. So, I was happy that I ended up in chemistry. Chinmoy Ranjan: I was born in Bhubhaneshwar, Later, I got exposed to a lot of professors doing interthat. That's sort of why I did my PhD in solid state

TE: Was there a teacher you especially liked or ad-

CR: My father for one; he basically instilled in me **CR**: I think my favorite subject was physics. When I a sense of excellence. Then there was a principal at my high school who encouraged students a lot. He used to be previously employed in South Africa, and had lot of exposure to the world. He had a nice perspective on things. He used to encourage students to do stuff. Somebody who would tell you "you can do anything you want; you 16 and so was Tendulkar when he did some of the best work of his life; nothing is impossible". At IIT, Prof. Sabyasachi Sarkar was an inspiration. He was the one who introduced me to bio-inorganic chemistry and nanotechnology. During my PhD, I met really excellent people. Those guys seemed to know everything. PhD experience

TE: Your work is in sustainable energy. How have

entire ecosystem of how things work. For example, CR continues: I am also a meat eater. All I'm saythe smog problem in Delhi is somewhat connect- ing is, it is better to avoid over consumption. Energy ed to burning piles of grass. It is done to create the wasn't a big issue some time back, and energy research black colored char, which aids in improving the ferpicked up only in the late 70s and again in 2000 betility for the next crop. Suppose we were to take these cause of increase in oil prices after the Iraq war, a lot piles of grass somewhere else, it would also cost en- of it originating in the US. It's not that people in ergy. Where will we get this energy from? Answers India didn't worry about energy before, but it's a very are not simple. If we adopt something new, we need hot topic now. We have the basic science, and the to understand how it is going to affect the existing problems we work on are not too different from those ecosystem. This was the case when India faced crop in Europe or US, but the scale of implementation reshortages; it led to the increased use of fertilizers and quired in India is huge. We have all the facilities too, pesticides to increase food production, but we didn't but the problems we have been addressing are not understand all the consequences. Earlier people used necessarily India-centric. Often the challenge is techto feed vegetable waste to cattle, and the dung was nology; lab-research doesn't necessarily get translated used as fertilizer. The cattle acted as recyclers. Today to the market. The problem is there aren't enough household waste is taken somewhere and burnt. Susengineers or scientists at the top of Indian compatainability is not an easy question. nies to create scientific or engineering solution-based

TE: Where does India stand in energy research?

"Scientists and engineers must work to-gether to embrace the commercial aspect of translating laboratory research. Otherwise everything remains within the lab and ends up just in a paper."

CR: Energy related research is relatively new in India. But on the other hand, Indian practices are relatively sustainable in general; in terms of energy, it is one of products. In contrast, US companies like Google and the greenest countries per capita, this is mostly be-Tesla are headed by engineers. Elon Musk at Tesla cause we have a huge poor population who have not not only thinks about how to make a rocket but also tasted modernity yet. One of the reasons for India's about how to make money, while making these rockreputation in this context is that it is largely vegetarets. In India, companies have been headed by traders. ian in terms of per capita meat consumption. Eating A trader knows how to make money while selling; non-vegetarian food is a strain on the food chain. In he doesn't know how to design an engine. Our innatural ecosystems you have numbers like one predadustrialists mostly land up selling us technology and tor for a very large number of plant eaters. For examproducts developed elsewhere. Scientists and engiple, the ratio of tigers (predator) to deer (prey) is very neers must work together to embrace the commercial small within a forest ecosystem. When you consume aspect of translating laboratory research. Otherwise meat, you put yourself alongside the predators, and everything remains within the lab and just ends up our huge numbers imply a huge strain on the ecosys- just in a paper. tem, leading to severe imbalances. Being vegetarian is much better for sustainable living, and if we ever **TE:** What do you think are some of the best practices become an extreme meat-eating nation like the West, of the west that should be inculcated in India, and that might flip our sustainability. vice versa?

TE: In the present political climate, isn't that a loaded CR: They need to take things lightly, and we need to statement?



take things more seriously. They have practices that

developed in the last 500-600 years. We have an old- I saw fewer independent scientific ideas. The social er surviving culture, and a 'chaltha hai' kind of atshould be careful. Most of them are energy intense door of a Nobel Laureate and have a free discussion. lifestyle. Things that work in Norway and Iceland extent in Europe. need not work in India due to the huge differences in climate and population. Iceland's population is less TE: What are some of your hobbies? than Yeswanthpur's. European solutions don't translate to India very easily, so we have to be careful not **CR**: I'm a sports-loving person. I used to play cricket, to make rushed adaptations.

TE: Which places have you enjoyed the most?

CR: There are a number of places I want to visit again. **TE:** How would you rate yourself as a cook? I liked Iceland a lot. I believe I liked the Northern Arctic places the most. I am still discovering India. CR: Previously I was a good cook, but after marriage Right now, I am travelling through Karnataka and I am not. Kerala, which is one of the most beautiful places. TE: Have you seen the Northern lights?

but when you look through a camera lens, they show I rarely get opportunities to cook, so my cooking their true colours.(The title picture in this interview was provided by CR)

TE: How do you find IPC and IISc?

ly liked the department on the very first day when I an idea of how to generate funds on his own. came for the interview.

TE: You have worked in both the US and Europe. What differences did you find between them?

CR: In general, europe is very top down culturally.

structure is very hierarchical, and comes from medietitude that goes along with it. On the question of val times. The US, on the other hand, is much more adapting western practices, specially technology, we independent. In the US, a student can knock on the and we cannot easily know how they will affect our You can't do that in India, and maybe only to some

table tennis and tennis. I got to play a lot of cricket even during my Ph.D. I did learn some horse riding at Cornell, but discontinued after I fell down.

TE: Is that on a relative or an absolute scale?

CR Continues: An absolute scale. My wife is a great CR continues: Yes. They usually look like clouds, cook. She knows cuisines from all around the world. skills have really gone down after marriage.

TE: What advice would you give an aspiring faculty member?

CR: IISc is very pretty and IPC is very nice. I real- CR: To have a new idea and a vision of his own. And

TE: A vision of your own for the future?

CR: My vision is that people get less sick and live life safely and sustainably.

Overheard in the corridor Seems like you are a big Modi fan Indeed, had my kid been born on 8th Nov, I would have named him "Demonetization"



Answers





Department of Inorganic and Physical Chemistry Indian Institute of Science, Bangalore-560012