Indian Science News Association
ESTD.–1935

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ESTD.–1935

The Development Dilemma

Last year, Wayanad in Kerala, located in peninsular India, faced significant challenges. Over the past two months, we have received reports of unprecedented cloudursts, flash floods, and landlides from the Himalayan States of Himachal Pradesh and Uttarakhand, as well as from the Union Territory of Jammu and Kashmir. When this editorial was being written, the death toll from the massive devastation on the way to the famous Vaishno Devi shrine had exceeded 41, and more people were feared to be trapped under the debris. Disaster management forces from both the Centre and the State are tirelessly conducting rescue operations, with no clear idea when this will end. So far, the losses have been enormous, and the death toll has been uncountable.

Or, take the case of India's east and northeast. Darjeeling, the hill queen of Bengal, often suffers due to its dilapidated infrastructure, especially during the rainy season. Early in the season, the entire northeastern region had faced incessant rains. Tourists were marooned and failed to enjoy the scenic beauty of Tawang in Arunachal, when fresh reports of continuous showers poured in this week.

Surprisingly, this is happening when the monsoon in India is at its peak. Down to Mumbai, the commercial capital of the country, is getting awash with flood waters almost in every nook and corner. Before August closes in a couple of days, the hapless Mumbai scenario is one of life coming to a standstill, with a mangled public transport and mounting death statistics. This is a record every year, and there is no sign of change. Who can forget the dreadful July 26 of 2005, when an unusual rainfall amounting to 944 mm had battered and inundated the dazzling city within 24 hours?

The situation in other metros of India is no better. Residents of cities such as Bengaluru, Delhi and Kolkata cannot enjoy the romance of monsoon magic, fearing waterlogging and disruption of public life. The situation in contiguous areas is more pathetic. Television channels transmit running shots of wounded patients from collapsed shanties being carried on shoulders to the nearest health facility as bridges are broken or have been swept away in monsoon floods in rural Bengal. Similar snaps were also available last month from neighbouring Orissa.

The big question that looms large is whether we are facing the wrath of nature due to the so-called pangs of development. Meteorologists have been warning of changes in weather patterns due to global warming, which may lead to more such natural disasters. The rains are becoming furious in certain regions. A recent study said, there have been more low-pressure developments over the Bay of Bengal, causing havoc very often in the eastern part of the country. Orissa and Bengal have already faced the brunt in recent years and will continue to face so in the years to come.

A recent piece in India's largest English daily recalled that when the British had built the popular toy train services in Shimla, they took care of the geology of the region "to keep it light and avoid water buildup in the hillsides beside the tunnels." Now there are high-rises there instead of the old disaster-proof mud and timber structure. Posh hotels and homestays are coming up in all the places of tourist interest, ignoring all possible norms. On a similar note, a noted geologist has pointed out the dangers of felling of trees, "some of them even 100 years old," when construction of tunnels is underway for highways to Rangpo in Sikkim, "though this may be of strategic importance." Mumbai's development blitzkrieg, on the other hand, over a not-too-distant past, is also turning out to be a conjecture of faulty urban planning, a phenomenon evident in other metropolitan cities like Kolkata and Bengaluru. Day by day, buildings are becoming taller and taller in underdeveloped areas, with resultant garbage heaps, and choked drainage systems from the accumulation of plastics and other non-biodegradable materials. Even smart showers lead to waterlogging and end up in public woes.

Now that it is clear that natural disasters from the ecological imbalance are going to be inevitable, we must take note that their economic impact is nonetheless formidable. According to available statistics, India's accumulated financial loss on this account far exceeds Rs. 12.6 lakh crores over the last 25 years. The situation, therefore, calls for a rethinking by our policy planners as early as possible. At the same time, better coordination with meteorologists, economists, architects and overall, our politicians is the need of the hour. The inauguration of the storm research laboratory in Kolkata the other day is just a small beginning.

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Himalayan Blunder

Ananda Chakraborty

From Kashmir in the west to Arunachal Pradesh in the east, our vast country is bounded on the north by the lofty Himalayan range whose height may reach above 8880 m.

For so many centuries, these mountains led thousands of 'adventurers to explore the length and breadth of the range, some seeking answers to the 'evolution of life, culture and civilization, some looking for the geological history, and some just enjoying the beauty.

Millions of people visited the remote corners of the range, enduring extreme hardship and physical strain to reach the shrines of various deities.

The geological history and the religious yatras, combined with the so-called development of the region for an improvement of the quality of life, will be the main points I am going to discuss.

Geological Background

As we all know more or less comprehensively that the Himalayan mountains are an example of Fold mountains, or to elaborate, they were thrown up to form the lofty range when the movement of the fractured continental plate that started breaking away from the southern Supercontinent Gondwanaland during the Early Jurassic epoch (ca.201 to 145 million years ago). The supercontinent broke up into a number of fragments

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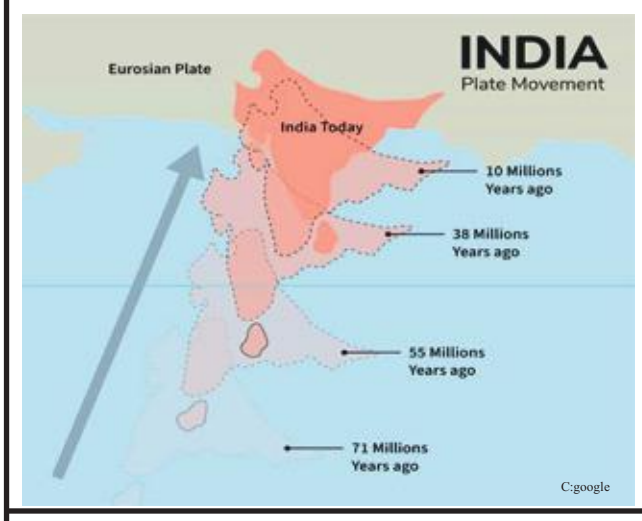

GERD

What, Where, When, And How

Prasanta K. Bose

Who do we listen to? I am sure you, too, are hovering between the horns of a dilemma when you pay attention to doctors for a myriad of problems. While your rheumatologist asks you to lie down on a flat pillow below your shoulder or even without one, the gastroenterologist will advise you to use a wedge pillow under the bed when you go to sleep, which creates at least a 45-degree angle.

This guarantees a better sleep and prevents acid from flowing from your stomach to your throat, a condition known in medical parlance as gastroesophageal reflux, which affects at least one in five Indians due to their food habits. Left untreated, it may cause GERD or even cancer in the long run. But don't panic, as reflux 40 times a day is common. If it persists for more than 100, consult a doctor.

I obtained all this information from a panel of eminent gastroenterologists from a reputable hospital in the south, who presented at a webinar. I was probably the lone journalist attendee, except for the host, who was the deputy editor of a premier south-based daily. Taking advantage of the collective digital interview, I can say that I received all the answers I wanted to collect. Yes or no, the interaction was very informative, but the time was too short.

One advice, be it from a joint pain expert or one of the panellists, is common. Avoid junk

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September 1, 2025

The Squall Front Strikes

Debdut Ghoshthakur

When the monsoon becomes hyperactive, or a deep depression forms over the sea, or when two opposing types of winds collide, the sky creates such abnormal situations that we can hardly imagine. The wounds of destruction from frequent cloudbursts in Jammu, Himachal Pradesh, and Uttarakhand are still raw. Such disasters are no longer unusual. But what happened in the sky on Monday, the first night of September 2025, is something that, in my 67 years of life, I cannot recall ever witnessing.

The phenomenon was abnormal. Usually, such situations don't occur. After a few flashes of lightning and rumbling clouds, the sky cracks open with deafening thunderbolts — that's the normal phenomenon. But that night, for hours, there were continuous flashes of lightning, clouds rumbling ceaselessly,

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INDIAN SCIENCE NEWS ASSOCIATION (ISNA)
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cordially invite you to the

CERTIFICATE AWARD CEREMONY of the XXXVIII Training Programme (Online)
Certificate Course of BASIC TRAINING on Science Communication and Media Practice 2025-2026

to be held on

15th September, 2025 (Monday) at 5.30 p.m. *via* Google Meet

Professor Swapan Kumar Datta
Founder Vice-Chancellor of the Biswa Bangla Biswabidyalay
Former Vice-Chancellor, Visva-Bharati University
Former DBT-Distinguished Biotechnology Research Professor, University of Calcutta
will grace the occasion as the **Chief Guest**

Ms. Mahuya Santra
Consulting Editor, West Bengal Commission for Protection of Child Rights
will grace the occasion as the **Guest of Honour**

Professor Mahuya Sengupta
Professor and Head
Department of Biotechnology
Assam (Central) University
will grace the occasion as the **Special Guest**

Professor Bikas K. Chakrabarti
President, ISNA
Former Director, Saha Institute of Nuclear Physics, Kolkata
will preside over the programme

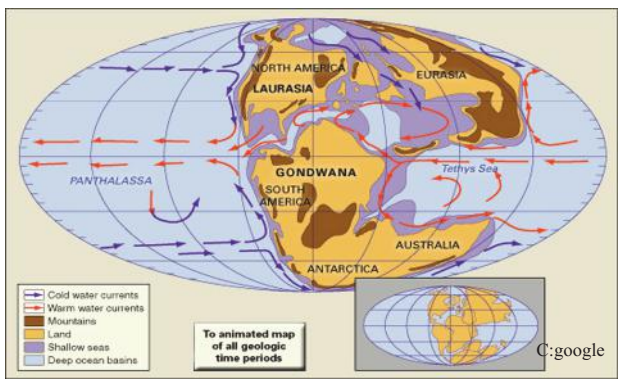
Prof. Manas Chakrabarty
Honorary Secretary, ISNA

Dr. Amit Krishna De
Convener
XXXVIII Training Programme on Science Communication and Media Practice (TPSCMP) 2025-2026
and
Honorary Secretary, ISNA

Shri Prasanta K. Bose
Chairman

Place: Kolkata
Dated: 09/09/2025
Link: https://meet.google.com/ahr-uhxi-ysf

<<1 **Himalayan Blunder...**



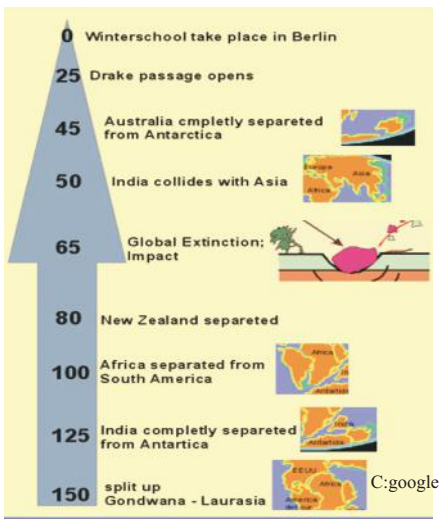
that now form the continents of Antarctica, Africa, South America, Australia and India.The roughly triangular Indian plate started moving northeastwards at a speed of around 3-5 cm per year.

Between 38 and 20 million years ago, the Indian plate collided with the southern margin of the Eurasian plate, throwing up the sediments of the Tethyan sea floor, gradually into the Himalayas.

That is why climbers find remnants of marine fossils in the limestone rocks of Mt. Everest. For their convenience, wide metalled roads, huge hotels, and homestays started coming up, and the environment was severely compromised.

Human problems Though the Chota Char Dham yatra pilgrims combined with visitors to Hem Kund Sahib, Valley of Flowers and other points of tourist interest put undue pressure on the resources of the region (roads, accommodations, eateries, etc.), it was more or less manageable till the end of the last century. Since then, the visitors have increased manyfold, and for their convenience, wide metalled roads, large hotels and restaurants have come up, putting too much load on the fragile ecosystem.

I personally spoke to a gentleman in 2015, living near Joshimath, who used to run a modest accommodation for travellers heading to Badrinath, Valley of Flowers, and Hemkund Sahib, and also arrange for their trekking needs.



When I spoke to him again after the Joshimath disaster of January 2023, and pointed out that indiscriminate construction work on the unstable landslide mass (it was pointed out by two Swiss geologists, Heim and Gansser) he calmly responded, "Pahad mein aisa to hota hi hai, hum keya garib rahe jayenge? Development nahi dekhenge?"

This is the problem of present-day India. We cannot help but suddenly reduce our carbon footprints, thus bringing down global warming that is causing cloudbursts, lake collapses and landslides, but we can definitely plan all engineering work in the higher reaches of the Himalayas, taking into account the geology and lay of the land, flow of rivers and underground water and most importan tly,balance development and environment.

In North Bengal, tunnelling in soft rock, prone to collapse for building the railway track, and cutting down thousands of full-grown trees, some of these 100 years old, for facilitating the highway to Rangpo (they are definitely of strategic importance), should have been given long thought.

Natural disasters are hurting other Himalayan regions, like Himachal Pradesh, and also in peninsular India (Wayanad). We understand that there are certain natural calamities we cannot prevent, but we should remember that there are many that we can. Maybe our future AI-trained scientists will discover a solution.

Ananda Chakraborty
Former associate professor of Geology,
Presidency College,
Calcutta

<<1 **The Squall Front Strikes**

heavy rain in some places, stormy rain in others, yet not a single thunderbolt tearing across the sky. We are not at all familiar with such a climatic condition.

On that night, I was in Kopai, Birbhum. The weather had been a heatwave for the past three days. Not even a leaf stirred. Hardly any clouds had gathered by that evening. After finishing dinner and preparing for bed, I glanced outside through the windowpane and was startled. The sky was strung with a garland of lightning flashes. It looked like the decorative lights of a Kolkata Puja pandal. Soon, a storm rose outside, with rain. Suddenly, the electricity went out. The sky outside was lit with garlands of light. Clouds rumbled endlessly. I don't know how long it lasted. I fell asleep. At 3:30 am, I woke up. The luminous garland has gone. I don't know when the storm had calmed down. But the rain had almost stopped.

Early in the morning, I called Kolkata. The same unusual incident had happened there, too. Continuous lightning streaks in the sky, cloud rumbles, heavy rain. In Barasat as well. But there was no storm there. Further south, the weather mirrored exactly what we saw in Kopai. One question then kept haunting me: what was the mystery of "all this lightning without a single thunderbolt splitting the sky?"

I reached out to my acquaintances in the weather department. Early in the morning, I got some calls, missed some. But I did receive an explanation for Monday night's event. Enough to put into writing. If wrong, the experts will surely refine it. After all, I am no student of meteorology! Just a retired reporter, a self-styled "know-it-all" about weather.

The information I gathered said that on Monday night, wave-like clouds formed in the skies of several South Bengal districts. A "Squall Front" was observed. This is a type of weather condition capable of producing powerful and monstrous cumulonimbus clouds (towering thunderclouds usually seen during Kalbaisakhi, the nor 'westers). Sometimes, even during heavy rainfall, such special clouds can form. In this squall front, the clash between easterly and westerly winds results in phenomena like torrential rain and lightning. As a result, regions under such a squall front often face heavy rainfall. In some places, fierce storms also occur.

North 24 Parganas, Nadia, Kolkata, Howrah, South 24 Parganas, East Midnapore, West Midnapore, Birbhum, Jhargram, Murshidabad, and East Burdwan, a squall front formed parallel over these parts of South Bengal on the first night. Due to contrasting temperatures, the process of frontogenesis created this squall front. As the warm easterlies from the Bay of Bengal collided with relatively cooler winds from the country's western side, powerful vertical thunderclouds were formed. Because of frequent charge variations, continuous lightning flashes were observed. And due to this uninterrupted lightning, there was no crashing thunder. Only deep rumbles filled the air.

According to meteorologists, when lightning flashes and rumbling sounds are seen and heard, it means a thunderbolt has definitely occurred. However, it has taken place in the upper layers of the atmosphere. Not all lightning strikes reach the ground. At the same time, charges are exchanged

between multiple clouds. Failing to find a suitable conductor, the immense energy tries to connect with opposite charges through the air itself. The heat generated causes the air to explode, which is why the deafening sound is heard. When this occurs five or six miles above (since thunderclouds can reach such heights), the original explosive sound is not heard as loudly because the lightning has not struck the ground. It has instead taken place high up through charge exchanges between clouds. But the main explosive sound reverberates from cloud to cloud, and that is what we hear as rumbling thunder.

However, this abnormal weather did not cause significant damage to life or property. That, in itself, was a relief!

Debdut Ghoshthakur
Former Chief Reporter,
Anandabazar Patrika, and a veteran
environment writer

1>> **What, Where, When, And How....**

food, quit smoking and eschew alcohol. At the same time, beware of a sedentary lifestyle that causes obesity, which is a problem not confined to Indians alone. If you are a coffee addict, moderate your intake, since too much of it may cause acidity. When taken in excess, even curd, a well-known probiotic, may be acidic for your stomach. Identify the foods that generate problems for you, and don't go in for heavy meals. Wait for at least three hours before going to bed, and lie on your left side, as our stomach is also on the left side of the body.

Why does gastroesophageal reflux disease (GERD) occur? According to Dr. Jacob Raza A.S., there is a valve-like mechanism, the sphincter, at the joint of the food pipe, which is the oesophagus, and the stomach. The function of the valve is to regulate the entry of food into the stomach and act as a guard against the reflux of acid, which is present in the stomach to help digestion. Obesity, food taken in a hurry, or spicy and fatty food may cause excess production of acid that tends to move upward if the sphincter becomes loose or slack over time.

The problem is felt when the acid travels to your throat region, leading to a sore and raspy throat and a chronic dry and unproductive cough. Or, there is heartburn or a lump in the chest. Sometimes this gets confused with a heart complication. People with diabetes have a general tendency to suffer from GERD. In medical parlance, this condition is known as Gastroparesis, which affects the stomach muscles and prevents proper stomach emptying. Even after a little food is swallowed, there is a feeling of fullness.

Another panellist, Dr. E. Rabindranath, says that at the beginning, people rely on over-the-counter (OTC) medicines, which initially work. However, over time, this becomes ineffective, and reflux recurs. Even, there may be regurgitation. In addition, something always appears to be stuck in the Adam's apple region, which is called the Globus sensation. There are, of course, newer drugs like proton pump inhibitors (PPIs) like Rabeprazole that neutralize acid efflux from weaker muscles. Dr. Rabindranath smiles as he says patients panic when gastroenterologists recommend an endoscopy to start with. They fear that they will have to swallow a metre-long pipe during the procedure, as they believe it will be very painful. However, this is a common and simple process that involves inserting the tip of the pipe like a tablet. There is another method called pH monitoring, in which a probe is inserted in the food pipe to measure how many times a day there is reflux. One, however, will have to be cautious about "trigger foods that act as a red carpet for acid reflux," he asserts.

When all else fails, the only remaining option is surgery and that too with the help of endoscopy, according to Dr. A.C. Arun, the last speaker. Symptomatology in the case of GERD is very relevant, and the first complication is known as "Stricture," the narrowing of the food pipe, resulting in difficulty in swallowing food. Again, this narrowing can be cured by balloon endoscopy when the stricture can be dilated with the help of a balloon-like substance.

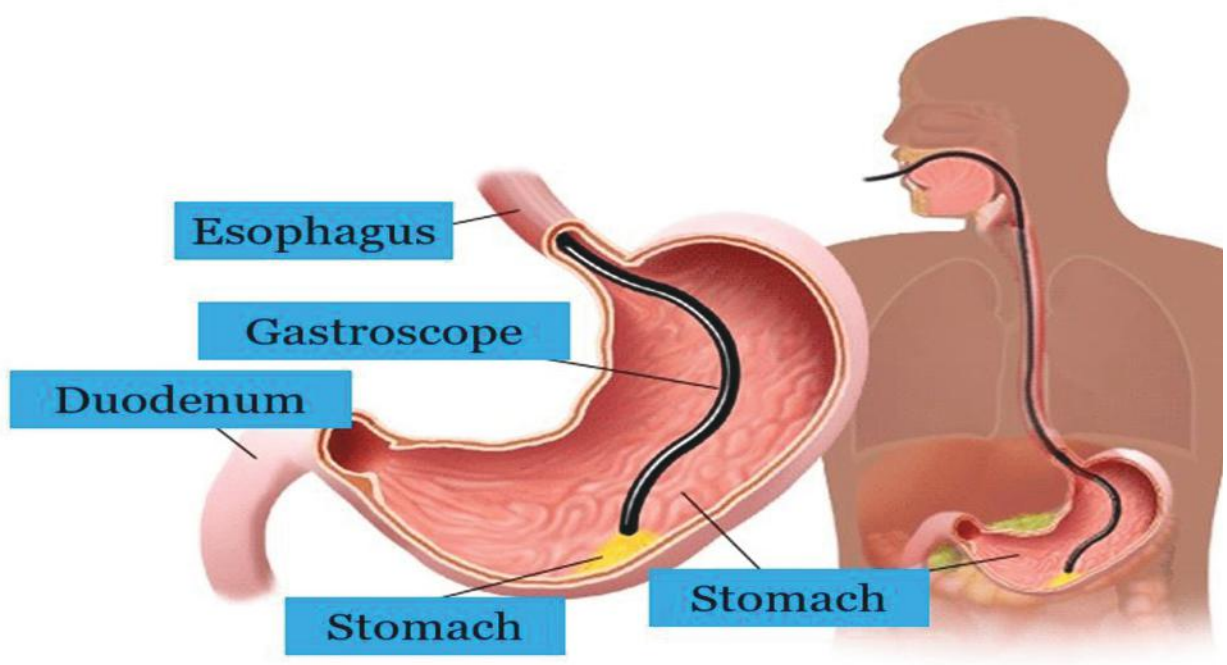
The second concern is blood vomiting, which at times can be dangerous as patients develop very low blood pressure and are at risk. They may die even when being transferred to the hospital, as vomiting from developed ulcers becomes uncontrollable. Even this can be treated by the application of a clip at the oesophageal joint with the help of endoscopy. "Of course, we first try medication to treat them, as ulcers develop due to the reluctance to take medicines at prescribed intervals," he laments.

The final and most dreaded symptom is Barrett's oesophagus. Dr. Arun reassures patients that this is not a quick phenomenon. Generally, Barrett's oesophagus develops by the end of 10-15 years when drugs fail. There are various surgical intervention options. The "Laparoscopic Fundoplication" involves suturing the oesophageal junction through laparoscopy so that excess acid cannot travel back to the oesophagus. Since this is a surgical procedure, it has its own set of complications. On the other hand, this can also be done by endoscopy, which involves removing lesions before cancer develops.

Alternatively, radio frequency ablation is done at the lower oesophageal sphincter to strengthen the weak muscles. Another method is to endoscopically insert a clip at the joint to make the gate narrow. The third method is called ARMS, when he cites the example of a burn injury. After burns heal, the skin around the wound shrinks.

Similarly, the surgeon artificially creates a wound at the sphincter and ultimately lets it heal with a scar around, which means a narrowing that prevents acid from flowing upward. These procedures are performed under anaesthesia so that "patients can have a pleasant experience," Dr. Arun comments.

Before the hour-long session, followed by Q&A ended, all three panellists had a common message for the sufferers, and that was "lifestyle modification," a reiteration by doctors from other disciplines as well.



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"Betelbuddy"

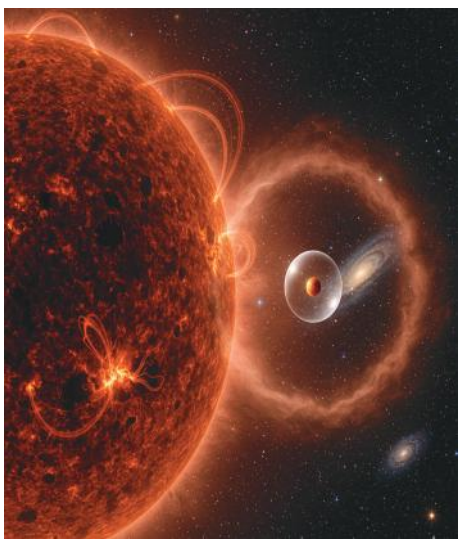
The Star Companion

Debabrata Sur

You might have seen a bright star on the left side of the Moon (Jupiter is on the right side) in November, just above our sky around 11 p.m. That is Betelgeuse, a red giant star approximately 100,000 times brighter than our Sun and more than 400 million times its volume. The star is nearing the end of its life span, and when it dies, the explosion will be bright enough to see during the day for weeks. This is the 10th brightest star in the night sky.

A new study reveals that the observed starlight from Betelgeuse is pulsating, likely due to an unseen companion star orbiting it. The scientists at FlatironInstitute, USA, have modelled a companion of this star, which is named "Betelbuddy,"

Astronomers can predict when Betelgeuse will die, effectively 'checking its pulse.' It is a variable star, meaning it gets brighter and dimmer, pulsating like a heartbeat. In Betelgeuse's case, there are two heartbeats: one that pulses on a timescale a little longer than a year, and one that pulses on a timescale of about six years.



One of these heartbeats is Betelgeuse's fundamental mode, a pattern of brightening and dimming that is intrinsic to the star itself. If the star's fundamental mode is its long-scale heartbeat, then Betelgeuse could be ready to blow sooner than expected. However, if its fundamental mode is its short-scale heartbeat, as several studies suggest, then its longer heartbeat is a phenomenon called a long secondary period. In that case, this longer brightening and dimming would be caused by something external to the star.

Scientists still don't know for sure what causes long secondary periods, but one leading theory is that they arise when a star has a companion that circles it and barrels through the cosmic dust that is produced and expelled by the star. The displaced dust alters how much starlight reaches Earth, changing the star's apparent brightness. This leads to the model of "Betelbuddy," and it might be proved right when a team of scientists will play as paparazzi and try to snap images of it on December 6, as there will be a potential window of vis ibility around that time.

Till then, let us keep our eyes on Betelgeuse, which will be visible in the night sky for some more time.

Organizing Committee member, ISNA

ENSO

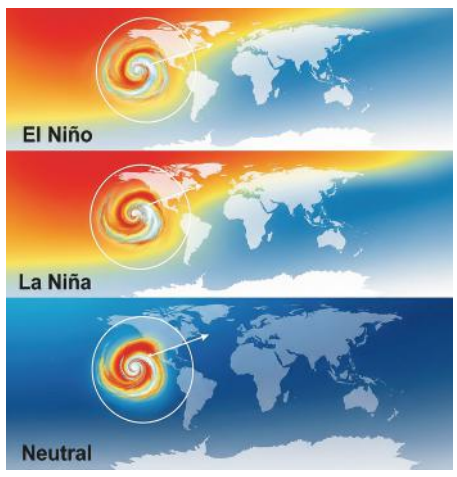
Mouktik Sengupta

There are some very interesting phenomena that occur on Earth, which are crucial to sustain life on the planet. One such interesting phenomenon is the ENSO (El Niño-Southern Oscillation). ENSO is a global climate phenomenon that emerges from variation in winds and sea surface temperatures over the tropical Pacific Ocean. It is interesting to note that wind, which is a very common factor in the day-to-day lives of human beings, is very crucial for maintaining climatic stability and the life-cycle on the planet.

To understand ENSO in a more detailed manner we must know comprehensibly about the three phases of ENSO. These three phases are not continuous and are irregular in nature, but have a cyclic pattern. The three phases of ENSO are:

•EL NINO - In this phase warm waters spread across the Pacific towards South America, and the ocean temperatures rise by 3-9 degrees F, due to which cold water stops rising from the deep ocean. This also causes fish populations to move or die as they need cold, nutrient rich water. Air pressure drops over Eastern Pacific and storm systems form over warmer ocean water. Due to El-Nino, global temperatures rise, and droughts are seen in Australia and Indonesia, On the other hand, weaker monsoons are seen in India.

• LA NINA - In this phase cold water dominates in Eastern Pacific and water temperatures drop by 3-5 degrees F. Cold water rises more than normal and fish populations thrive due to this. Air pressure also increases that blocks storm formation. The effects are seen around the world, with strong monsoons in South East Asia, Australia and western Pacific, and cooler global temperatures.



• NEUTRAL - This phase occurs when temperature and pressure conditions are normal in ocean, with no major disruptions and rainfall patterns remain stable worldwide with no major catastrophe.

But why suddenly ENSO? For, ENSO is one of the most powerful climate drivers on the planet, as it acts like a global weather engine. It affects weather patterns across 60% of the world. ENSO follows reasonably predictable patterns and, thus it is easier to estimate its effects. It regulates climate, balances global temperatures, and drives major ocean currents. It regulates marine food chains, global agriculture, and freshwater resources. And it is very important in an Indian context as it is directly responsible for strengthening and weakening our monsoon patterns. So, ENSO is a very crucial phenomenon for planet Earth.

Former student, ISNA

ISRO Programmes Need Popularization

Sulagno Samanta

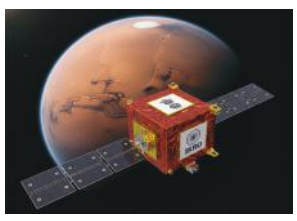
We live in the age of 'Space'. The fact of popularity has been carried forward through time amongst human minds. If we research on the ancient history, a lot of stories project the fountain source of all sciences, which is Astronomy. Different countries' heritage sites & museums preserve these in the form of scriptures, texts & imagery. The tragic factor is that we only find just a few of them in our textbooks. The role of media professionals in this regard is crucial. A science filmmaker must research a hell of a lot to come up with a true story.

The present day is quite upgraded with facts & figures. When we peep into the history of space, we get to know about cosmonauts, who travel out towards the vastness. Most of the people who were sent happened to be from America except for a few. The logo of NASA has made a mark in the space sector, and the leaps of mankind have somewhat been patented by the organization.

Let us dive into the edge of 22nd century. The Indian Space Research Organization (ISRO) is uprising. It had a very humble beginning from the times of late President A.P.J. Abdul Kalam. With a very limited resource & fund it has set an example for the global economy. The country came into the media spotlight when it was the successful mission of "Mangalyaan." It was accomplished quite economically which was lesser than the overall budget of Indian Premiere League (IPL). The "Chandrayaan" trilogy also brought all eyes towards ISRO, that became a global example of perseverance to success.

When I was stuck at home quarantine in 2020, I remember watching live the 'Space-X' docking event with the International Space Station. Here, Elon Musk, the founder and CEO was revolutionizing the private space sector in producing more sophisticated missions when compared with 'NASA.'

We Indians after Independence have kind of aligned our cultures with the West. The media consumption also followed this trend. Even now, the release of a Hollywood movie excites us more. The NASA projects attract millions from the Globe. Space-X being a new venture is also in the fore-front. ISRO on the other hand is not highlighted by certain global media aggregators.



We must visualize these in the form of examples.

Previously, when ISRO suffered losses, the media including people of India used to mock about its' growth in science & technology. After the limelight the scenario changed a lot, though the streaming and marketing of the events are several steps behind. Probably, the minimal budget allocated has zero space for marketing. We need to have corporates in the process onboard.

If we look at NASA's upcoming 'Artemis' mission, the amount of hype that's being created amongst the public is unmatchable. Whereas a similar kind of upcoming ISRO project 'Gagan-Yaan' lacks that marketing strategy though the failure probability quotient is almost equal for both the countries. The 'Aditya L1' mission's success was also being addressed one time at ISRO headquarters on its final day. The Mars Orbiter Mission didn't have that much hype as of Curiosity Rover though we have a movie made in Bollywood titled "Mission Mangal".

However, the current stage is somewhat promising as we see policies being addressed for space with global terms in the United Nations. It seems like our country believes in popularizing after its successful accomplishment. Any such achievement is perceived because of humanitarian voyage. Organizations across the globe are collaborating with India's space centres. Mr. Elon Musk also met our Prime Minister during his official visit to the United States when he talked about businesses highlighting India's potentials in "Space." Creators are also filming our achievements through social media bridging that marketing gap digitally, thus popularizing space science towards Gen-Zs globally.

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Artificial Intelligence

How It Powers The Digital Revolution

Ritaban Mukherjee

Artificial Intelligence (AI) is no longer just a futuristic idea - it's an everyday reality transforming our lives in countless ways. From your smartphone's ability to find the fastest route home, block spam texts, or remind you to drink water, AI works quietly behind the scenes, much like a smart friend who learns your habits over time. At the heart of these conveniences are neural networks—complex systems that process vast amounts of data to recognize faces, detect fraud, and even recommend your next TV show.

At its core, AI is a relentless learner. It studies enormous collections of data from everyday apps, much like your music service learning your favourite tunes. AI uses two main learning approaches. In supervised learning, systems are trained with examples labelled by humans, such as pictures marked as "cat" or "dog." Unsupervised learning, on the other hand, lets AI discover patterns on its own, grouping similar images or sounds without prior hints. With each repetition, AI refines its predictions - improving how autocorrect understands your unique way of typing or how your map app anticipates traffic. Interestingly, AI grows smarter through its mistakes. Each error - like mixing up a friend's face or suggesting an odd coupon - provides crucial feedback. AI measures these errors with what experts call an "error function," and then adjusts its internal settings accordingly. Over time, these tweaks help the system achieve greater accuracy, even though they sometimes highlight hidden biases, especially if the training data isn't diverse enough. This process is similar to learning from a kitchen mishap and perfecting a recipe through practice.

The inner workings of AI can be imagined as a multi-layered building. Lower layers recognize basic shapes or simple sounds, while higher layers piece together more complex details like words, emotions, or whole faces. This layered structure, known as deep learning, allows your phone's voice assistant to understand and convert spoken words into text accurately or enables facial unlock features to work securely. AI goes from noticing simple pixels to interpreting nuanced information, making interactions seem almost human.

AI's influence stretches far beyond personal devices. In healthcare, hospitals use AI to spot early signs of illness from X-rays, while banks rely on it to flag fraudulent transactions in seconds. Even agriculture benefits from AI, as drones assess crop needs to optimize water and fertilizer usage. Despite these impressive benefits, the widespread use of AI raises important questions about ethics and responsibility. Algorithms can unintentionally perpetuate biases or make opaque decisions that are hard to trace, which is a concern when they're involved in critical areas like loan approvals or medical diagnoses.

Looking ahead, the potential of AI appears both exciting and challenging. Future applications could address massive global issues like environmental protection, disaster management, or personalized education. However, as AI weaves itself into crucial systems such as traffic control or energy management, even a small error could cause wide-reaching problems. Therefore, careful oversight and collaboration among developers, policymakers, and the public are key. Responsible design and transparent practices will help ensure that while AI makes our lives easier and more efficient, it also respects fairness, accountability, and our privacy.

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Kanny Lall Dey
A Pioneer of Indigenous Drugs

Manas Chakrabarty

Ayurveda is the most recognized component of the traditional Indian system of medicine. Elaborate information on the use of mainly terrestrial plants and minerals for curative purposes is documented in Sanskrit in Ayurvedic literature. The chemists of the modern era of drug development, beginning with the dawn of the 20th century, however, needed the previously mentioned information in the English language.

This task was accomplished by, amongst others, Rai Bahadur Dr. Kanny Lall Dey, C.I.E., Hon. M.P.S., F.C.S. In his Presidential Address at the 7th Indian Science Congress (Nagpur, 1920), Acharya Prafulla Chandra Ray referred to Dr. Dey's contribution to Indian pharmacology.

Kanny Lall Dey (or Kanhai Lall Dey) was born to Rai Radhanath Dey, a Deputy Collector, in Calcutta on September 24, 1831. After completing his schooling, he enrolled at Calcutta Medical College (CMC) and received his diploma at the age of 22. Although he won many prestigious prizes, he did not graduate as a medical doctor. Nonetheless, he is referred to as Dr. Kanny Lall Dey in all available literature.

Kanny Lall began his career as a Sub-Assistant Surgeon in the medical branch of the Municipal Department, Bengal Government, in December 1853. Later, he became a Professor of Chemistry in the Presidency College, Calcutta, an officiating Professor of Chemistry and Chemical Examiner to the Bengal Govt., an Additional Chemical Examiner to the Govt., and a teacher of Chemistry and Medical Jurisprudence in the vernacular classes at the CMC.

Kanny Lall's most highly acclaimed compilation is 'Indigenous Drugs of India' (1st edn. 1867; 2nd edn. 1896). It contained short descriptions of medicines, of both vegetable and mineral origins, of common use in India. He was also concerned with Hindu social laws and habits in relation to health. He also contributed display materials on indigenous drugs to various international exhibitions in Europe and the USA, and was duly honoured.

Kanny Lall became a member of a committee of the Home Department for the overall promotion of the indigenous drugs, penned many textbooks and translations in the Bengali language, and also acted as a Sectional President of the 1st Indian Medical Congress (Calcutta, 1894). Kanny Lall received many awards and honours from India, the U.K. and the USA. The Govt of India conferred the title of 'Rai Bahadur' upon him in 1872 in recognition of the valuable services rendered by him to the cause of medical science in India.

Kanny Lall retired from government service in 1884 and began practising privately. He was an honest, courteous, and dignified man, respected by Indians and Europeans alike. He passed away on August 16, 1899. In his demise, India lost a 'savant' of the 19th-century Indian investigators and advocates of indigenous drugs.

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Story of a boy!

Sabyasachi Chatterjee

This is the story of a boy. That boy is a higher-class student. He is an enthusiastic student but his teacher complains that he does not honour deadlines for any assignment. Is he not sincere? Is he not interested in studying? No, that is not the matter. Then, what does he do?

He is overactive in any programme. If he gets news that any event is being organised, he always joins the team to make the event successful. Be it a science fair or science programme or an environment awareness camp, he will be there to organize. Sometimes the initial organizers request him to cooperate with them, but mostly he comes forward on his own. He believes that it is his responsibility. When, in a selfish society like the present one, everyone tries to avoid their duties, he becomes an exception.

He is always available to render any technical expertise to publish any newsletter or periodicals of any association. Even on a personal level, he wholeheartedly helps any researcher to finalise his/her assignments. However, most of the people who received his help forget to acknowledge his contribution. They do not even inform him after the successful completion of their assignments.

One of the prominent Renaissance men of the 19th-century Bengal once said that after knowing that someone defamed him, that person must be benefited by him. Does the boy of our story know it?

His teacher is a worried person. How can this boy complete his assignments? The teacher teaches him to be 'selfish'; to pay attention to his own studies.

His teacher is an early riser. After waking up, he checks his emails and WhatsApp messages. One morning, the teacher finds an email has arrived in his mailbox at around 3:00 A.M. The boy has sent a part of his assignments. The teacher becomes happy. He expresses his happiness, but at the same time writes, "though I am happy that you have sent the assignment in time, but don't forget to take care of your health; you should have proper sleep. Call me after completing your breakfast".

The boy reads the reply. Suddenly, he notices tears in his eyes. He takes the oath on his own that, despite other commitments, he must complete his work. That would be a proper regard for his caring teacher; a real gift for the teacher's day.

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The SI Saga

Devaprasanna Sinha

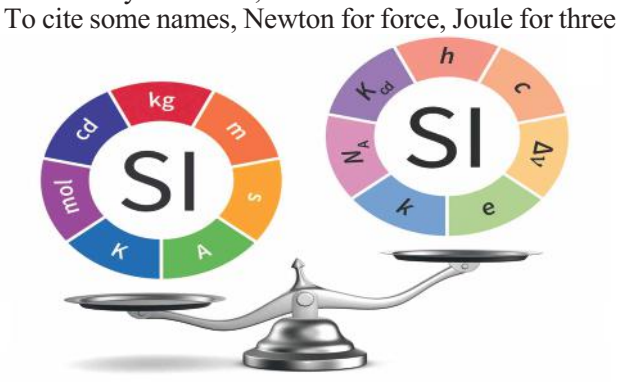
From time immemorial, many physical substances have been discovered/invented that were identified and then, from time to time, placed in different groups. Different attributes determine the properties of those physical substances or quantities. Units were given for the basic substances such as mass, length, time, etc. Based on basic units, other units have been derived for substances such as density, speed, energy, resistance, and conductance, among others. We know that parts of the human body, like the thumb, elbow, open arms or in some cases, parts of sticks were used to measure length long ago, and several others to measure mass, and time. Later, the basic units as metre, gm., second, etc, as part of CGS units were used by human beings for scientific, commercial, and engineering purposes in their daily life.

Now it is the SI or the International System of Units that has been in vogue for many years, and thereafter de facto world standard. CGS Units dates back to the French Revolution in the late 18th century; the first two units introduced were the metre and kilogram, established in 1799. CGS units were initially prepared by the scientist Gauss in 1832, and a version was formally adopted and introduced by the British Association for the Advancement of Science in 1874 by the scientists, primarily by James Clerk Maxwell, along with William Thomson, who advocated for a standardized system.

The year 1954, the 9th CGPM, the beginning of SI with base units - meter, kilogram, second, ampere, kelvin, candela. After certain changes in the 1960s, finally the mole was added as the 7th base unit in 1971. This SI system of units was adopted by most countries, except for some of the imperial systems that still exist in USA and, UK. SI units, formally known from French Systeme International unites as the International System of Units, were established in 1960 by the 11th General Conference on Weights and Measures (CGPM), and finally adopted in 1971. The International Bureau of Weights and Measures (BIPM) is an intergovernmental organization that maintains the SI system and its definitions. Definitions were also compiled in other booklets like published by NPL in 1993 and 2003.

Changes were made in SI in 2018 to provide more accurate definitions to incorporate the exact numerical values of some constants, and with effect from May 20, 2019. For example, The Kilogram is now defined in terms of the Planck Constant rather than the mass of the International Prototype of the Kilogram (IPK) held at the BIPM in France. IPK, a platinum-iridium cylinder stored in Paris, was found to have lost its mass over time. Hence, the rationale for having SI units. Planck's Constant is always constant everywhere. Similarly, Boltzmann Constant for Kelvin, Avogadro Number or Constant in the definition of Mole. Metre, Kilogram, and Candela were not included in the change of revision for the definition.

From the seven base units, as many as 22 derived units were formed to measure various things like pressure, force, and energy. One finds names of great scientists who have been used to describe those numerical values with appropriate units. These names were mostly of French, German and British Scientists. To cite some names, Newton for force, Joule for three



- Work, Energy and Heat (calorie, earlier non-SI unit replaced), Watt for power and Farad (Faraday), Hertz, Ohm, Celsius, Pascal, Ampere, Siemens, Lux, and Grey may be mentioned. Earlier names of Siemens were Simon and, much earlier, mho (opposite to ohm - the unit for electrical resistance) for electrical capacitance. The total list, with the stories behind, is not presented here due to paucity of space.

As said earlier, some of these units are still used in scientific contexts, partially in Gaussian units for electromagnetism, and in certain specified fields, such as astronomy and fluid dynamics. But some have been replaced fully. A few decades ago, we read in our old textbooks, dyne as the force and erg as the energy, even calorie for heat, as part of CGS units. But these names or symbols, mostly originated from Greek words, as we see in many symbols/names for elements/compounds, have been totally replaced with scientists' names, not necessarily as discoverers, but for improved accuracies and consistencies, examples being Newton and Joule. However, the mathematical relations between these are given in all cases in explicit forms, like 1 Newton = 100000 dynes for conversions required.

India adopted the metric units in December 1956 by the Indian Parliament, and effect since October 1, 1958. Historically, one can witness some Indian own units, which may be indigenous and developed in ancient times, particularly in land measurements, including the erstwhile FPS units. Much more could have been written that is available on the internet, and the notes and history on units published from time to time in many magazines. The present attempt is to trigger seasoned and budding science writers to present all these in broader views and perspectives on papers and videos on different aspects of related events with worldwide interests and acceptability, keeping in view the ancient works in this direction.

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Child Science

Moon is the 'Limit'

Anik Chatterjee
Class VI, Bhavan's Gangabux Kanoria Vidyamandir

Chandrayaan-3 is India's third moon mission conducted by ISRO. It was launched on July 14, 2023 from the Satish Dhawan Space Centre and successfully made a soft landing on the Moon at around 6:04 pm on August 23, 2023. With this achievement, India became the fourth country (after Russia, the USA, and China) to successfully land on the lunar surface, and the first country in the world to land near the Moon's south pole. The mission was equipped with advanced scientific instruments to conduct studies, analyze lunar soil, and gather crucial data for future research. The estimated cost of Chandrayaan-3 was around $77 million (approx. ₹.615 crore). The word 'Chandrayaan' means 'Moon vehicle'. The success of this mission demonstrates India's strong determination to explore space and uncover the mysteries of the Moon.

Soujanya Banerjee
Class-III, Lions Calcutta Greater Vidya Mandir

Aradhya Saha
Class-VII,
Rashmoni Balika Vidyalaya

Today, as the tricolour flutters proudly in the azure blue August sky, our hearts swell with gratitude, pride, and unity. On this day in 1947, our nation broke the chains of colonial rule and stepped into the light of freedom — a freedom earned through the courage, sacrifice, and unwavering spirit of countless brave souls, who dreamed of an independent India.

Seventy-eight years later, we stand as a testament to their vision. We have grown from a struggling newborn nation into the world's largest democracy — vibrant, diverse, and full of possibilities. From the mighty Himalayas to the golden coasts, from the green fields to the bustling cities, India thrives as a blend of cultures, languages, and traditions, bound

Happy Independence Day, 2025

Somdeep Ghosh

together by the unshakable thread of unity in diversity.

This day is not just a celebration — it is a reminder of our responsibility. Freedom is not only a gift; it is a duty to uphold justice, equality, and harmony. As we face new challenges in the 21st century —technological growth, environmental sustainability, economic development — let us pledge to work together, respect our differences, and stand united for our common future. Let the saffron remind us of our courage and sacrifice, the white of our truth and peace, and the green of our prosperity and growth. And let the Ashoka Chakra guide us on the path of righteousness and progress.

To every citizen of this great nation — young and old, in cities and villages, at home and abroad — may the spirit of freedom inspire us to dream bigger, work harder, and make India shine even brighter on the global stage.

Jai Hind!

Class IX, Bhavan's Gangabux Kanoria Vidyamandir, Salt Lake, Kolkata

Royal Bengal Tiger

Chandrani Chakraborty Banerjee

Tiger Tiger Royal Bengal Tiger
Black stripes on a yellow body
You are the jungle's master

You rule the animals
You are a great fighter
You are the jungle's king
Royal Bengal Tiger

You eat animals
Carnivorous eater
Sundarbans your residence
Royal Bengal Tiger

Assistant Teacher,
Karamabad Uchcha Vidyalaya

Trees, Not Notice Boards

Anindita Mukerji

Tree pinning—the practice of hammering nails or sharp objects into tree trunks—might seem trivial, but it's incredibly harmful to tree health. People often do this to hang advertisements, decorations, or lights, but the damage caused is far-reaching and usually invisible.

Dr. Asesh Kumar Lahiri, a former international expert with the Food and Agriculture Organization (FAO) of the United Nations, explains that a tree's bark acts like armour, shielding it from diseases and pests. When nails pierce this protective layer, they create open wounds that invite fungi, bacteria, and insects to infest the tree. Over time, these infections compromise the tree's structural integrity, making it weaker and more prone to collapse.

The harm doesn't stop at the bark. Beneath it lie the phloem and xylem—the lifelines of every tree that transport food and water. Nails disrupt these pathways, reducing the tree's ability to nourish itself. Dr. Lahiri also highlights that metal lodged in trees can cause internal cracks, making them vulnerable to uprooting during storms or heavy winds. Rust from nails adds to the damage, releasing harmful chemicals that stunt growth and health.

"Thankfully, there are practical and eco-friendly alternatives to tree pinning that can protect trees while serving the same purpose," he added. These include:

1. Dedicated Notice Boards: Installing public notice boards or kiosks in busy areas for advertisements and announcements.
2. Wall Advertisements: Utilizing walls, fences, or other man-made surfaces for displaying signs instead of trees.
3. Digital Advertising: Shifting to online promotions via social media, websites, or digital screens.
4. Banner Stands: Using portable banner stands or frames for temporary announcements during events.
5. Eco-Friendly Stringing: Tying decorations or signs to trees using soft, biodegradable materials like jute or cotton instead of nails.
6. Ground-Based Signage: Placing boards or signs on poles or stands fixed into the ground.
7. Community Boards: Setting up community-specific boards for notices and posters.
8. LED Displays: Using energy-efficient LED boards for reusable advertisements.

Cities like Delhi, Pune, Mumbai, Pimpri-Chinchwad, and Thane have already initiated drives to remove nails and penalize offenders. Pune's "Angholichi Goli" campaign has been especially impactful in this regard. Trees are living beings that give us oxygen, shade, and countless other benefits. Even a single nail could mark the beginning of a tree's decline. Protecting trees means protecting ourselves—let's cherish them for what they are, not use them as notice boards.

Freelance Journalist and Director, Environment Rotary Club, Akurdi, Pune

Crimson Revival

Vasudha Singh

A drained river flows in me,
Lifeless and pale, murmuring erratic songs.
Body waiting to merge with oxygen,
Each breath too slow, too long.

Radiance of skin shadowed by whispered dawn,
Lips loose bloom, hands feel the cold
Quickened rhythm in hope of strength
But finds the chamber hollow and old.

Shadows covering once bright eyes
A strangling enervation won't let go
Even a climb of a single stair becomes mountain-capped snow.

Marrow still holding on to a hope
Seeds of iron waiting to ignite flame
Greens with protein and citrus awaken iron growth
Reminding the blood of its viral name.

And life revives with a crimson flood
Restoring warmth in every vein
Body whispers its hymn of bliss
A gentle strength grows above pain.

M.Sc. Student, Sister Nivedita University

Silver-haired Join Hands
Green Patuli
Ashesh Lahiri

Located in the South 24 Parganas district of East Kolkata, Baishnab Ghata Patuli Township, commonly known as Patuli, has undergone a remarkable transformation over the years. Developed as a World Bank project by the Kolkata Metropolitan Development Authority (KMDA), the township has evolved from a barren landscape to a thriving ecosystem, thanks to the collective efforts of its residents.

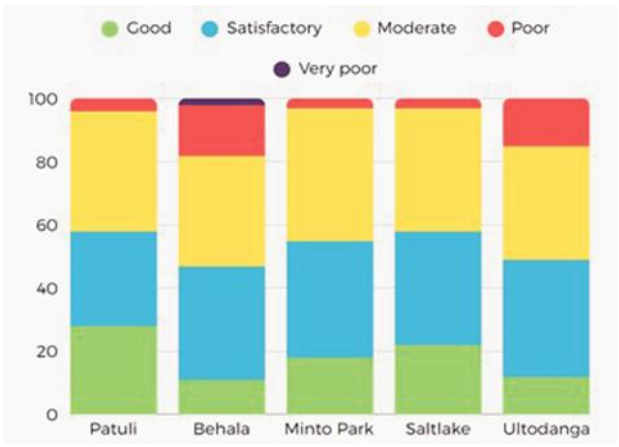
Early Days and Challenges As residents began building their homes on the allotted land from the late 1980s, the area was characterized by low-lying lands and numerous ponds. The Adi Ganga Basin's unique geography presented both challenges and opportunities for the residents. Despite the difficulties, the community came together to create a green oasis in the midst of urbanization.

The Greening Initiative In the early 1990s, the Forum of the Cooperative Society was formed to support housing development in Patuli, and with it began community-led plantation efforts. The first major drive started in 1993, when residents sourced saplings from government nurseries and personally took charge of planting and nurturing them. A key event was the annual "Bono Mohotsab" (Plantation Day), during which forest officials distributed free saplings, later supplemented by contributions from housing cooperatives.

Over the years, both collective groups and dedicated individuals have kept the plantation momentum alive. Though the original groups slowed down with age, newer volunteers carried forward the mission. The Forest Department's social forestry project was crucial, supplying seedlings and technical guidance. Residents also planted trees along ponds, roadsides, and vacant plots, often protecting them from grazing and other challenges. Thanks to community perseverance and the region's fertile alluvial soil, Patuli gradually flourished into a green, vibrant neighbourhood.

A Haven for Biodiversity During the last couple of decades, Patuli-Baishnabghata township has metamorphosed into an urban biodiversity hotspot, with its greening initiatives, fostering a thriving ecosystem. The abundance of trees, shrubs, and herbs — many introduced naturally through seed dispersal by birds, squirrels, and wind — has enriched the local flora. Ponds and green spaces have further supported this ecological balance, creating habitats for diverse species. Studies highlight that biodiversity in Patuli surpasses many other parts of Kolkata and is comparable to protected green areas such as Central Park and Citizen Park. I documented as many as 95 tree species in the township, noting that many emerged organically, rather than through deliberate planting. Birdlife is equally rich: according to records by local birder, Mr. Amit Naskar, the area hosts 52 resident bird species and seven winter visitors. Notable sightings include the Taiga Flycatcher, Bronze-winged Jacana, Citrine Wagtail, and White-rumped Munia, underscoring Patuli's ecological significance within the city.

Impact on Micro Environment and Quality of Life Studies indicate that Patuli's greening initiatives have significantly improved both environmental quality and residents' well-being. Unlike many parts of Kolkata, land surface temperatures in Patuli have remained relatively stable, largely due to its extensive tree cover. This greenery has also mitigated air pollution, despite the presence of major roads and bus terminals, contributing to vehicular emissions. Analysis of Air Quality Index (AQI) data from



the NEERI report, based on PM, NOx, and SO_2 levels collected by the West Bengal Pollution Control Board between 2012 and 2018, showed Patuli consistently achieving the highest proportion of "good" AQI, compared to other monitoring stations. Resident surveys further highlighted these benefits: 60% reported their area felt much cooler, 25% slightly cooler, and only 5% slightly warmer, with none perceiving it as much warmer. By contrast, residents in other city areas predominantly reported warmer conditions. These findings suggest Patuli's vegetation supports cleaner air and a cooler urban microclimate.

A land-surface temperature analysis conducted over Kolkata between 1988 and 2021 revealed a clear rise in temperatures across both North and South Kolkata. In contrast, the Baishnabghata–Patuli Township has shown remarkable stability, with its land-surface temperature remaining largely unchanged during the same period, underscoring the cooling impact of sustained greening initiatives in the area.s

Thermal Imaging shows the impact of shades on temperature over Patuli-Baishabghata township (red - high temperature; blue - low temperature)

The Patuli urban forestry initiative demonstrates how green spaces can deliver multiple co-benefits to the community. Beyond providing shade and recreational areas, the plantations also support local vendors who set up shops under tree canopies. They contribute medicinal plants that serve health needs, while also generating economic returns through fruits, honey, wood, vegetables, and herbs. In this way, Patuli's urban forestry not only enhances the ecological balance but also strengthens livelihoods and promotes community well-being.

A Community's Legacy The story of Patuli's greening is a testament to the power of community-led initiatives. Through collective action and perseverance, the residents have transformed their environment and created a haven for biodiversity. As a model for sustainable urban development, Patuli's greening initiative serves as an inspiration for other communities to take ownership of their environment and work towards creating a greener, healthier future.

Forestry expert
and environmentalist

The Medicinal Benefits Of Papaya
S. K. Basu

Papaya (Carica papaya) has numerous medicinal benefits due to its rich composition of vitamins, enzymes, and antioxidants.

1. Digestive Health: Contains papain, an enzyme that aids in protein digestion and relieves indigestion and bloating. Helps with constipation due to its high fibre content. The daily intake of Papaya helps promote digestion and provide relief from constipation and hyperacidity due to its laxative properties.

2. Anti-Inflammatory Properties: Papain and chymopapain reduce inflammation, making papaya useful for arthritis and other inflammatory conditions. In the food industry, papaya is used to tenderise meat as it contains an enzyme called papain that breaks down proteins.

3. Boosts Immunity: Rich in vitamins C, A, and E, which enhance immune function and help fight infections.

4. Wound Healing: Papaya pulp and leaves promote faster healing of wounds, burns, and ulcers due to their antimicrobial properties.

5.Supports Heart Health: High in antioxidants (lycopene and beta-carotene) that protect against heart disease. Contains fibre and potassium, which help regulate blood pressure. Papaya supports the healthy functioning of the heart due to its potassium, fibre, and vitamins, which in turn aid in managing high blood pressure.

6.Anti-Cancer Properties: Rich in flavonoids and lycopene, which reduce oxidative stress and may lower cancer risk.

7. Diabetes Management: Papaya leaves have been used traditionally to regulate blood sugar levels.

8. Liver Protection: Papaya extracts help detoxify the liver and improve its function.

9. Skin and Hair Benefits: Used in skincare for treating acne, pigmentation, and ageing due to its antioxidant and exfoliating properties. Promotes hair growth by nourishing the scalp. Papaya pulp can be applied as a facial mask to help reduce pigmentation, acne and wrinkles on the skin.

10. Antibacterial & Antiviral Effects: Papaya leaf extract has shown effectiveness against dengue fever by increasing platelet count. Has natural antibacterial properties that help in fighting infections.

11. Antioxidants: Papaya is beneficial for the skin due to its antioxidant properties. Antioxidants such as vitamin C help reduce inflammation and fight against various diseases by strengthening the immune system.

Phytochemicals

Papaya contains several phytochemicals that contribute to its medicinal properties.


C: Laki Banik

These bioactive compounds have antioxidant, anti-inflammatory, antimicrobial, and immune-boosting effects. Some key phytochemicals present in papaya include:

1. Alkaloids

Carpaine: Exhibits anti-malarial, anti hypertensive, and anti-inflammatory properties.

Dehydrocarpaine: Known for its potential antibacterial and antifungal effects.

2. Flavonoids

Quercetin: A strong antioxidant that protects against oxidative stress and inflammation.

Kaempferol: Supports heart health and has anti-cancer properties.

3. Carotenoids

Beta-carotene: Converts to vitamin A, essential for vision and immune function.

Lycopene: A potent antioxidant that protects against cancer and heart disease.

4. Phenolic Compounds

Caffeic Acid: Has anti-inflammatory and neuroprotective properties.

Gallic Acid: Acts as an antimicrobial and anti-cancer agent.

5. Saponins

Help reduce cholesterol levels and have immune-boosting effects.

6. Enzymes

Papain: A proteolytic enzyme that aids digestion and has anti-inflammatory effects.

Chymopapain: Helps with wound healing and reduces inflammation.

7. Tannins

Possess antimicrobial and anti-diarrheal properties.

8. Glucosinolates and Isothiocyanates

It has anti-cancer and detoxifying properties by supporting liver function. These phytochemicals work together to make papaya a powerful medicinal fruit with digestive, anti-inflammatory, antimicrobial, and immune-boosting benefits. In Ayurveda, the juice of papaya leaves is known to inhibit the growth of the dengue virus and increase platelet count.

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Organizing Committee member, ISNA
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I Fire; The Genius Cracks Me Up
Tuhin Sajjad Sk

Hey, why are you wasting time? Come and join us. Now imagine how glum it would be to settle in a family of researchers! Are you trying to make a wisecrack about Ph.D. comedy? Hahaha, you got it. Just foresee the hall where neither of them would ever feel brainy over each other…

Well. Now tell me one thing. If I pitch my research paper into the forest, have I submitted it to Nature? Yeah, smartly joking! Umm Hmm. Can I have a water bottle, please? Sure. Do you know why hydrogen leaves water? Yes, it found the bonding to be too negative! But I feel like a chemical bond is made between us through this humour. Hey buddy, are you still in love with that black cat in the library? No, now I'm having a sprite in my life.

By the way, let me throw another joke at cats. Actually, nowadays I only deal with Schrodinger's cat. You know, the day before yesterday, a student went to the librarian and asked for a book about Pavlov's dogs and Schrodinger's cat. The librarian said, "It rings a bell, but I don't know whether it's there or not."

What happened? Can't guess whether you're fused or confused? No. No. I'm fine. I think fusion and fission are often confused. Why? Very simple; Fusion combines, while fission divides… I guess that's where the confusion comes in!

Hey bro, just forgot to ask about your liver health. Have you given up drinking or not? Yes, I promised never to go to the bar again. That's great, regarding this, let's have a joke in the bar. A tachyon enters a bar, and the bartender says, "Sorry, we don't serve your type!" The tachyon replies, "I was just passing through!" Ho Ho Ho, let's have another from my side. Okay. A photon walks into a hotel, and the receptionist offers to help him with his bags. No need, asks the photon, I'm travelling light! You're not feeling salty, right? No. No. Not at all. But my friend, do you think "salty" is just a mood? It's a whole chemistry lesson. Who knows, "Na" could be so dramatic! Wow! Well, tell me, what do you call a book about anti-gravity? Unputdownable! Great, I always try to be unputdownable in my life. For that you've to work hard, although many of us depend on disbeliefs, superstitions and unscientific rituals to succeed in life.

Dear friend, I've got your message. You know, A Higgs Boson walks into a church. The priest asks it to leave. The Boson says, without me, how can you have mass? Exactly, that's why it says, when life gives you ions, make energy. I believe hard work pays. But what about DNA? Don't you know, DNA stands for Deoxyribonucleic Acid — but jokingly, it can also mean "Do Not Alter," unless you're a scientist! Hahaha.

As a science nerd, I'm really glad Pope Leo XIV has a degree in maths, because it means he doesn't just know about sin(sine) but also understands cos(cosine). Interestingly, Two scientists claim they've figured out how to create life, and the senior one says they should inform God. But when they start gathering dirt, God interjects, "Hold on! You need to make your own dirt!"

Ho, Ho! Ha, ha ….

Member, Organizing Committee, ISNA,
and a science communicator

World Environment Day

Workers' Health In Thoughts

Prasenjit Mukherjee

Every year, 5th June — World Environment Day — reminds us to think about our relationship with nature. In 2025, the United Nations highlighted the global fight against plastic pollution. Plastic has become inseparable from modern life due to its low cost, durability, and flexibility. However, while we often discuss the damage caused by plastic waste to oceans, soil and biodiversity, we rarely consider the hidden toll of plastic production itself — especially on the workers who make it.

The convenience of plastic lies in a dangerous world of toxic chemicals and unsafe work conditions. In 2023, the International Labour Organization (ILO) published a report titled "Hazardous exposures to plastics in the world of work." The report highlighted how workers are exposed to harmful substances throughout the lifecycle of plastics — manufacturing, processing, use, and waste disposal. Such exposures lead to cancer, respiratory diseases, cardiovascular problems, hormonal disorders, reproductive issues, congenital defects and other chronic illnesses that may surface years later.

In India, the risks are as follows:

1. Respiratory diseases such as chronic bronchitis, asthma, and pneumonitis are common due to inhalation of toxic dust and fumes from PVC, PET, and polycarbonates. Poor ventilation and lack of protective gear worsen the situation.
2. Cancers result from contact with high-risk chemicals like vinyl chloride, styrene, benzene, and phthalates — leading to lung, bladder, and blood cancers.
3. Skin diseases such as chemical burns, and allergies occur when resins, dyes and solvents are handled without gloves or safety equipment.
4. Reproductive and hormonal disorders arise from long-term exposure to substances like phthalates and Bisphenol-A (BPA), causing infertility, foetal defects and hormonal imbalance.

Over the past few decades, India's plastic industry has expanded rapidly, serving packaging, construction, automotive and consumer goods. Yet, this growth has come at a heavy price for the workers, whose health is sacrificed for production. Therefore, the fight against plastic pollution must not remain limited to waste management or environmental conservation only. It must also include the health and dignity of the workers at the heart of the agenda. Employers must ensure safer workplaces, while the state must step in with stricter regulations, better occupational health standards and compensation for victims of occupational diseases. Civil society and trade unions, too, have a critical role in making these issues visible.

We have to take a pledge to protect the earth from plastic. Do remember those persons whose lives are endangered by its production. A cleaner world is not possible without healthier and safer conditions for the workers.

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Yersinia pestis

Scientists Uncover Crucial Evidence

Abhishek Datta

Scientists have now obtained definitive evidence about the origins and nature of the Justinian Plague, which ravaged the Mediterranean Basin, Europe, and the Near East from 541 to 549 CE. Many scientists consider this to be the first plague pandemic in history. The name is derived from Emperor Justinian, who ruled the Byzantine Empire at that time. Justinian himself was affected in 542 CE but managed to recover. Estimates about the death toll vary considerably, ranging from five million to 100 million. According to the contemporary Byzantine historian, Procopius, around 10000 people were dying daily in the city of Constantinople. While scientists always suspected the bacterium Yersinia Pestis as the cause of this pandemic, there was a lack of clinching evidence.

Now, a team from the University of South Florida, Florida Atlantic University, and international collaborators has confirmed that Yersinia pestis, the bacterium behind the later Black Death, was also the culprit of the Justinian Plague. The breakthrough comes from teeth recovered in a mass grave beneath the Roman hippodrome in Jerash, Jordan, just 200 miles from where the outbreak was first recorded in Egypt. Scientists discovered definitive genetic proof of Y. pestis by decoding DNA from remnants, putting an end to centuries of conjecture. Nearly identical strains of Yersinia pestis were found in the victims, demonstrating the bacterium's widespread distribution throughout the Byzantine Empire between AD 550 and AD 660. The investigation also found genetic differences that might indicate regional epidemics and interactions with other pathogens.

Such a breakthrough in our understanding of a massive pandemic adds to the valuable knowledge on the spread and evolution of pathogens, helping us stay better equipped to combat related problems that might arise in the future. According to Rays HY Jiang of the University of Florida, co-author of the study, "Plague continues to evolve, and containment measures cannot completely eradicate it. Like COVID-19, vigilance, preparedness, and scientific understanding are crucial to managing onoing threats."

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Adornments

In A Journey to Protect Health and Environment

Sanchalita Bhattacharyya

Adornments were born in the taste of humans. When people started decorating their own bodies using elements from nature, the creation of adornments began. It is people who have made their ornaments or accessories better and prettier with their own labour, artistry and creativity. Traditionally, natural resources such as metals and gems are used to make adornments. The stock of all these valuable resources is limited in nature. Labourers have to work in the mines to extract these resources, and their health is greatly affected. Mining also harms the environment.

Additionally, fire in the manufacture of metal jewellery uses a large amount of natural energy and produces carbon, which causes environmental pollution. We know that carbon dioxide is responsible for global warming. The use of chemicals in the manufacture of metal ornaments endangers both the environment and the health of the workers.

In 2015, a study titled "Green Gas Emissions in Jewellery Industry: A Case Study of Silver Ring" by the Department of Environmental Research at Chulalongkorn University in Thailand found that 1.3 kg of carbon dioxide is produced in the process of making a silver ring. The electroplating method, used to make metal ornaments shiny, also causes a lot of environmental pollution. Environmentalists are aware that this is one of the areas responsible for global warming.

Therefore, to prevent the ever-increasing natural disasters and environmental pollution, it is necessary to change the traditional methods of making ornaments. But it is unreasonable to expect that people will stop dressing up for the sake of the environment. So, we have to think of alternatives. In response to that search, the idea of eco-friendly adornment comes up. Eco-friendly adornments satisfy people's tastes, protect the environment, and protect the artist's health as well.

Earring made of Corn's husk (Source: Visit at the Buyers Sellers Meet, Organised by BRAIPRD, Kalyani) C: Moumita Ghosh

Taking this into consideration, various organizations have taken different initiatives. For instance, Rural Self Employment Training Institutes (RSETIs), supported by the Ministry of Rural Development, Government of India and the Government of West Bengal, conduct training camps in various districts. Here, artists are taught to make adornments, as well as other handicrafts, free of cost. At the end of the course, a certificate is issued by the Ministry of Rural Development, Government of India.

Earring and Pendant made of Cornflower (Source: Visit at the Buyers Sellers Meet, Organised by BRAIPRD, Kalyani.) C: Moumita Ghosh

In this course, emphasis is laid on making eco-friendly and biodegradable adornments. They are making adornments from plastics and other waste materials, also as a good way of recycling waste. In various fairs and exhibitions organised by the government, stalls are given to the eco-friendly adornment makers, where they can display and sell these products. Apart from ornaments, make-up kits and skin decoration products are two dominant subsets of adornment. The makeup products and cosmetics available in the market contain some chemicals that are harmful to skin health. Nowadays, of course, herbal lipstick, herbal mehendi and other herbal make-up products are being produced to protect the health of the consumers. But high prices of those herbal products have kept them away from the general buyers.

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Animal Trafficking

Malabika Sengupta

Animal trafficking is one of the greatest threats to the animal world and various ecosystems. Wildlife trade remains the most profitable illegal industry globally. For centuries, animals have been smuggled from one part of the world to another. It is regarded as a green crime or environmental crime.

Zoos from different regions often exchange animals. After the transfer, the animals must adapt to a new environment. They experience significant physiological and mental stress and struggle to adjust. Wildlife trafficking accelerates the destruction of wildlife, forests, and other natural ecosystems. It also disrupts the balance of the environment. Due to habitat changes, animals develop mental and behavioral problems. They may show sudden agitation, lethargy, or confusion. Stress signs are also evident in their feeding habits. These stresses can weaken their immune systems, making them more vulnerable to infections and diseases. Trafficking reduces the genetic diversity. It leads to inbreeding depression. Due to the removal of animals, a smaller gene pool increases the likelihood of related animals' mating. Besides, this removal shrinks the gene pool and reduces the population size. As a result, loss of genetic diversity happens. This loss has a direct consequence on the adaptability of the animals in a new environment. It makes population of the species less resilient.

The sudden change in habitat brings some physiological stress in the animals. It has a direct effect on the metabolic system of the animals as well. Physical stress, exhaustion during transport bring both physical and mental fatigue. Severe dehydration is another important aspect that animals face during trafficking. Reproductive rate is also reduced.

It is the biggest challenge to the animal species as well as human beings. It can harm human health increasing the risk of zoonotic diseases like EBOLA, and HIV. Conservation of animal species and biodiversity is an important task for the mankind. We must preserve the gene pool so that we can save these animals from extinction risk in future.

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Scientifica Communica

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ISNA

38th Basic Training Programme Starts

Arijit Ghosal

The Indian Science News Association (ISNA), Kolkata, inaugurated the 38th Basic Training Programme on Science Communication and Media Practice (2025–2026) on July 16. The virtual event was attended by over 25 participants, comprising aspiring science communicators, scholars, media professionals, and academicians.

The inauguration commenced with a welcome address by Mr. Prasanta K. Bose, Chairman of the Training Programme, followed by brief remarks by Prof. Manas Chakrabarty, Honorary Secretary of ISNA, and Dr. Amit Krishna De, Honorary Secretary of ISNA and Convener of the Training programme. They outlined the goals and legacy of the training initiative, which have played a pivotal role in developing skilled science communicators over the years.

The keynote inaugural address was delivered by the Chief Guest, Mr. Biswarup Mukherjee, a veteran journalist and public relations expert. His speech emphasized several key aspects of modern science communication. He stressed the importance of ethical communication, particularly in an era where misinformation spreads rapidly. Mr. Mukherjee highlighted the role of science communicators in myth-busting, utilizing tools such as analogies, fact-checking, expert consultation, and paraphrasing to present complex information in a clear and understandable form.

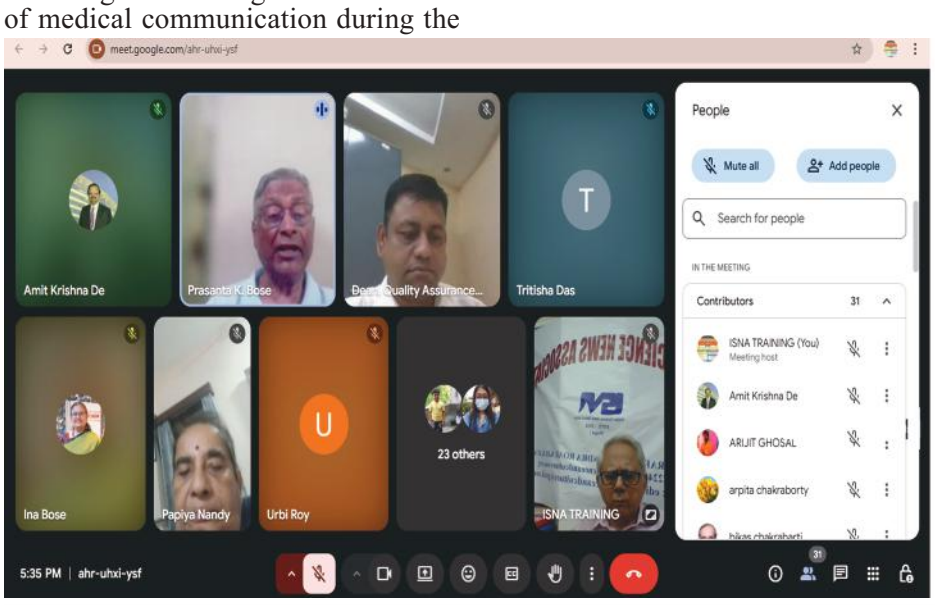
Cited real-world examples, including the challenges and successes of medical communication during the COVID-19 pandemic, the cyclone in Odisha in 2024, and public health campaigns such as the polio immunization drives. These examples illustrated the urgent need for clear and accessible communication strategies in crises and public health advocacy.

The Guest of Honour, Dr. Siddharth Swarup Rattray, Dean IQAC and Associate Professor at the School of Computer Engineering, KIIT University, Bhubaneswar, also delivered a compelling address. He emphasized the interdisciplinary nature of science communication, especially in today's data-driven world. Dr. Rautaray spoke about the growing need to integrate technology, visualization, and storytelling in communicating scientific knowledge to diverse audiences.

Prof. Bikas K. Chakrabarti, President of ISNA and former Director of the Saha Institute of Nuclear Physics, presided over the programme. In his address, he reiterated the foundational role ISNA has played in popularizing science in India and underlined the responsibility of communicators to remain unbiased and science-based in their approach.

The programme concluded with a formal Vote of Thanks by Prof. Prabir Kumar Saha, Honorary Treasurer of ISNA. The entire session was smoothly anchored by Ms. Urbi Roy and Ms. Tritisha Das, former students of ISNA.

Student,
ISNA SCMP 38th batch



ISNA Celebrates Doctors` Day

Priyanka Sau

The first Doctor's Day was celebrated in India on July 1 in the year 1991. This memorable day shares both happiness and sorrow by virtue of the birth and death anniversary of the most famous physician of India, and also Bharat Ratna Dr. Bidhan Chandra Roy. He was not only a physician but also the first Chief Minister of West Bengal in Independent India. It is hence a tribute to his contributions to the healthcare services to mankind. In recognition of his immense contributions, Dr. B.C. Roy Memorial Hospital for Children in 1967 and the B.C. Roy Polio Clinic and Hospital for Crippled Children in the year 2010 in Kolkata was established. Now this hospital is known as Dr. B.C. Roy Post Graduate Institute of Paediatric Sciences, Kolkata. (Sishu Hospital)

Indian Science News Association (ISNA) celebrated this auspicious occasion on July 1, 2025, in the N.R Sen auditorium, University of Calcutta. This propitious programme began with dignified felicitation of the Chief Guest, Prof. Dr. Dwijen Gangopadhyay & Prof. Bikas K. Chakraborty, President of ISNA, with a token of sapling by Dr. Amit Krishna De and Prof. Manas Chakraborty, Honorary Secretaries of ISNA.

Dr. De welcomed the august gathering in the name of the great doctor and freedom fighter Dr. B.C. Roy. Then Professor Manas Chakrabarty, Honorary Secretary of ISNA, introduced the distinguished speaker and the Chief Guest, Dr. Dwijen Gangopadhyay, former Professor, Calcutta School of Tropical Medicine, and also of the Calcutta National Medical College & Hospital. The program came to another part - prize distribution of the 'Mrinal Kanti Dewanjee Student Award' for 2024. The two awardees were Shri Sitangshu Sekhar Manna from National Gems Higher Secondary School, Behala, Kolkata and Shri Suprakash Mitra from Ramkrishna Mission Boys' Home High School (H.S.), Rahara, Kolkata. Each of them was awarded a memento and a cheque of Rs. 10,000, which was followed by their presentation on the topic - Importance of Basic and Translational Research.

The highlight of the programme was a presentation by Dr. Dhires Kumar Chowdhury, social activist, columnist, poet, and an executive committee member of the Geriatric Society of India. Dr. Chowdhury was felicitated by Prof. Prabir Kumar Saha, Honorary Treasurer, ISNA. Dr. Chowdhury began by sharing how he started his journey in the medical profession. He spoke on the burning issue of the negligence of old-age parents today and on the high expectation-oriented societal culture. He also talked about the degeneration of health in old age that results in cognitive and behavioural changes.

At the end, Prof Sudhendu Mandal, Editor-in-Chief, Science and Culture, spoke in brief about the contributions of Dr B C Roy towards the development of scientific temper in West Bengal. Prof. Bikas K. Chakraborty, President of ISNA, also addressed the audience. The programme ended with a vote of thanks by Prof. Prabir Kumar Saha, Honorary Treasurer of ISNA. ISNA's former students, Ms. Urbi Roy and Ms. Priyanka Sau, anchored the whole programme.

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