KNOWBEL

ENLIGHTNING THE NOBLES!

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NATIONAL TECHNOLOGY DAY

11 May

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Enlightening the nobles !

WELCOME !

Knowbel is back with a pool of mind-boggling articles filled with rare facts and famous personalities from all over the world brought to you in yet another edition! Through the journey of reading don't forget to pause and feel the whiff of brainstorming quizzes and contests that'll create an adrenaline chill within you! Cool prizes await the winners with the chance of being featured in our next issue!

We also provide you the golden opportunity to showcase your quirky talents at some point. Spread the message among friends and family members. Just as ripples spread out when a single pebble is dropped into water, your actions can illuminate the dark room of knowledge!

Turn on the page to discover more!
Something magical can happen when you read! So, keep calm and read on....
Thank You!

Stay home & Stay safe !

SPECIAL THANKS TO

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Welcome to the most inquisitive section of the magazine where interesting answers can be discovered to same of the silliest questions in the world! So, join in to know more . . .

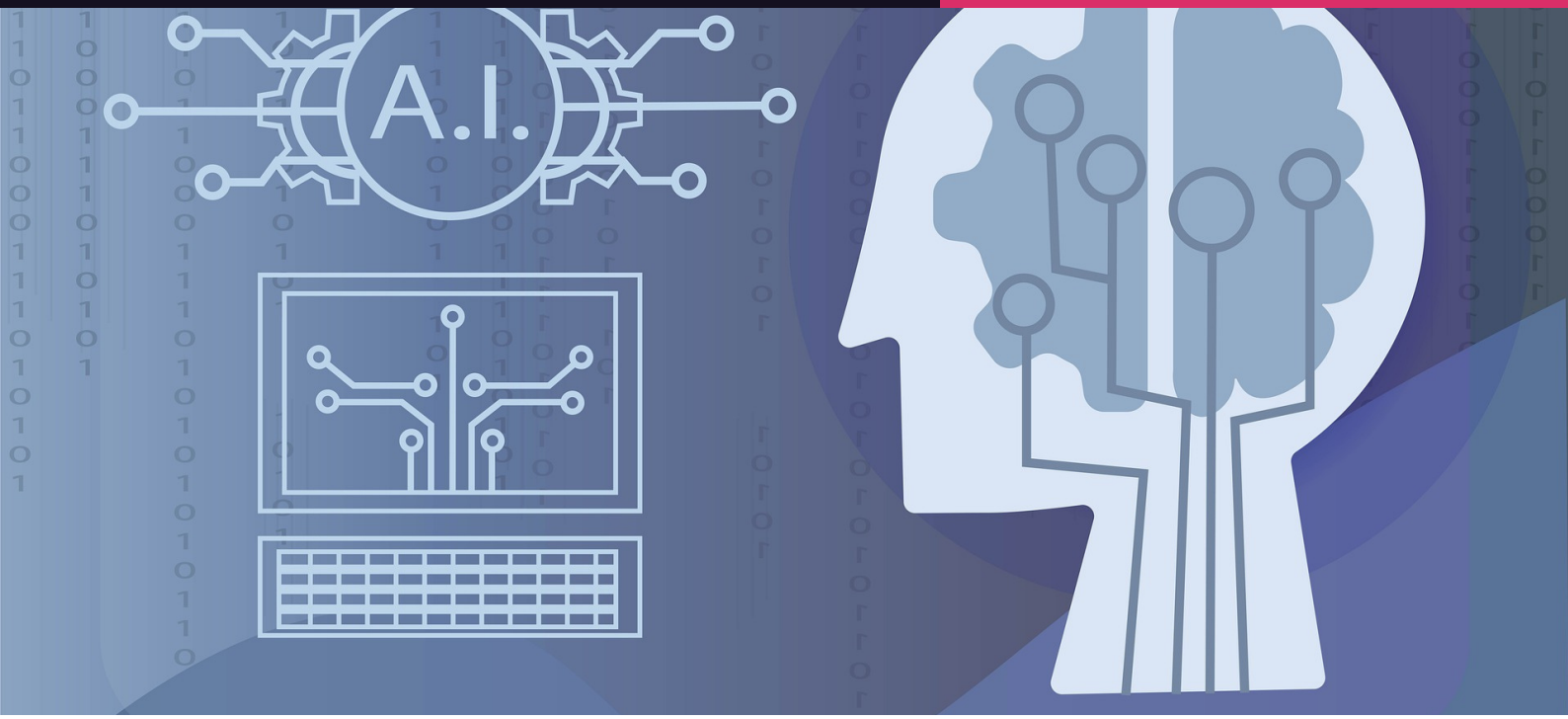

Image by John Conde from Pixabay

01 - AI FOR SUSTAINABLE DEVELOPMENT

- PRATISHRUTI PANDA

The emergence of artificial intelligence (AI) and its progressively wider impact on many sectors requires an assessment of its effect on the achievement of the Sustainable Development Goals. Using a consensus-based expert elicitation process, we find that AI can accomplish 134 targets across all the goals, but it may also inhibit 59 targets. For the environment group, 25 targets (93%) were identified for which AI could act as an enabler. Benefits from AI could be derived by the possibility of analysing large-scale interconnected databases to develop joint actions aimed at preserving the environment. AI will support low-carbon energy systems with high integration of renewable energy and energy efficiency, which are all needed to address climate change. AI can also be used to help improve the health of ecosystems.

The achievement of target 14, calling to prevent and significantly reduce marine pollution of all kinds, can be benefited through algorithms for automatic identification of possible oil spills. AI technology and big data can be used in regions where ethical scrutiny, transparency,and democratic control are lacking. AI might enable nationalism, hate towards minorities, and bias election outcomes. AI can negatively affect social media usage by showing users content specifically suited to their preconceived ideas. This may lead to political polarisation and affect social cohesion. A net positive impact of AI-enabled technologies is associated with increased productivity. In practice, each interlinkage was weighted based on the applicability and appropriateness of each of the references to assess a specific interlinkage—and possibly identify research gaps. Documented evidence of the potential of AI acting as (a) an enabler or (b) an inhibitor on each of the SDGs.

RIVETING READS IN THIS ISSUE:

02 - HOW ISRO AND NASA DEALT WITH THE PANDEMIC

03 - MUON'S ESCALATING CHALLENGE TO THE STANDARD MODEL.

04 - HOW DOES CAFFEINE KEEP US AWAKE?

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02 - HOW ISRO AND NASA DEALT WITH THE PANDEMIC

- PRATISHRUTI PANDA

ISRO had found it tough to undertake satellite launches during the ongoing COVID-19 pandemic. Rocket launching cannot be a “work from home” activity.

When the entire country was under lockdown, it was difficult for ISRO to undertake activities within and among its centres. Also, there were difficulties for customers who launched their satellites on the PSLV-C49 mission (launched on November 07, 2020). Their engineers and other staff had to undergo the customary quarantine after reaching India. The pandemic had made logistical supplies and travelling very difficult. It is noteworthy that despite the unprecedented Covid-19 challenges globally, many of the planned satellite launches still took place with some minor scheduling variations.

ISRO needed to create a “social bubble” of scientists and technicians at their laboratories. Globally, there has been a realisation that pandemic or no pandemic, satellite launches should still continue because it is a technology that helps humans immensely.

Defence Research and Development Organisation (DRDO), which deals with missile launches, was able to undertake its tasks effectively during the same period. There was a lull in their missile launches for a few months, but in September and October, DRDO undertook ten successful missile launches.

India’s Polar Satellite Launch Vehicle PSLV-C51 recently launched Amazonia-1 along with 18 co-passenger satellites. China and the United States have each reported a 25% increase in the number of launches during the year 2020. Four human missions to the International Space Station (ISS) also took place during the pandemic. At NASA, projects deemed “mission-critical” were excepted from telework restrictions.

Considering the high costs of entry to the sector, there is a risk that the crisis could lead to more industry concentration, eliminating smaller and younger firms that are key sources of innovation, employment, and economic growth.
Space agencies and other public administrations need to thoroughly consider vulnerable smaller actors in their overall crisis responses.

Image by Michael Draeger from Pixabay

By cacycle Wikimedia Commons

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03 - MUON'S ESCALATING CHALLENGE TO THE STANDARD MODEL.

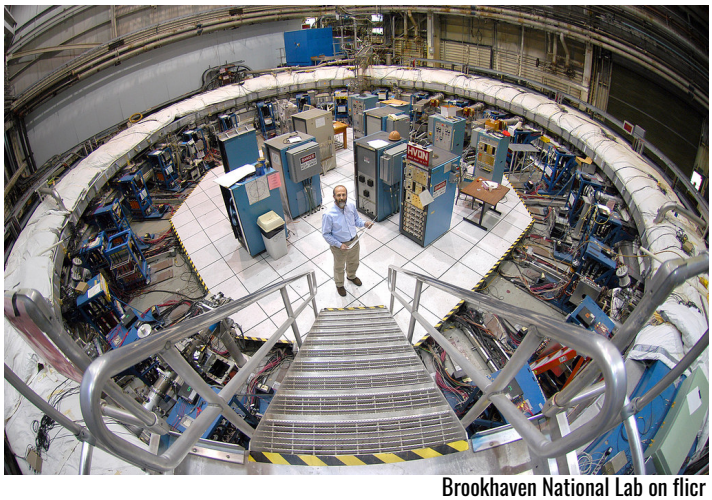
- PRATISHRUTI PANDA

A tiny subatomic particle called a muon, like an electron but far heavier, appears to be disobeying the laws of physics in a way that scientists say could change our fundamental understanding of how the universe works. Currently, we divide the forces that govern our lives into four categories: Gravity, Electromagnetism Strong force, which holds particles together and Weak force, which is involved in radioactive decay.

Scientists at Fermilab, a particle accelerator near Chicago in the United States, spun muons around a 15-metre magnetic ring at nearly the speed of light and noted the rate at which they wobbled. The muons' behaviour in the magnetic field was different from what would be expected using the standard model: they wobbled at a faster rate & quot. This suggests that the particle is sensitive to something outside our current understanding of the universe. This anomalous behaviour challenges The Standard Model of particle physics which was developed around 50 years ago.

"This suggests," said Chris Polly from Fermi lab, "there might be monsters we haven't yet imagined, that are emerging from the vacuum interacting with our muons". In other words; a new force or an undiscovered subatomic particle. But the physicists are celebrating cautiously for now, as the results have a one in 40,000 chances of being a statistical fluke. The accepted statistical confidence level needed to hail the findings as a discovery is- one in 3.5 million chances of being a coincidence.

The results resonate with those of a previous experiment, Muon g2, run-in Brookhaven National Laboratory, New York, in 2001. The results could help explain some of the big puzzles of the universe. For example, the expansion of the universe, which has previously been attributed to dark energy, could be the result of a fifth new force.



Brookhaven National Lab on flicr

The muon g-2 storage ring. This ring, in concert with a beam supplied by the Alternating Gradient Synchrotron, was used to make the first precise measurement of how negatively charged muons "wobble" in the magnetic field, information which can be used to confirm the Standard Model of particle physics.

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04 - HOW DOES CAFFEINE KEEP US AWAKE?

- ANURADHA MEENA

Caffeine is the world's most popular drug, consumed by the majority of us. People usually intake caffeine in the form of coffee and tea. Caffeine helps us feel alert, focused, happy, and energetic. But at the same time, it also raises our blood pressure and makes us feel anxious.

Now the question arises... how does it keep us awake? Caffeine is found in the leaves and seeds of some plants in varying amounts. In very high doses(usually found in leaves)it's toxic to insects, but in lower doses (found in nectar), it helps honey bees/insects remember the flowers to revisit it.

In the human body, caffeine stimulates the central nervous system by blocking adenosine, a sleep-inducing molecule. During the energy-releasing process, adenosine is produced, which binds to adenosine receptors in the neurons. When adenosine integrates with the receptors, it activates a cascade of biochemical reactions that cause neurons to fire more sluggishly and makes you feel sleepy.

Caffeine is the antagonist to adenosine receptors, and it prevents adenosine from binding with receptors. Caffeine and adenosine have a similar molecular structure; hence, they easily fit into the receptors. Caffeine inhibits adenosine from binding to the receptor.

The dopamine fosters the feeling of pleasure and makes you feel highly motivated. In some adenosine receptors are linked with dopamine's receptors. When adenosine binds with these paired receptors, it is harder for dopamine to fit in its spot, interrupting its mood-lifting work. But when caffeine takes adenosine's place, dopamine slides in. This is how caffeine keeps us awake with a tremendous supply of energy.

Of course, all effects of caffeine are not beneficial. Indeed, it makes you feel better and more alert, but at the same time, it raises your heart rate and blood pressure, causes increased urination or diarrhoea, and contributes to insomnia and anxiety.

https://pxhere.com/en/photographer/128689

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05 - WHY DO MOSQUITOES BITE ONLY SOME PEOPLE?

- ASMI GAIKWAD

Are you that person in the group who always gets bitten by mosquitoes? Well, believe it or not, it's related to genetics; partially!
Mosquito Man"- Professor Immo Hansen from Mexico City runs a lab that has a wide variety of strains of mosquitoes and an exotic one too. He feeds all of them with his own blood!

The relation of mosquitoes with humans- they need our blood proteins to make their eggs, so only the female mosquitoes bite. The eggs hatch into these wriggly larvae, which develop into pupae before becoming flying adult mosquitoes. Then they seek out vertebrate blood to make more eggs. This entire life cycle takes just two weeks!

To prove how much a person is attracted to mosquitoes, he used a Y-tube with holding chambers and put the mosquitoes in there. There's a fan inducing draft which spins with the speed of 4m/s. It was used to discover that the basis of attractiveness was partially genetic. A similar test carried over twins also yielded some surprising results- the test was conducted over 18 pairs of identical and 19 pairs of fraternal twins. The outcome showed that identical twins showed a greater correlation to mosquitoes than the fraternal ones since the former has more identical genes than the latter. Hence, it's partially genetic!

Scientists believe that it is something to do with the odour of volatile chemicals that your body gives off and also due to microbes/ bacteria present on the skin. One of the main signals mosquitoes like to follow is carbon dioxide. It means that a person with a high metabolism, someone who's been exercising or a pregnant woman, all of them have a greater probability to be bitten by a mosquito . Mosquitoes are also enticed with a variety of other volatile chemicals like lactic acid, acetone and ammonia. Some other chemicals that impair/ repel mosquitoes are- octanol, nonanal, decanal and 6-methyl - 5-heptene-2-one.

Mosquitoes have a significant impact on human health. They are the worst organisms of all times. Diseases like Malaria have killed millions all over the world, and many other mosquito-borne diseases continue to do so.

Pratheepps at English Wikipedia, CC BY-SA 3.0, via Wikimedia Commons

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06 - HOW DOES THE VACCINE PREVENT CORONAVIRUS?

- ANURADHA MEENA

Australian mathematician Matt Parker statistically proved that all the coronavirus particles present worldwide could be accommodated in just one teaspoon! A single teaspoon of coronavirus has already killed millions of people across the globe.

So, how does a vaccine prevent coronavirus? What's the need for a vaccine? How does coronavirus use our cells and make a thousand copies of themselves and kill us?
The human body is made up of 37.2 trillion cells. Once the coronavirus enters the body, its sole purpose is to get inside the cells and make a hundred thousand copies of itself. But the problem is that the Coronavirus can not penetrate through the cell membrane; rather it needs an ACE-2 receptor to bypass the barrier. Now, the main goal of all scientists, researchers, and doctors currently working on coronavirus is to prevent coronavirus spike protein from connecting with the ACE-2 receptor. Biologically there is only one pathway to prevent spike protein from being associated with ACE-2 receptors: by blocking them, which can be achieved by putting antibodies on them. Antibodies are generated by the immune system. If they are produced in the right amount at the right time, coronavirus can't do anything because antibodies will get attached to coronavirus spike protein, preventing them from entering into the cell. Those in whom this does not happen die due to COVID-19.

Now let's figure out how our immune system generates antibodies?
Coronavirus has spike proteins on its surface, and genetic material inside that encodes the instructions for making trillions of copies of itself. In January 2020, Chinese researchers studied coronavirus's genome and uploaded its gene sequence on their website for public access and made it freely available for everyone. Now pharmaceutical and biotech companies could read/access the genomic code and make RNA out of them. But why mRNA? Because mRNA is responsible for all types of protein made in the body and the only base of the coronavirus vaccine. mRNA encoded instruction of the spike protein is then packed into the lipid nano molecule and vaccinated into the body.

https://www.flickr.com/photos/pahowho/13383716683

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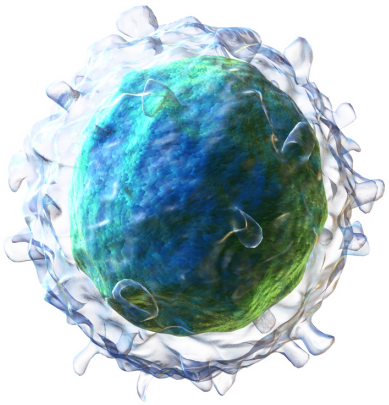
Now, lipid nanoparticle-containing mRNA enters the body's interstitial fluid and then gets fused with the cell. Inside the cell, there are organelles called ribosomes, also known as a protein factory. Ribosomes convert mRNA into protein. The mRNA that we have injected through the vaccine inside the cell will take up the ribosomes and code protein accordingly; the cell represents them on its surface. Some spike protein gets attached to MHC class one protein.

Billions of immune cells with millions of specificity are circulating in the body. Spike proteins connect with the cytotoxic T immune cell, B cell and some of them to macrophages. The macrophages eat the spike protein and show them on their receptors. Now macrophages go to the Helper T cell. As soon as the helper T cells come in contact with spike protein, they release cytokines. Cytokines give order to cytotoxins to make multiple copies of themselves to become Granzymes and memory T cells.

B cells become plasma cells and memory B cells. The function of a plasma cell is to generate antibodies, and the role of granzymes is to destroy the cell infected with coronavirus. The real soldiers are memory T cells and B cells. Their primary part is to remember the spike protein, and to order plasma cells to produce antibodies in case the body is infected with coronavirus.

What does exactly a vaccine do? It trains our immune system.
India's Covaxine is unique amongst all the vaccines. The working principle of Covaxine involves injecting the inactive coronavirus into the body. Inactive coronavirus has non-functional spike protein that can't infect the human body, but at the same time, they will give training to the body's immune system to fight against the virus.

Christian Emmer | Credit: emmer.com.ar



Lymphocyte
B cell

Blausen.com staff (2014) via Wikimedia Commons

FACTASTIC

Image by Wikimedia Commons

First Apple logo featured Newton

Despite carrying the name 'Apple', the company's first logo did not describe the physical shape of an apple. It was supposed to represent the law of gravity which was inspired by an apple.

Google was a typo

Google is a misspelled version of a mathematical number called 'Googol', which means 1 followed by 100 zeros.

Image by Google

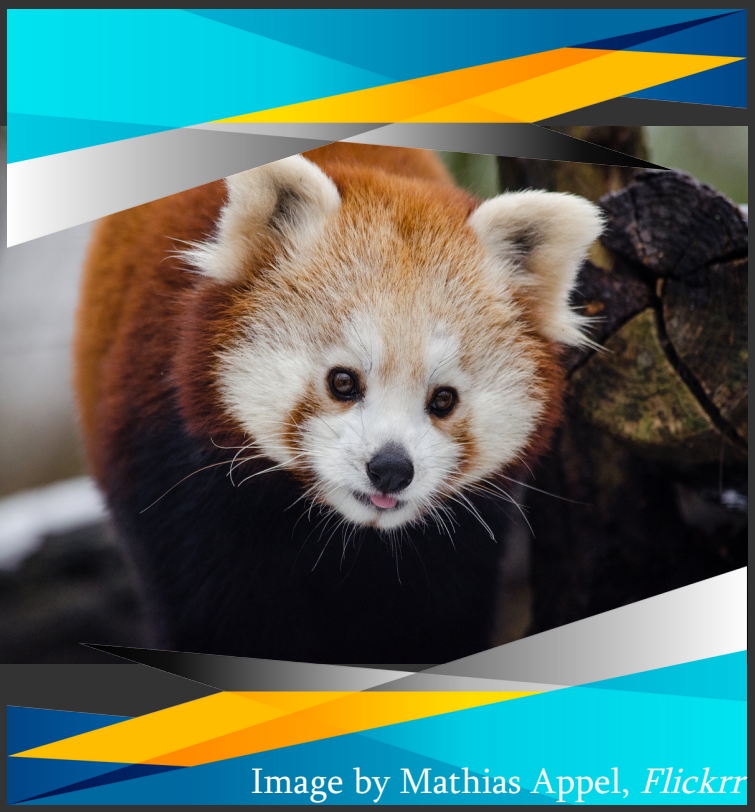


Image by Mathias Appel, *Flickrr*

Firefox is a Red Panda

The mascot for 'Firefox' is not a fox, but a 'Red Panda', an endangered animal from Asia. A mistake when translating red panda from Chinese to English is how we got 'Firefox'.

Most dangerous Computer virus

The most ever created was in the form of a worm called ILOVEYOU that attacked by replicating itself and crashing systems. It first arrived through e-mail messages as a love letter from a secret admirer.

Photo Illustration, Getty Images

Image by Adobe Stock Images

SPAM!

Spam e-mail got its name from the spam (canned) meat. It was named after a random Monty Python sketch in 1970, when over 2 billion of Spam cans were sold.

Robot means Forced-labour

The word 'Robot' is actually derived from the Church Slavonic word 'Robata' , which means servitude of forced labour. We hope they never discover that to be the case, as we're pretty sure that's when the robot uprising will begin.


Image by Creative Commons Public Domain

The Quizopedia ?

-ARE YOU READY FOR THE CHALLENGE?

Is your mind slowly going stale? Did you pride yourself on being the 'Know-it-all' in your class? Well, here's a chance to flex your grey cells and bring them back to tip-top shape. KNOWBEL presents to you 'Quizopedia.' I, Aditya, the quizmaster, have selected 11 of the most sizzling questions for you to crack. Note that these questions have an underlying connection.

Check out the instructions below:

The QR code below will take you to a Google Form, which contains a quiz consisting of 10 questions. You must answer all the questions and try to get them correct. You are free to make wild guesses as there is no negative marking! The names of the winners would be published in the upcoming issue, and the winner of the contest will receive prizes worth Rs. 250.
Answers shall be officially released via mail on May 25, 2021.

16th Quizo winner

Vishnu P
IISER Pune

The winners would be chosen based upon:
1. Number of Correct Answers
2. Time of Submission

Competition begins on: May 2, 2021, at midnight
Last Date for Submission: May 20, 2021

Scan or click on the QR code below:

1. Who has written the bhajan ' Mere to Giridhar Gopal, Doosro Na Koi' ?
a) Surdas
b) Mirabai
c) Narsinh Mehta
d) Chaitanya

2. In Congress (I), what does 'I' stand for ?

a) International b) Indira

c) Indian d) Independent

3. Which of these rivers is a tributary of the Ganges ?

a) Beas b) Godavari

c) Gomti d) Mahanadi

4. In tennis, which term is used to denote the score of forty all ?

a) Deuce b) Love

c) Ace d) Break Point

5. Who built the forerunner of the Grand Trunk Road in the 16th century ?

a) Ibrahim Lodi b) Akbari

c) Sher Shah Suri d) Rana Sanga

6. Which of these types of sarees would you associate with Gujarat ?

a) Maheshwari b) Chanderi

c) Paithani d) Patola

7. What nickname was given to Arjuna because he was ambidextrous ?

a) Sabyasachi b) Shuk

c) Kiriti d) Iravan

8. Which of the following would be normally found on the back cover of a book?

a) ISDN b) ISBN

c) IRBM d) ICBM

9. Which of these films was based on a novel written in English ?

a) Umrao Jaan b) Junoon

c) Lagaan d) Parineeta

10. Which Indian state has the longest coastline ?

a) Maharashtra

b) Tamil Nadu

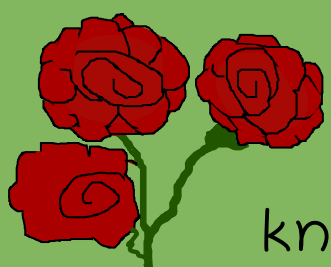
c) Gujarat

d) Kerala

PLOT-TWIST

-by Aishwarya Juneja

Visit: https://www.youtube.com/watch?v=Qal2ph1Wb1s



INSPIRON

SATYAJIT RAY

"SIMPLICITY IS THE ULTIMATE SOPHISTICATION"

Illustration by Ritu

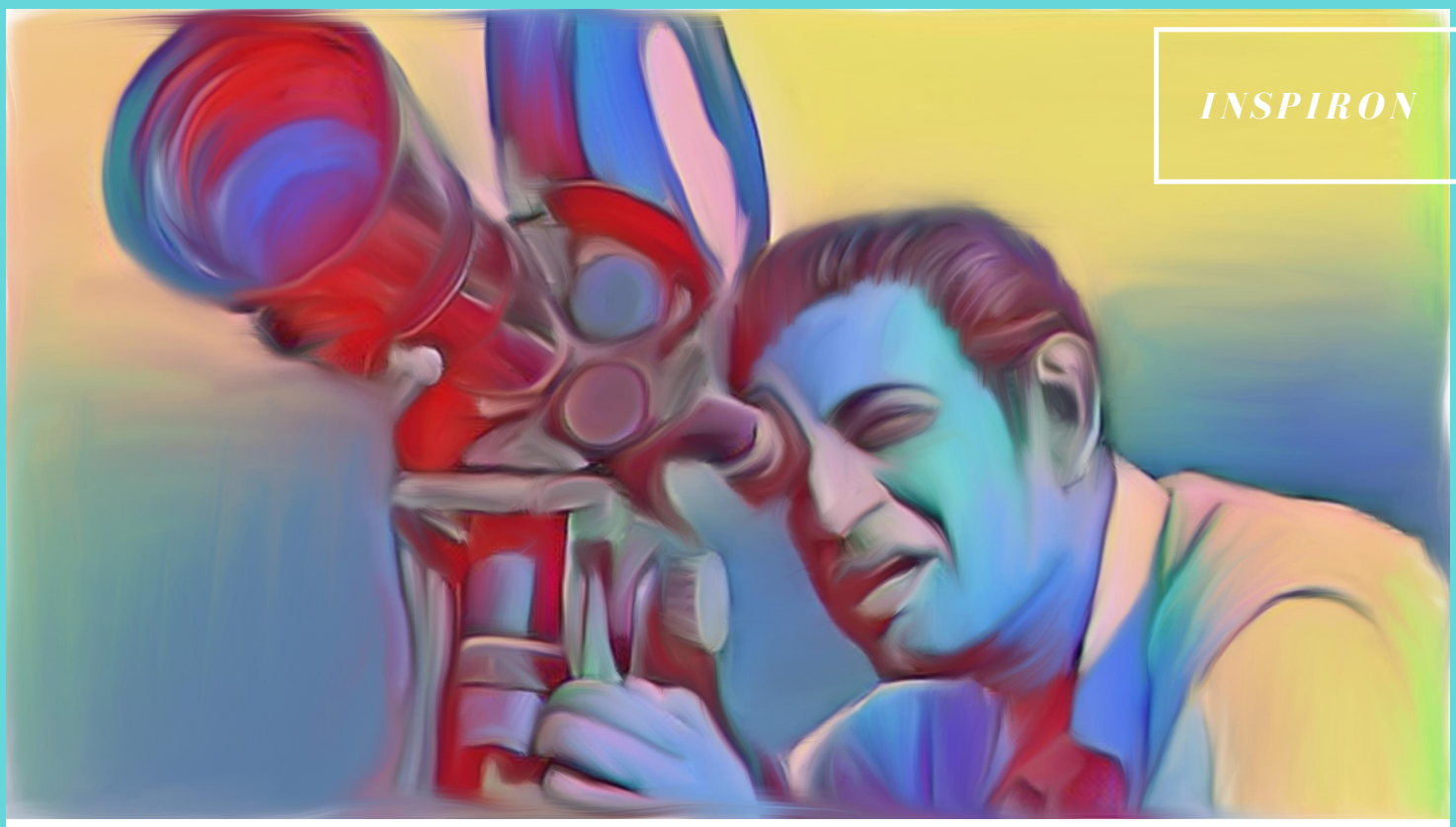


Illustration by Ritu

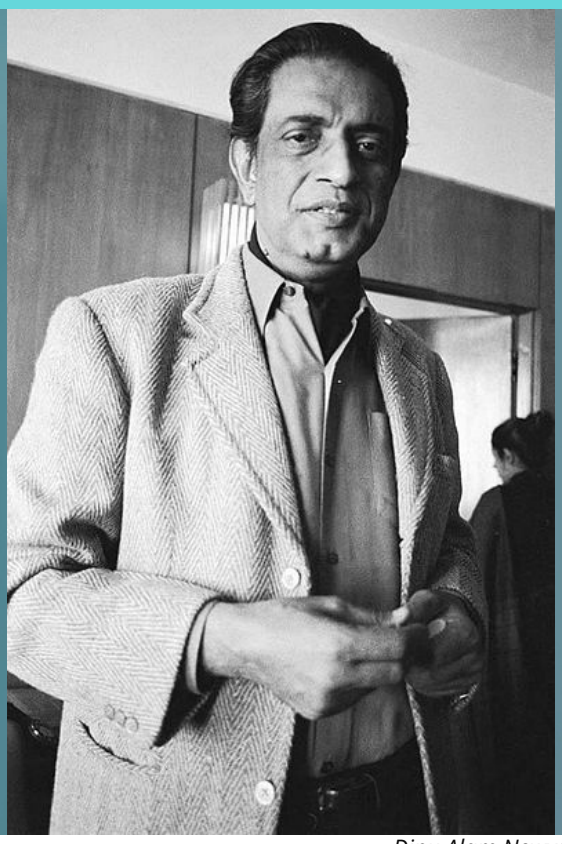
This magazine cannot be complete without paying tributes to some of the notable personalities who have played pivotal roles in enriching lives. So, turn on the page to know more....

Satyajit Ray was an Indian movie director, scriptwriter, documentary filmmaker, author, lyricist, and many more. In addition to being a multi-talented man, he is one of India's best-known filmmakers and considered to be among the masters of world cinema.

Satyajit Ray was born on 2nd May 1921 to Mr Sukumar Ray and Ms Suprabha Ray in Calcutta (now, Kolkata). The Ray family was one of the influential families in Bengal and had played a significant role in the social reforming of Bengali society. Upendra Kishore Ray, the grandfather of Satyajit Ray, had been a well-known writer, painter, composer and played the violin. Satyajit grew up in a home where the only familiar things next to food and water - were books and papers. His earliest memories include the smell and sounds of the block-making and printing process and an abundance of books and journals.

One of the most tragic moments in the early life of Ray was the unfortunate demise of his father, Sukumar Ray. The deadly kala-azar disease struck Sukumar Ray, and he died when his son was barely three years of age. Post his father's demise, Ray and his mother started living at his maternal uncle's house.

> *The only solutions that are ever worth anything are the solutions that people find themselves.*



Dinu Alam Newyork, CC BY-SA 4.0, via Wikimedia Commons

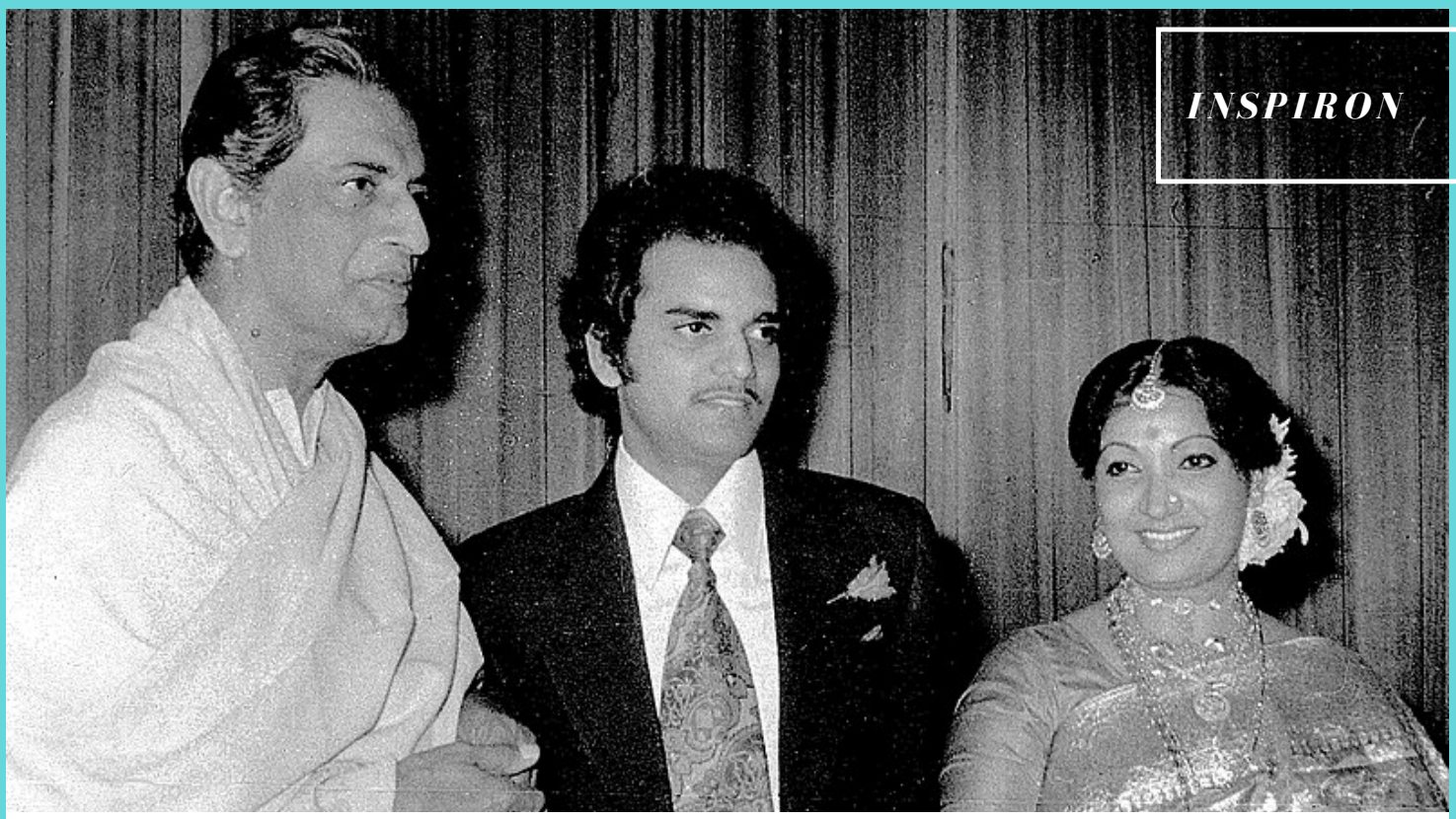
> *Dominus Omnium Magister. It means God is the master of all things.*

As a schoolboy, Ray was an absolute film buff. He devoured any piece of information related to movies in several magazines, newspapers, etc. His partner-in-crime in all of his interests was Bijoya Das, his maternal cousin and future wife. Both were particularly fond of Hollywood musicals just as they were of Western Classical Music.

Despite being interested in fine arts, Ray attended the Presidency College, Calcutta, to study science because of his mother's insistence and received his B.A. degree in Economics. During this period of Ray's life, he watched a ton of films. He wasn't only interested in what the actors were doing; instead, the focus was more on other features like the positioning of the camera, unfolding of the narrative, etc. He keenly observed every film and paid attention to characteristics that distinguished the work of one director from another.

Ray went on to attend the art school at Santiniketan, the rural university established by Rabindranath Tagore. There, he started developing an appreciation for Oriental (Eastern) and Indian art. He also learned a great deal from the contemporary painters at Santiniketan. Ray was exposed to both Western and Eastern cultures, whose perfect combination is evident through his films.

The Apu Trilogy is one of the greatest works of Satyajit Ray. The first of the three films, Pather Panchali (1955), was an enormous success both in commercial and critical aspects.



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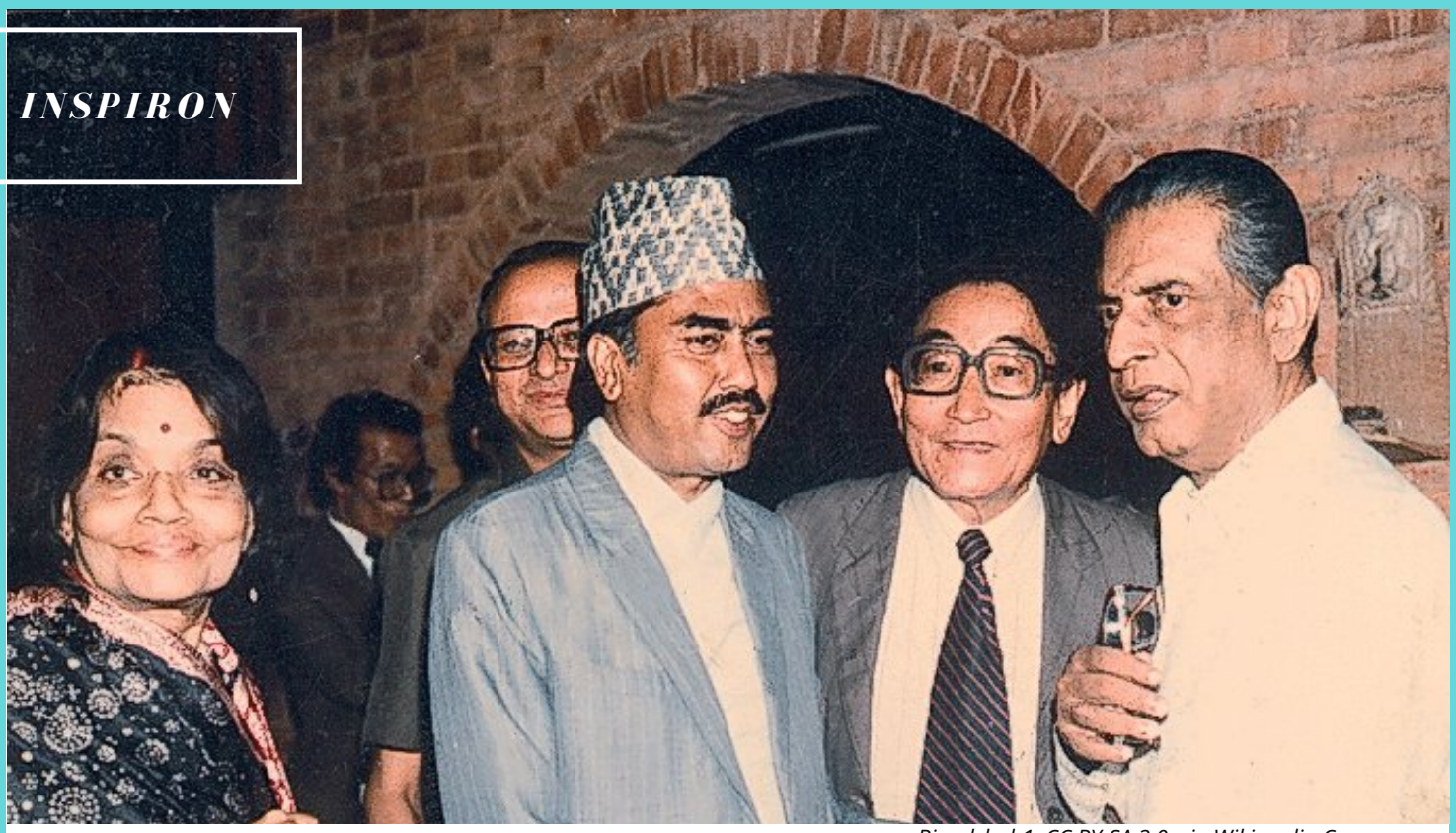
Despite facing financial issues for making the film, it won the 1956 Cannes International Film Festival, making it a worldwide success. This achievement ensured Ray of the financial backing required to produce the subsequent two films - Aparajito (1956) and Apur Sansar (1959).

The trilogy narrates the story of Apu, the son of a poor Brahmin priest living in a rural setting. As Apu grows up, he moves from his village to Calcutta, which exposes him to modern influences, causing a significant change in his personality. He has ambitions of being a novelist instead of being satisfied with remaining a priest. The central theme of all three films is the conflict between traditions and modernity. It depicts the change in culture in Indian society during that period.

Satyajit Ray focused on depicting the disagreement of feelings and thoughts of the characters more than the action or plot of the story. Moreover, his film's characters include ordinary people with average ability and talents, relatable to the masses. The above two features, when combined, results in an extensive range of genres and moods of his films, including musicals, tragedies, comedies, etc.

His notable achievements include 32 National Film Awards, the Dadasaheb Phalke Award, the Padma Bhushan, and the Bharat Ratna - India's highest civilian award.

> *“There’s always some room for improvisation.”*



Bimalshah1, CC BY-SA 3.0, via Wikimedia Commons

> *When I write an original story I write about people I know first-hand and situations I'm familiar with. I don't write stories about the nineteenth century.*

In addition to this, he has won many honours in reputed international film festivals. Satyajit Ray is the second film personality after Charlie Chaplin to receive an honorary doctorate from Oxford University.

While working on Ghare Baire, an adaptation of one among many novels of Rabindranath Tagore, in 1983, Ray suffered from a heart attack. Although Ray completed the movie with the help of his son Sandip Ray, his condition kept deteriorating slowly but steadily in the last decade of his life. Finally, Satyajit Ray passed away on 23rd April 1992 at the age of 70. A true legend!

"Every flower must grow through dirt."

~Laurie Jean Sennott

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Send in the amazing photos clicked by you and we'll be happy to feature them in our magazine and on social media.

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