



विज्ञानवार्ता

Reflections of Science

Edition 2017

FEATURED

Saving rivers in the
third millennium

Page 2

WHO BREATHES WHILE THE CITY CHOKES ?

Choke to death or cleanse the
breath.

Page 20

PREFACE

Standing in a minute corner of a universe infinitely vast, the potential for discovery is eternal. Even the simplest innovations widen the horizon for further exploration. It is this extent of yearning for the unexplored which brings the ITLeens the pleasure of presenting to you the second edition of the sublime science magazine-“Vigyanavartan”.

Science is the poetry of reality and hence it gives the science club an immense pleasure to be able to bring forward the concepts of science and motivate their application in real life.

Science creates a new world every day. It requires continuous and profound effort for as long as the mankind exists. With this approach, we at ITL are taking another step forward towards striving for excellence and prowess.

It is intriguing to want to know the secrets of the universe, but to really know them you have to think in terms of energy, frequency and vibration. We expect our readers to explore and unravel the mysteries of science with the same fervor.

Ultimately, curiosity is the beginning of the journey of innovation.



FROM THE PRINCIPAL'S DESK

MS.SUDHA ACHARYA



All that is necessary for faith is the belief that by doing our best we shall come near to success and that success in our aims worth attaining.

-Rosalind franklin

IT GIVES ME IMMENSE PLEASURE TO PEN A FEW WORDS AS A PROLOGUE TO THE SECOND EDITION OF OUR IN-HOUSE SCIENCE MAGAZINE 'VIGYANAVARTAN'. THE MAGAZINE AIMS AT CHURNING OUT THE LATENT TALENT IN THE FIELD OF SCIENTIFIC RESEARCH AND DEVELOPMENT WHICH BEARS IMMENSE POTENTIALITY OF SHARPENING THE INTELLECT AS PART OF THE OVER ALL PERSONALITY DEVELOPMENT OF OUR STUDENTS. EMPOWERMENT OF STUDENTS FOR THEIR ALL ROUND DEVELOPMENT THROUGH EDUCATION IS OUR CHERISHED MOTTO. TODAY EDUCATION MEANS MUCH MORE THAN MERELY ACQUIRING KNOWLEDGE. IT IS ACQUISITION OF KNOWLEDGE AND SKILLS, BUILDING CHARACTER AND IMPROVING EMPLOYABILITY OF OUR YOUNG TALENT TO EMERGE AS EFFECTIVE AND EFFICIENT GLOBAL LEADERS. I CONGRATULATE ALL THE CONTRIBUTORS AND THE EDITORIAL BOARD FOR BRINGING OUT SUCH A WONDERFUL MAGAZINE. THE SECOND EDITION OF 'VIGYANAVARTAN' HAS ADDED ANOTHER FEATHER TO THE CAP OF ITL PUBLIC SCHOOL AND HAS CREATED A NEW LEGACY FOR THE STUDENTS TO FOLLOW. I WISH MY DEAR STUDENTS THE VERY BEST IN ALL FACETS, FOR ACHIEVING GREATER SUCCESS AND SCALING NEWER HEIGHTS IN FUTURE.

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INDIAN RIVERS...

THE RECLAMATION

“ Only when the last river has dried up and the last fish has been caught will we realize what role Rivers played in our lives ”

We are a minute to midnight before the rivers are consumed and destroyed by the mankind. Rivers are bearers of life and quenchers of our thirst. The rivers of India play an important role in the lives of the Indian people. The river systems provide irrigation, potable water, cheap transportation, electricity as well as provide livelihoods for a large number of people all over the country. The rivers are considered holy by all Hindus of the country. There are seven major rivers namely Indus, Brahmaputra, Narmada, Tapi, Godavari, Krishna and Mahanadi. Along with their numerous tributaries, which makes the river system of India.

With endless exhaustion and use of rivers, water pollution has become one of the biggest issues India is facing today and untreated sewage is the main source of this pollution. The rivers Ganga, Yamuna and Sabarmati are amongst the most polluted water bodies in India. Ganga, the most important and the largest river in India, is synonymous with purity. . But it poses significant threats to human health and the environment. Severely polluted with human waste and industrial contaminants, Ganga provides water to about 40% of India's population across 11 states, serving an estimate population of about 500 million people.

Yamuna is the longest and most important tributary of Ganga, and is highly venerated and according to popular legends, bathing in its sacred waters frees one from the torments of death. Moreover the river accounts for more than 70% of Delhi's water supply. The waters of Yamuna described by Babur, as 'better than nectar' have turned sluggish and murky. The people bathe, urinate, wash clothes and perform other activities in the water of the river. There are stretches of river that have been declared ecologically dead, and we the people of Delhi are the murderers of our beloved Yamuna.

EFFECTS OF POLLUTION

The increased toxicities and filth piled up in the rivers have had adverse effects on these water bodies. The contaminated water has had a tragic effect on the fish in the river and subsequently on the arrival of migratory birds. The Ganga river dolphin is one of few species of fresh water dolphins in the world. Hydro-electric and irrigation dams along the Ganga prevent the dolphins from travelling up and down the river and is the main reason for their reducing population. Damodar considered 'sorrow of Bengal' due to its devastating floods, has now become the sorrow of both Jharkhand and Bengal owing to excessive pollution. Skin diseases, diarrhea, dysentery, respiratory illness, anemia and complications in child birth are very common to the local communities living along the stretch of Narmada.

Rise in quantities of nitrogen and phosphorus based chemicals in the river has lead to increased annual growth. This in turn has lead to a phenomenon called 'Eutrophication' that is harmful for aquatic life. Moreover, many types of cancer are common along the Ganges River. Overall, the pollution of Ganga is detrimental to the health of people who live off it, and needs to be cleaned before it's too late.

GOVERNMENT INITIATIVES

There is a magic in this planet and it is contained in the waters. Our earth is called a blue planet and it is up to us to preserve our rivers and protect them from the wrath of technology and modernization. A range of policies and laws have been introduced and implemented by our law making bodies to safeguard our precious rivers-

Yamuna Action Plan (YAP) to clean the dirtiest river of the country was formally launched in 1993, is one of the largest river restoration projects in India.

The 'Namami Gange Programme', is an Integrated Conservation Mission, approved by the union government with its key achievements as creating sewerage treatment capacity, creating river-front development, bio-diversity conservation, afforestation, industrial effluent monitoring and spreading public awareness.

The Sabarmati Riverfront project is an environmental improvement, social upliftment and urban rejuvenation project that will renew Ahmedabad. The project aims to reclaim the private river edge as a public asset and restore the city's relationship with its river. The Riverfront project presents a great opportunity to create a public edge to the river on t sides of Ahmedabad.

- ANSHITA , SHYNA , KANNAGI

CARBON CREDIT

The burning of fossil fuels is a major source of greenhouse gas emissions, especially for power, cement, steel, textile, fertilizer and many other industries which rely on fossil fuels (coal, electricity derived from coal, natural gas and oil). The major greenhouse gases emitted by these industries are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons (HFCs), etc., all of which increase the atmosphere's ability to trap infrared energy and thus affect the climate.

To slow down overall emissions of green house gases (GHG), and ideally, global warming itself, a variety of new financial markets emerged, offering businesses key incentives — aside from taxes and other punitive measures.

'Carbon credit systems' was a solution that came about near the end of the 20th century to limit GHG. Credits are awarded to countries or groups that have reduced their greenhouse gases below their emission quota. A carbon credit is essentially a permit that allows the receiver to burn a specified amount of hydrocarbon fuel over a specified period of time.



The carbon credit system looks to reduce emissions by ensuring that all countries keep their overall carbon emissions in check.

Emissions Balance



A key feature of this system is emissions trading, or cap-and-trade schemes. The scheme's governing body begins by setting a cap on allowable emissions. It then distributes or auctions off emissions allowances that total the cap. Member firms that do not have enough allowances to cover their emissions must either make reductions or buy another firm's spare credits. Members with extra allowances can sell them or bank them for future use.

An Example

Trees of the Future, an environmentalist group that works to reduce megatons of greenhouse gases from the atmosphere, plants enough trees to reduce emissions by one ton and is awarded a credit. If Hindalco, an aluminium producer, has an emissions quota of 10 tons but is expected to produce 11 tons, it can purchase the carbon credit from the environmental group.

The carbon credit system looks to reduce emissions by ensuring that all countries keep their overall carbon emissions in check. Bhutan is the only carbon negative country in the world. Thanks to Bhutan's massive tree cover, 72% of the country is still forested; the country has become a carbon sink. It means that Bhutan absorbs over 6 million tons of carbon annually while only producing 1.5 million tons.



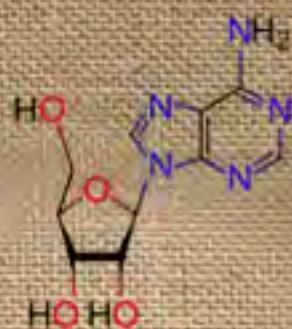
**MR. PRADEEP LOCHAN PANDA
(HOD PHYSICS)**

Sleepyheads Beware....

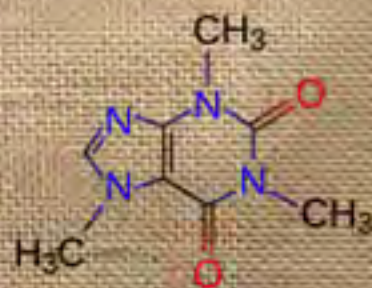


According to Dalai Lama, 'Sleep is the best meditation'. Alternating between sleep and consciousness is the result of the combined action of various chemicals in our brain and among the most important are melatonin and adenosine.

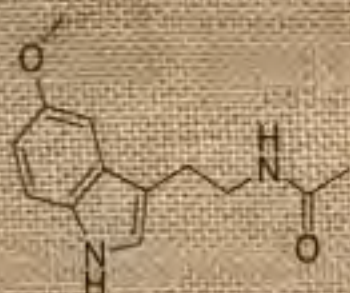
Adenosine is a by product of energy consumption by the body. It accumulates in the body throughout the day, generating a feeling of tiredness and sleepiness which marks the beginning of the sleep process and is then removed while we sleep, to wake up fresh. That's why we fall asleep easily after a tiring day andt feel tired when we don't get enough sleep. One of the strongest evidences of the role of adenosine in sleep is its competition with caffeine. Caffeine binds to the same brain receptors as adenosine, preventing it from acting, which explains why caffeine can prevent us from falling asleep. Imagine that we put chewing gum i.e. caffeine in a lock whose key is adenosine; we manage to open the door, but only after a few hours cleaning the lock.



ADENOSINE



CAFFEINE



MELATONIN

Melatonin, in turn, is a hormone produced by the pineal gland, a structure within the brain. The presence of melatonin in the brain inhibits the alertness and contributes to sleep. The production of melatonin is extremely sensitive to light: it is stimulated by the approach of night, but it's inhibited as soon as the retina detects light. The smallest amount of light reduces the production of melatonin, which is why we begin to wake up when the sun rises, or why there are people who can only sleep in complete darkness.

-DR. VAISHALI MISHRA
(HOD CHEMISTRY)

DRONES ON DEMAND



Recently drones have found a growing number of commercial applications like delivering packages, guiding routes, clicking selfies, providing internet access in remote areas. Drone on demand services are trying to make drone technology useful to consumers, as opposed to merely being relegated to solely aerial imaging. Drones can be requested to perform a multitude of tasks; from location scouting to personal security that can be undeniably helpful. The last couple of years have witnessed the widespread adoption of this technology for civilian use

FUTURE PROSPECTS OF DRONES



Rock & soil analysis



Delivery



Security



Agriculture

ECONOMY AND DRONES

With increasing traffic on roads it is important to find an easy and alternate way to get products and services delivered on demand. Realization of drones would make this dream come true. Drones on demand can be efficiently used if they are being shared by various individuals and companies.

**MS. SHIKHA SIKKA
(HOD BIOLOGY)**

And the NOBEL PRIZE goes to...



What is the NOBEL PRIZE

Since 1901, the Nobel Prize has been awarded for outstanding achievements in Physics, Chemistry, Medicine or Physiology, Literature and Peace. It manages the assets provided by Nobel for awarding the prizes. Each prize includes a medal, a cash award and a personal diploma.

The Nobel Prize is an international award which is administered by the Nobel Foundation in Stockholm. The foundations of the prize were laid in 1895 by Alfred Nobel, the inventor of dynamite, who wrote his last will in which he left most of his wealth to establish the Nobel Prize.



NOBEL PEACE PRIZE

Nobel Peace Prize for 2017 will be awarded to the International Campaign to Abolish Nuclear Weapons (ICAN). The organization is receiving the award for its work to draw attention to the catastrophic humanitarian consequences of any use of nuclear weapons and for its ground-breaking efforts to achieve a treaty-based prohibition of such weapons.



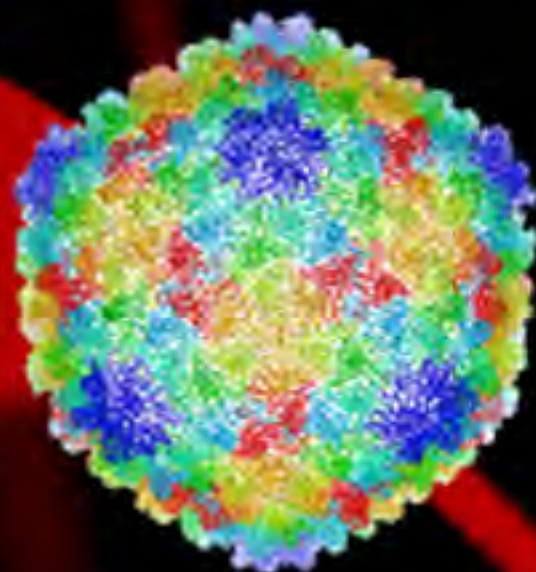
NOBEL PRIZE IN PHYSICS

The physics prize was divided, one half awarded to Rainer Weiss (Professor at MIT), the other half jointly to Barry C. Barish and Kip S. Thorne (Physicists at Caltech) "for decisive contributions to the LIGO detector and the observation of gravitational waves". They received the prize for the discovery of gravitational waves released in the world by violent events in the universe such as the mergers of black holes.

NOBEL PRIZE IN CHEMISTRY



The Chemistry prize was awarded to Jacques Dubochet (Biophysicist) Richard Henderson (Scientist) and Joachim Frank (Professor) "for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution" Cryo-electron microscopy is a technique that takes accurate and detailed pictures of living things at atomic scales. This is assisting scientists make high-resolution, 3D images that can help in cancer drug research and better understanding of the Zika virus. .



The 2017 prize was awarded jointly to Jeffrey C. Hall, Michael Rosbash and Michael W. Young "for their discoveries of molecular mechanisms controlling the circadian rhythm" The award celebrates the study of the tiny biological clocks in every living thing. The three American scientists "were able to peek inside our biological clock and elucidate its inner workings," the Nobel Prize Committee said. "Their discoveries explain how plants, animals, and humans adapt their biological rhythm so that it is synchronized with the Earth's revolutions."

NOBEL PRIZE IN MEDICINE



WORMS TO EAT AWAY OUR POLLUTION WOES

It turns out that the common wax worm can eat plastic. Also known as the *Galleria mellonella*, these worms may help reduce the waste caused by plastic bags. Each year, one trillion plastic bags are used around the world. They are

made from polyethylene -- one of the strongest kinds of plastic. The wax worm is the larvae, or young form, of an insect called the greater wax moth. These kinds of worms are also called caterpillars.



Bertocchini, a beekeeper, says she made the chance discovery after removing the worms from beehives, where they live. She put the worms in a plastic shopping bag, which became full of holes. Bertocchini worked

with other researchers from the Spanish National Research Council and Britain's University of Cambridge's Department of Biochemistry. She carried out experiments on the worms and found that the worms can "do damage to a plastic bag in less than an hour." When 100 worms were placed in a normal plastic shopping bag, the holes began to appear in just 40

minutes. After 12 hours, researchers saw “an obvious reduction in plastic mass.” According to the research a single enzyme produced by the worm is responsible for the chemical process that breaks down the plastic. They also found that the worms turned the polyethylene into a different organic compound called ethylene glycol. It is used in making polyester fibers as well as antifreeze for vehicles. It is not yet clear if the worms produce enough for commercial use.

Plastic is not the natural food for wax worms. But the researchers say that since they lay their eggs in beehives, the larvae feed on beeswax. Wax is a polymer, that has a chemical structure that is not dissimilar to polyethylene.



Researchers say they still need to better understand how wax is digested, or processed, in the worm. Finding that out could lead to a solution for dealing with plastic waste.



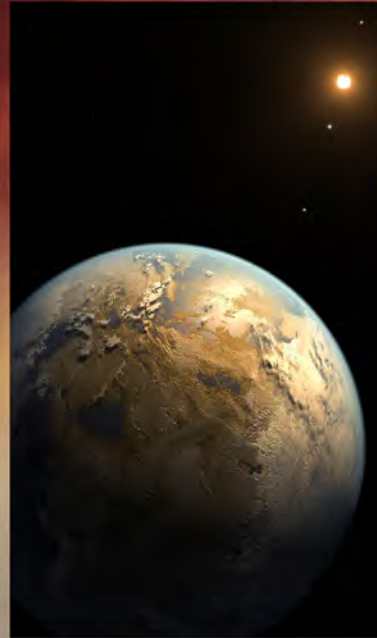
MS. SHIKHA SIKKA

“ THE COSMOS IS ALL THAT IS OR EVER WAS OR
EVER WILL BE . ”

- CARL SAGAN

What is Cosmos?

The cosmos is the universe regarded as a complex and orderly system; the opposite of chaos. Edwin hubble is regarded as the founder of cosmos. His discoveries changed the way mankind understood the universe



KEPLER 186 F

C O S M O S
A SPACETIME ODYSSEY

The Purpose

The cosmos forms the basis of all research in astrophysics and astronomy. It not only deals with questions regarding the space-time continuum but also serves a philosophical purpose of relating our lives to its real purpose, the origin of its existence and the possibility of an extraterrestrial species waiting to meet us, get to know us. The reaches of the cosmos extend farther than

what we anticipate for it contains secrets we have never ever dreamt of

HUBBLE
TELESCOPE



The question of Our Existence

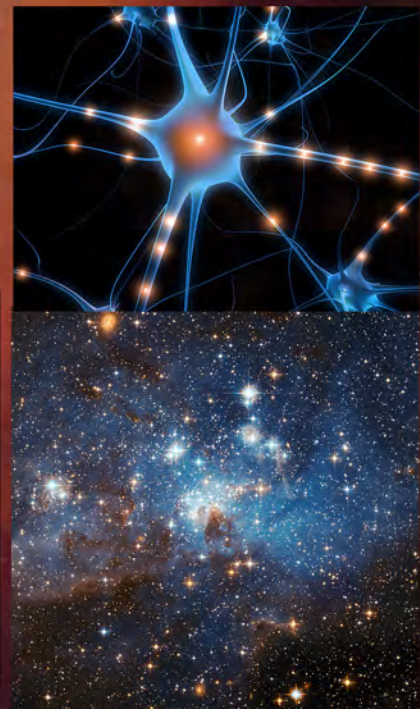
The entity regarded as the creator of the cosmos as we know it, is referred as God (Generator, Operator, Destroyer). The existence of such an entity allows us to provide an explanation to questions which challenge our very presence. Nevertheless, the presence of such an entity becomes important in moral life to keep a human in his senses of reality. However, a more scientific purpose is to find whether the presence of a creator is necessary to explain things which effectively happen based on simple laws. Popular theories which surround studies of cosmos suggest actions of such an entity to be random, playing with lives of beings like us. Consider this statement- "If God does exist and created this world, it would mean that he stands above of us. Then a question arises that after leading life as a powerful being, why would he create a world like this. Does he enjoy the sorrow of beings like us? If he is so powerful and gentle, why isn't there happiness throughout the

“NOT ONLY GOD PLAYS DICE, BUT... HE SOMETIMES THROWS THEM WHERE THEY CANNOT BE SEEN.”

“BECAUSE THERE IS A LAW SUCH AS GRAVITY THE, THE UNIVERSE CAN AND WILL CREATE ITSELF FROM NOTHING.”

- STEPHEN HAWKING

world.” It not only represents a possibility of the contradiction of our thoughts but also states that our well-perceived thought of God may just be an illusion. After everything, it is possible that God does play dice.



HUMAN
BRAIN

U
N
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E

INVENTIONS IN SCIENCE

WOOD PULP

BALLS

SOLUTION TO OIL SPILLS

Marine oil spill is one of the common disasters worldwide, which has long-lasting, negative impacts for economy and the environment. Researchers from Indian Institute of Science Education and Research (IISER) in Kerala wanted to look for methods that can both clean the water as well as recover the precious spilt oil and have found an inexpensive and efficient way to clean up marine oil spills by using marble-sized balls made of wood pulp.



The gelator repels water and only absorbs the oil. It congeals the absorbed oil, which could be recovered by applying pressure or through distillation. Each cellulose ball can absorb oil 16 times its own weight. After the oil is recovered, the left-over pulp can be recycled. All crude oils were instantaneously absorbed by the material.



LUNAR LAVA TUBES

FUTURE HOME

A city-size lava tube has been discovered on the moon, and researchers say it could serve as a shelter for lunar astronauts. The tube was discovered when the Japanese lunar orbiter SELENE—gathered data near the moon's Marius Hills skylight, which is the tube's entrance. Lava tubes are channels that form when a lava flow cools and develops a hard crust; this crust then thickens and makes a roof over a still-flowing lava stream. This lava tube could protect lunar-living astronauts from hazardous conditions on the moon's surface. Such a tube could even harbor a lunar colony. If the scientists' gravity analyses are correct, the lava tube near Marius Hills could easily house a large U.S. city such as Philadelphia.

'MOTH EYE' PHONE NO MORE GLARES

Unusual structures on moth eyes that help the insects see at night have inspired a new anti-reflection film for electronic devices. The new technology could help users see their screens even in bright daylight. The film significantly reduces glare as well as the need to duck into the shade to read what's on the screen.



The nature-inspired film is expected to be inexpensive to manufacture, he said, and has the added benefits of being scratch-resistant and self-cleaning. Users could finally rid their phones of the dust, fingerprints and grime that tend to collect on regular touch screens.

TINTO RANG A HOPE FOR RESEARCHERS

Researchers in labs often work with a number of chemicals and hazardous materials that could affect their health. Acid stains are used to test a number of chemicals that is probably carcinogenic. In March 2016, J Fathima Benazir developed a stain that, if replaced with acid stains, could help researchers reduce their exposure to harmful chemicals. The new stain called Tinto Rang.



**-UPALI
UPASANA
GIRI**

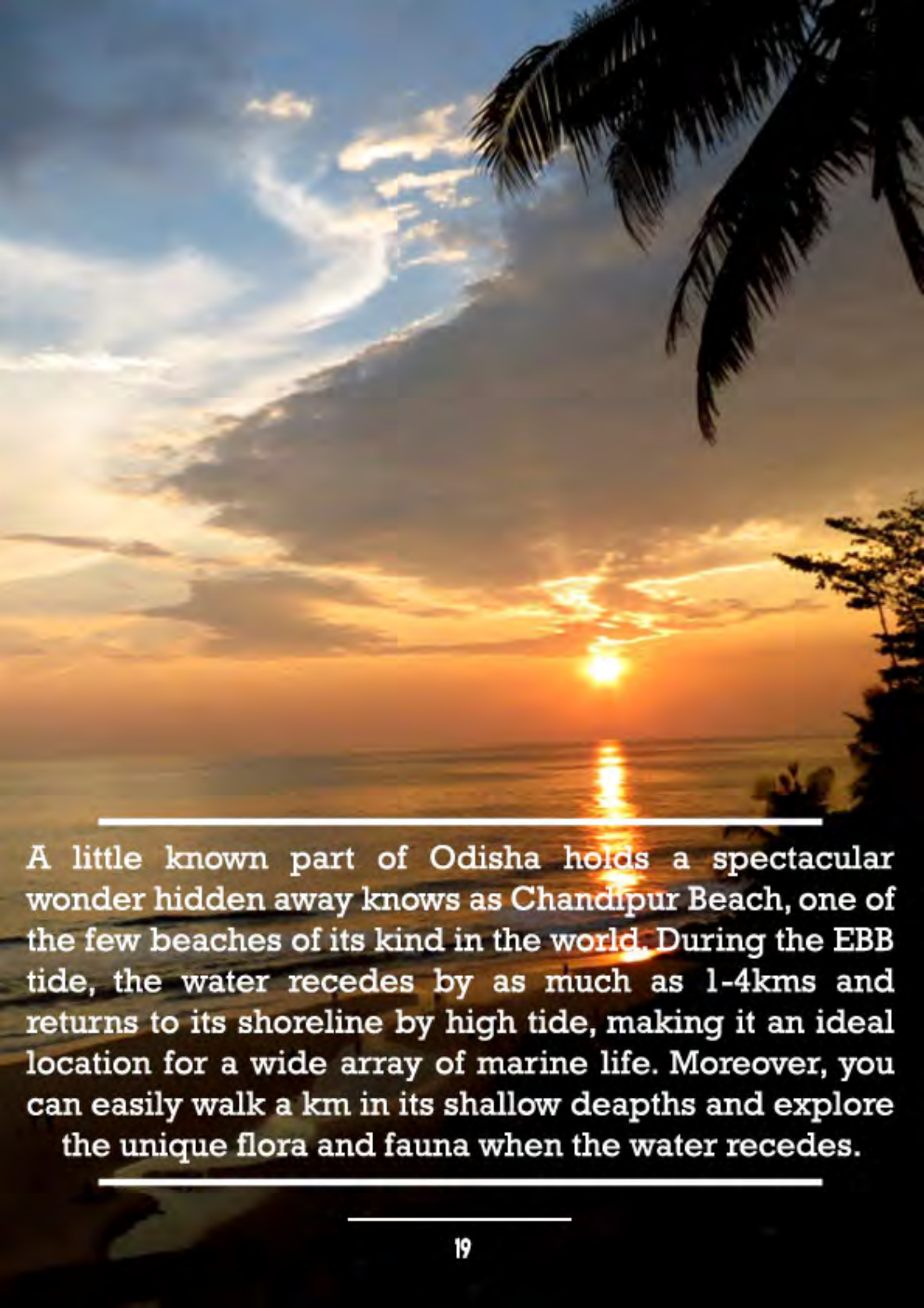
I have travelled
all my life
Through dark caves and illumine sites,
Overcome by my wonderlust
And my humane hunger for knowledge
My curiosity gives me strength
I am eve's sun
The desire to know the unknown
To find the unfound
Burns in my heart
Like an eternal flame
What can never burn out
Hence i elope from my home
To seek
To ask
And
To explore



The 7600 sq.km landmass in india is the largest salt desert in the world. It is completely uninhabited and home to one of the largest international borders of India. Apart from being aesthetically pleasant it is famous for its widely varying temperatures. It can go upto 50 degrees during the day and fall to less than zero during the night



About 30kms from Leh you will find a hill out of fantasy novels. The hill has magnetic properties, hence the name, it attracts magnetic elements and is said to move vehicles up the slope at the speed of 20kms/hr even when the engines are turned off. The reality though is quite different, it is explained as optical illusion caused by completely or mostly obstructed horizon. Hence judging the slope of a surface is difficult due to lack of reliable reference. The hill, while appearing upwards is slightly downward sloping



A little known part of Odisha holds a spectacular wonder hidden away knows as Chandipur Beach, one of the few beaches of its kind in the world. During the EBB tide, the water recedes by as much as 1-4kms and returns to its shoreline by high tide, making it an ideal location for a wide array of marine life. Moreover, you can easily walk a km in its shallow depths and explore the unique flora and fauna when the water recedes.

Air is the most important resource we need to survive. But in today's time every breath we take to live is slowly and steadily taking us closer to death. Polluted air has severe health hazards not only on humans but also on plants, animals and inanimate objects.

Major pollutants causing the drastic air pollution which blankets the planet are Carbon monoxide, Nitrogen Oxide, Carbon Dioxide, Lead, CFCs, Suspended Particulate Matter (SPM), and Sulphur Dioxide. Along with these, volatile compounds and Benzene accelerates carcinogenicity and are termed as air toxins. These components react rapidly with tissues and airways lining of lungs and cause a multiple of respiratory problems.

Air Pollution kills at least nine million people and costs trillions every year, which threatens the continuing survival of human societies. The vast majority of the pollution deaths occur in poorer nations and in some, such as India, pollution causes a quarter of all deaths.

DELHI IS INDIA'S ASTHMA CAPITAL

DELHI has the highest levels of Respirable Suspended Particulate Matter (RSPM) among the four metros, exposing its residents to a greater risk of asthma than people elsewhere in the country.

Acceptable levels of RSPM should not be more than 60 microgram (mg) per cubic meter (cu m) annually. In 2008, Delhi's

By Meenal Dubey in New Delhi

RSPM was recorded at a shocking 149 mg/cu m, according to a report published by the Central Pollution Control Board (CPCB) with the help of data collected between January and August 2008.

This is well above Mumbai's RSPM mark of 118 mg/cu m, Kolkata's 104 mg/cu m and Chennai's 54 mg/cu m.

It is no secret that India's capital is highly

Turn to Page 6

Who Breathes While The City Chokes

The rising of temperatures and ozone holes are problems which have attracted the most attention of scientists all over the world. Fluorides and Smog are responsible for various types of injuries to plants. They interfere with the photosynthesis and respiration of plants. Similar impact of ozone can be seen in the lesions to plants. The most dramatic early instances of plant damage were seen in the total destruction of vegetation by sulphur dioxide in the areas surrounding smelters. Air pollution can also cause damage to property and materials. The smoke, grit, dust and oxides of Sulphur have harmful effects on structures.

“

IT IS THE CRUCIAL FOR THE LIFE IN YOU, IT IS DECISIVE FOR THE LIFE YOU LIVE, AND YET EVERYDAY IS AN EFFORT TO BREATHE.

”



**CITIZENS
WORRY AS
THE AIR
DETERIORATES**

Delhi world's **most polluted**

The most recent impact was observed by the national capital of India, Delhi in the most catastrophic manner. For several days now, the bustling South Asian metropolis has been blanketed by a dense haze that has reduced visibility in parts of the city to just a few hundred meters. Even in the middle of the afternoon, it is hard to make out the color of traffic signals at some of the city's busier junctions. But it is still warm – although the evenings are growing cooler, daytime temperatures remain at above 80°F – and the gray pall enveloping the city has a sharp burning smell, tastes like dirt and makes eyes water.

That's because the haze isn't winter fog – it's smog, a dangerous mixture of pollutants that has returned to the city with record force. Delhi's air quality has been deteriorating for years. Breakneck growth, coupled with scant official regard for the environmental impact of the city's rapid expansion, has turned it into one of the world's most polluted urban centers.

The city is regularly choked in thick fog as an array of traffic and heavy industries throw 3,000 ton of pollutants into the air every day. Delhi's landlocked geography, unlike the coastal cities, magnifies the impact of these factors.

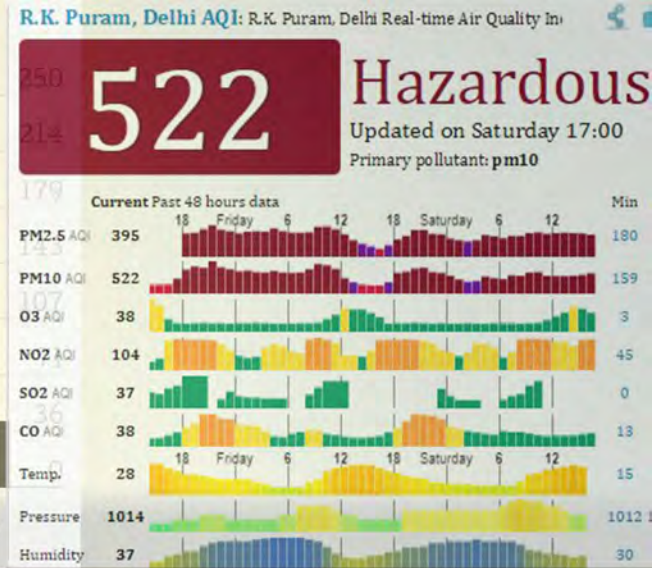
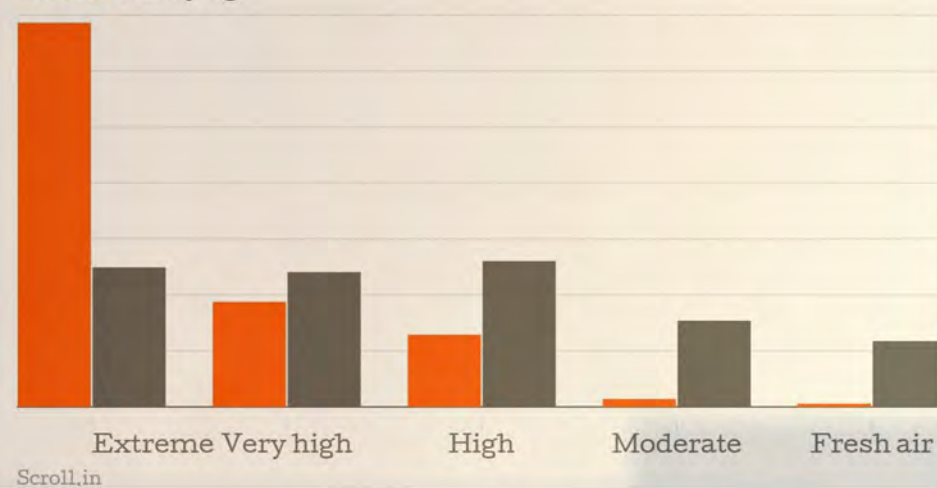
The problem tends to worsen in the autumn and winter months, when pollutants belched out by the city's industrial areas and growing swarm of cars are supplemented by fumes from firecrackers burnt during Diwali.

Winds usually blow the pollutants and particulate matter away, helping to clear up some of the smog. But with no winds, the pollutants remain stagnant in the air.

In addition to this the giant fires lit by farmers in neighboring states to clear their lands for the winter crop-planting season add to the annual scourge, spreading smoke across northern India.

**-SANCHITA, UPALI
SHYNA, KANNAGI**

Days per year of different pollution levels in the two cities
 ■ Delhi ■ Beijing

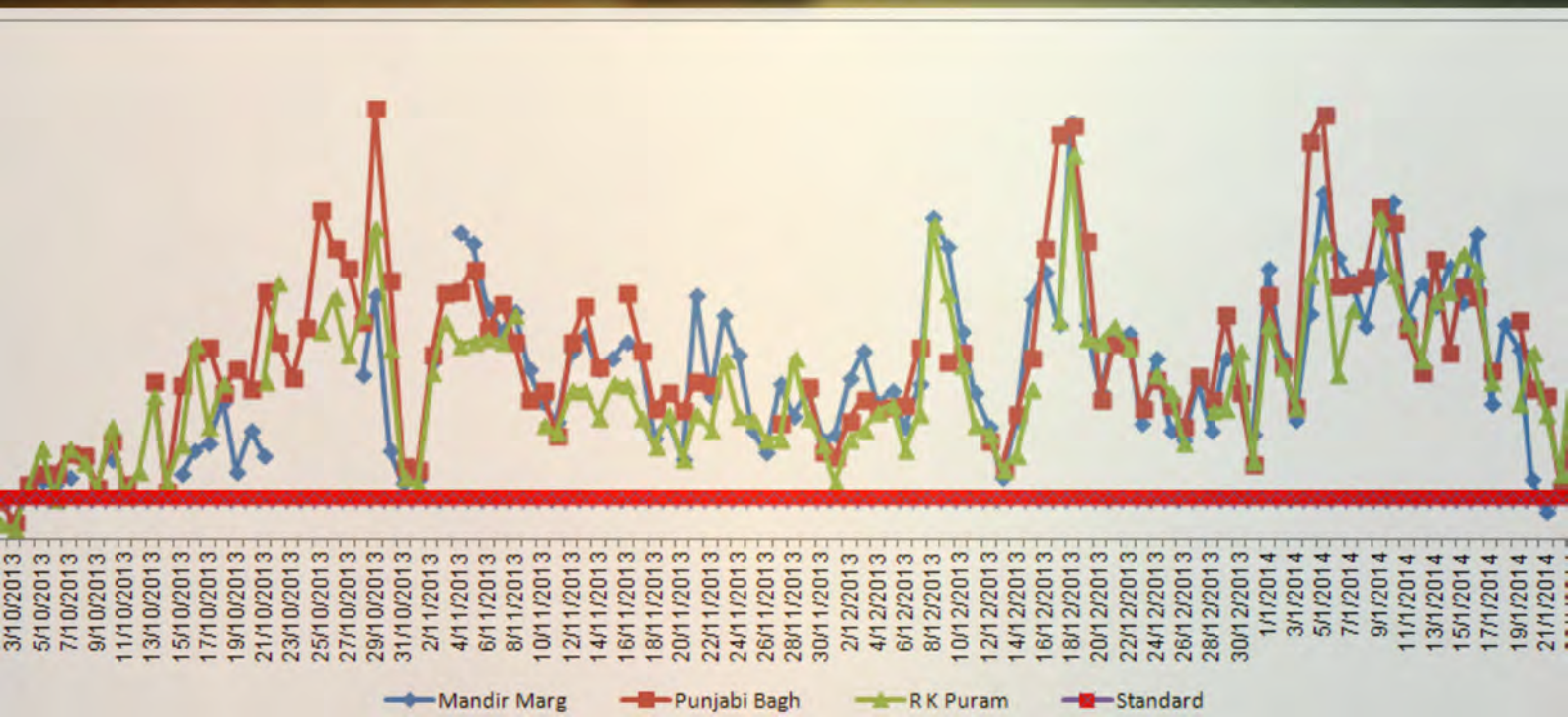


As we talk about the current situation the air quality has been "severe" as pollution levels touched a new high. Levels of particulate matter finer than 2.5 micrometers (pm2.5) crossed the 900 mark in some areas, recording almost 15 times the safety limit. The centre has introduced a set of measures which include- Another round of odd-even initiative, shutting down Badarpur coal plant for 10 days, five day ban on all construction and demolition in the city and diesel generators and water sprinkling on roads.

The Delhi government has also asked the Centre to consider cloud seeding, a process that induces artificial rain that can help settle pollutants and clear the smog. The efficacy of the process is, however, debatable.

The adverse effects of such a pollution emergency gives us a tentative to work towards the decontamination of the air

It's on to us now- choke to death or cleanse your breath.



HAS IT CROSSED YOUR MIND?

- 64 Say only begrudgingly
65 Western mil. alliance
66 Wedding word
67 Dried plums
68 Imbecile
69 Prankster

DOWN

- 1 Maternity ward
3 "Monty Python and the Holy Grail" emblem
5 Oakland N.E.L.'er
6 Wheel turner
7 Astron., e.g.
8 Eponym of the city now known as Istanbul
9 Like St. Augustine vis-à-vis all U.S. cities
10 Show off at Muscle Beach

PUZZLE BY JOHN LIEB

- 31 Shakespeare play that begins "Now is the winter of our discontent"

- 52 Legally
53 Car showroom sticker initials
54 The "A" in

DOWN:

1. type of glass that is highly resistant to heat
2. method of growing plants without soil
3. study of which organism is called saurology
5. non-stick cooking utensils are coated with this
7. closest galaxy to earth
8. inert gas used by sea divers

ACROSS

4. smallest flightless bird
6. solvent of gold
9. ozone layer lies in which layer of atmosphere
10. metal causing itai itai disease
11. instrument used for measuring wind speed
12. poorest conductor of heat

ANSWERS:
Across
4. Kiwi, 6. aquaregia, 9. stratosphere, 10. cadmium, 11. anemometer, 12. lead
Down
1. borosilicate, 2. hydroponics, 3. lizards, 5. tellur, 7. andromeda, 8. helium

SOUND OF MUSIC

MICHAEL SHUTCMAN / EDITED BY WILL SHORTZ

- 68 Scholars believe that "A Midsummer Night's Dream" by William Shakespeare was composed a decade after it was performed
- 9 Chicago director
10 Erika
11 Daria
12 "The Rocky Horror Picture Show" model

SCI-COM

THE FLAKE EQUATION:

FRACTION OF PEOPLE WHO
IMAGINE AN ALIEN ENCOUNTER
BECAUSE THEY'RE CRAZY OR
WANT TO FEEL SPECIAL

PROBABILITY
THAT THEY'LL
TELL SOMEONE

AVERAGE NUMBER
OF PEOPLE EACH
FRIEND TELLS THIS
'FIRSTHAND' ACCOUNT

FRACTION OF PEOPLE WITH
THE MEANS AND MOTIVATION
TO SHARE THE STORY WITH
A WIDER AUDIENCE (BLOGS,
FORUMS, REPORTERS)

$$P = W_p \times (C_r + M_z) \times T_k \times F_o \times F_i \times D_r \times A_u \approx 100,000$$

$(7,000,000,000)$ $(1/10,000)$ $(1/10,000)$ $(1/10)$ (10) (10) $(9/10)$ $(1/100)$

WORLD
POPULATION

FRACTION OF PEOPLE WHO
MISINTERPRET A PHYSICAL
OR PHYSIOLOGICAL EXPERIENCE
AS AN ALIEN SIGHTING

AVERAGE
NUMBER
OF PEOPLE
THEY TELL

PROBABILITY THAT ANY
DETAILS NOT FITTING THE
NARRATIVE WILL BE REVISED
OR FORGOTTEN IN RETELLING

EVEN WITH CONSERVATIVE GUESSES FOR THE VALUES OF THE VARIABLES, THIS SUGGESTS THERE MUST BE A HUGE NUMBER OF CREDIBLE- SOUNDING ALIEN SIGHTINGS OUT THERE, AVAILABLE TO ANYONE WHO WANTS TO BELIEVE!



The atomic
symbol for
confusion

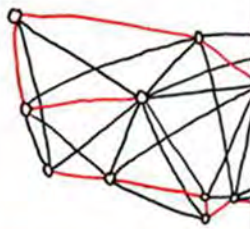
WHAT DO YOU CALL AN ACID WITH AN ATTITUDE?

gimme ur lunch

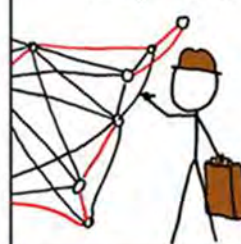


A-mean-oh acid.

BRUTE-FORCE
SOLUTION:
 $O(n!)$



DYNAMIC
PROGRAMMING
ALGORITHMS:
 $O(n^2 2^n)$



SELLING ON EBAY:
 $O(1)$

STILL WORKING
ON YOUR ROUTE?

SHUT THE
HELL UP.



THE EVOLUTION OF THE PARASITE



KDELKA.

Help! Help! I'm dissolving!

But bears are insoluble...

That's easy for you to say...
You're not Polar!

Source: Internet

Science Week



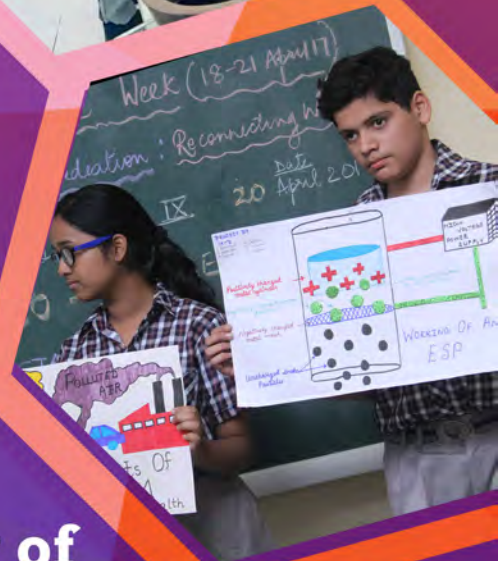
Display of prepared herbal lotion bars and room fresheners.



Awareness drive



Students preparing and selling herbal products



Display of SWACHHTA SWAG by the students



Sanjeevni Vatika



**Basics of
plantation
being
explained to
students.**



**An effort to save
our earth**



THE EDITORIAL BOARD



OUR PATRON-MS. SUDHA ACHARYA

We, the students & teachers of the Science Department would like to express our profound gratitude to our respected Principal Ma'am and the esteemed school authorities for being a constant source of support and providing us with this opportunity of making "Vigyanavartan" possible

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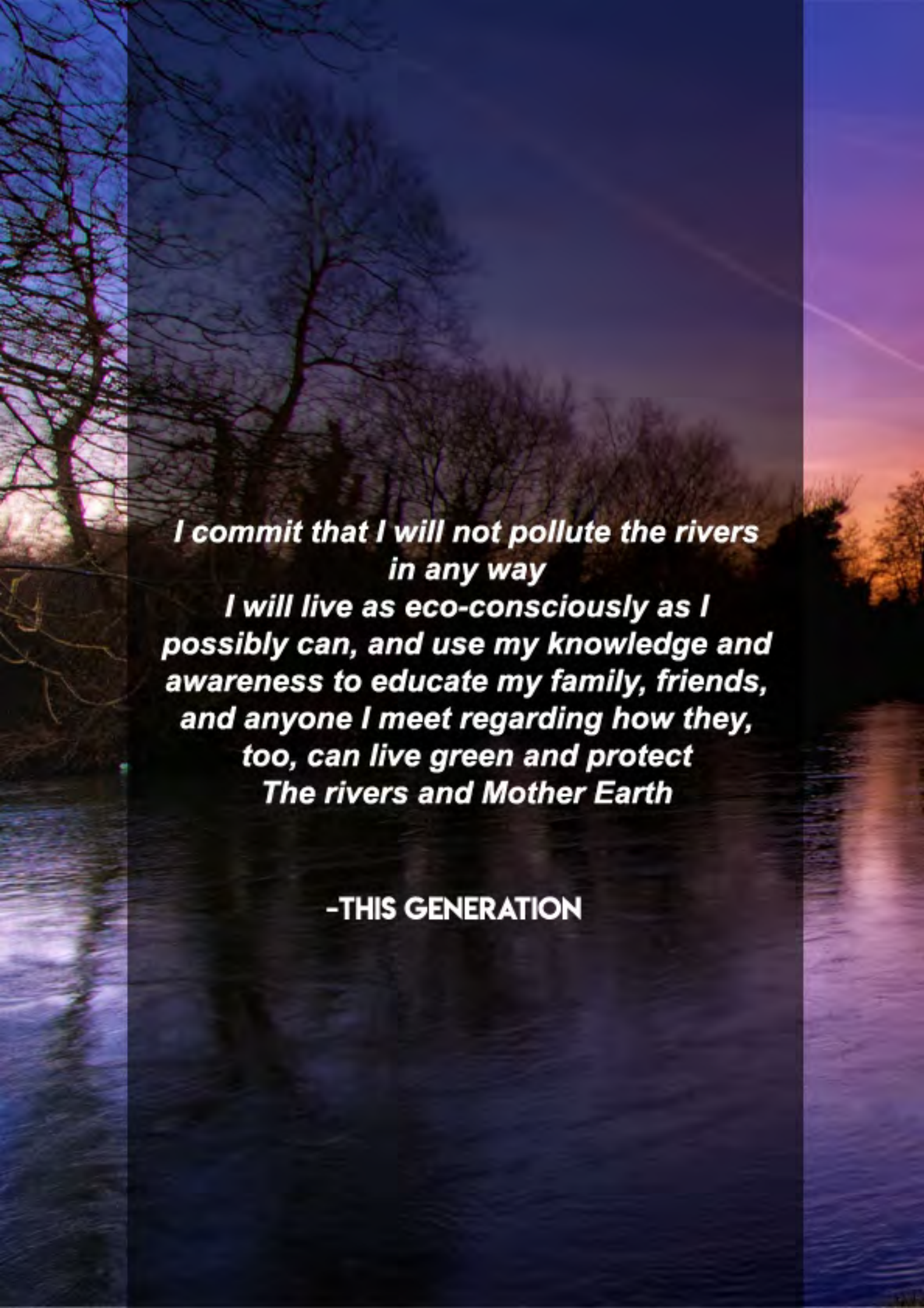
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A vertical photograph of a river at sunset. The sky is a mix of deep blue, purple, and orange. Bare trees line the banks, their silhouettes reflected in the calm water. The text is centered in the middle of the image.

***I commit that I will not pollute the rivers
in any way***

***I will live as eco-consciously as I
possibly can, and use my knowledge and
awareness to educate my family, friends,
and anyone I meet regarding how they,
too, can live green and protect
The rivers and Mother Earth***

-THIS GENERATION