EVOLVERE

2018-19

Picture by- Vibhuti, III year

THE WEB OF LIFE

POOJA, IIIrd YEAR

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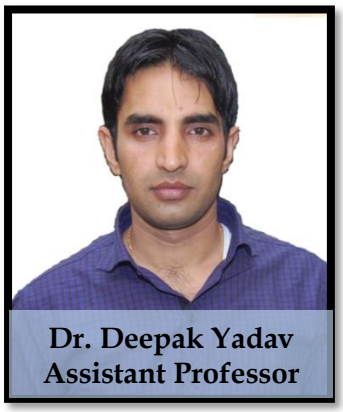

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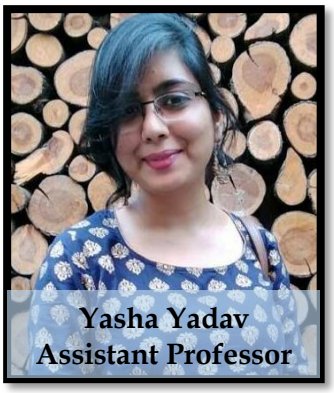

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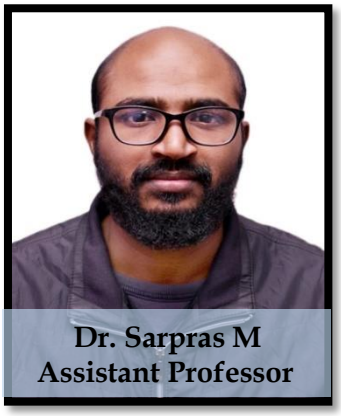

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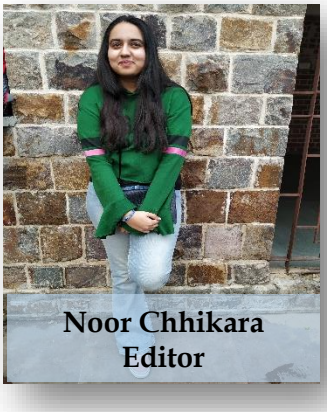

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Message from Staff Advisor

I congratulate the Editorial team members on the release of ***Evolvere,*** the Annual Department magazine of Zoological Society, ***Synapse***. ***Evolvere*** embodies the potential and the literary skills of our students.

The magazine is a blend of thoughts of our students in the form of articles on contemporary science, paper review, movie reviews, interesting facts on science and creative writing in the form of poems. This year also, a special section has been included in the magazine dedicated for students to share their essays and memes.

I appreciate the editorial team for their determined efforts in bringing out the magazine and making ***Evolvere*** innovative and inspiring.

Blessings to our dear outgoing batch of 2016-2019 and sincere wishes for their success!

Dr. Monika Sharma

(Staff Advisor, ***Synapse*****)**

President's Note

Now you understand
Just why my head's not bowed.
I don't shout or jump about or must talk real loud.
When you see me passing, it ought to make you proud.
I say,
It's in the click of my heels, the bend of my hair,
The palm of my hand, the need for my care.
Cause I'm a woman
Phenomenally.
Phenomenal woman,
That's me.

Maya Angelou

Another year gone by, and here we are with the tenth edition of 'EVOLVERE: THE UNFOLDING'. It's been a wonderful year with so many memories to look back to. We collected all those memories and now we present them to you. Time flies fast, it seems like only yesterday that I took admission to this college and here we are, all set to bid adios. This department has given me so many memories to cherish and many memorable lessons. Miranda has metamorphosed me into an individual very different from the one who had entered the college three years back. During these three years I have seen SYNAPSE evolving. Every year, Zoology Department welcomes the amateurs and transforms them into penmen of their own destiny and fulfil their dreams.

With the release of our magazine 'EVOLVERE' we hope to bring forth the fine artists of our department. This edition would not have been possible without the able guidance of our Teacher-in-charge Dr. Monika Sharma and our Staff Advisors- Dr. Pooja Suman and Dr. Deepak Yadav. I would also like to congratulate our Editorial Board including the Editors- Anubhuti Krishna and Noor Chhikara and the

Co-Editors- Devanshee Prakash and Jasmine. At last I would like to thank my fellow mates who contributed to this magazine in every way they could. Kudos to each one of you.

Editor's Note

'Happiness can be found in the darkest of times, if only one remembers to turn on the light'

- Albus Dumbledore

This year was like a roller coaster ride, one with many up-downs and unexpected turns. But one thing that got us going was working on the magazine and waiting for this amazing piece of work to take shape, all in a good time. Evolvere 2018-19, stands on the ground that creation gave us a web, where everything is interconnected, and we owe our lives to a lot of beings that goes unnoticed. We take forward the message that both science and art is bridged by one thing, creativity. That creativity is an amalgamation of the thousands of words that moulded this work of art.

This couldn't have been possible without the utmost support from our Teacher-In-Charge, Dr. Monika Sharma and our Staff Advisors, Dr. Pooja Suman and Dr. Deepak Yadav.

We congratulate the whole Editorial board, Student's council and the entire department for the successful completion of this year's edition.

As Evolvere completes a decade of existence with the 10th edition, we promise that it will only grow more and remain the enigma it always was.

NOOR CHHIKARA

ANUBHUTI KRISHNA

EDITORS

EVOLVERE (2018-19)

To explore the circle of life,
welcome to the science side.

LESSONS TO LEARN FROM WILDLIFE

Anthropocentrism is a belief that regards humans as the most important and evolved entity on the planet. But there is no denying the fact that even if we do believe in this idea, we still have a lot which we can learn from the wildlife around us. So here are five crucial lessons that wildlife can teach us -

Lesson no. 1–To never fall into self-pity

An intriguing quote from *D.H. Lawrence* says– "I never saw a wild thing sorry for itself. A small bird will drop frozen dead from a bough without ever having felt sorry for itself."

Man, of all animals, has a great propensity for self-pity, despite a better availability of resources. The struggles are not less for animals in the wild and the biggest scuffle is to find food.

Zavodovski Island near Antarctica is inhabited by chinstrap penguins. The island is an active volcano. Adult chinstrap penguins take turns to guard the chicks and gather food. In order to do that they have to move through treacherous waters and high cliffs, risking death. Many, when they return with food are bloody with broken bones, but this is what life is like on the island and they continue the struggle without an ounce of self-pity.

A chinstrap penguin covered in blood, returning from a treacherous fish catch

Lesson no. 2-To learn to accept change

"To go with the drift of things,

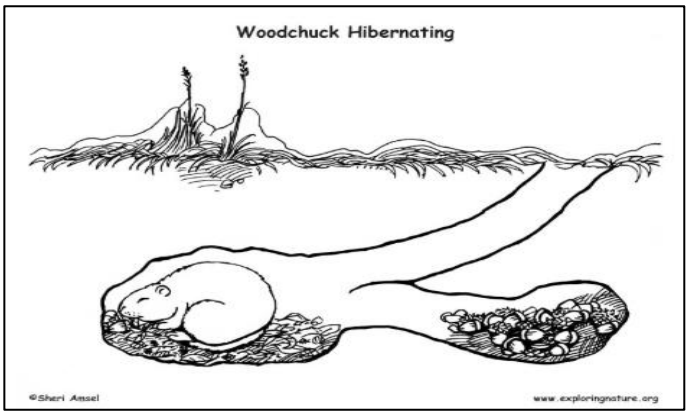
To yield with a grace to reason,

To bow and accept the end of a love or of a season." – *Robert Frost*

Change is inevitable and is synonymous to life and growth. One can learn adaptability from animals. They readily adapt themselves to changing environmental conditions.

Winters are harsh, temperature drops, snow covers the ground and food becomes harder to find for most animals. Animals undergo many adaptations to survive in severe winters. Woodchucks, also known as groundhogs are rodents found in North America. A woodchuck's heart rate goes from 80 beats per minute

while active to 4 - 5 beats per minute when it is hibernating, and its body temperature drops from 98 to 38 degrees Fahrenheit. Also, their incisors, which grow continuously and are kept short by gnawing, stop growing while they are hibernating.



<u>Lesson no. 3</u>-To Persevere (turning a setback into a comeback)

"Everyday is a fresh beginning,

Listen my soul to the glad refrain.

And, spite of old sorrows

And older sinning,

Troubles forecasted

And possible pain,

Take heart with the day and begin again."- *Susan Coolidge*

The male Baya weaver bird is no less than an architect. It weaves a complex hanging nest which has two chambers and heat shield mechanisms. During the building process, which takes the male around 18 days, it makes several trips to collect the grass strands. Midway in the building process, a female would come to inspect the nest. If she is satisfied with the nest, she accepts the advances of the male after which he completes the nest and they breed, but if she rejects the nest, then the male tears up the whole structure and starts building the nest afresh.

The male perseveres in making the nest again and again despite rejection until one female finally accepts his build and makes it a home.

The male Baya weaver bird displaying its craftsmanship in building a complex hanging nest

<u>Lesson no. 4</u>- To be Orderly and Industrious

“If you always try your best,

Then you’ll never have to wonder,

About what you could have done,

If you’d summoned all your thunder.

And if your best was not as good,

As you hoped it would be, you still could say,

‘I gave today all that I had in me’ “- *Barbara Vance*

We know of several hardworking animals in the animal kingdom including the social insects such as ants, bees, termites, wasps and fishes such as cleaner wrasse which tirelessly clean fellow aquatic creatures. Birds display their industriousness while building nests and raising their young. Young orangutans are nursed by their mother until they turn five years old and continue to remain dependent on her until 9 years of age. The mother feeds them, finds food for them, carries them, defends them and builds a treetop bed for them every single night. That is one hardworking mother. However, orangutans are now under serious threat due to habitat loss for palm cultivation.

A female orangutan with its baby on a tree nest she built

<u>Lesson no. 5</u>- To believe in teamwork and synchrony

“There is a blackness like a furl of smoke

Hurtling and twisting fast across the sky-

It shudders and explodes

And shards of shrapnel fly upwards,

Bursting, bursting, then condense,

Cascading down, and cresting to bespatter

The air above us as the starling scatter,

And then the flock implodes,

Flattens once again, and forms a cloak

Of undulating wing-beats, recompense

For having had the sense

To go outside and see the things that matter."- *John Beaton*

Animals display amazing teamwork and coordination. One such spectacular display of teamwork is an avian behavior called murmuration. The flock of birds moves in such a dramatic display changing shape to look like a wisp of smoke or a tornado at one point or a thundercloud the very next moment. The collective dance of the birds is a sight to behold. The birds which are famous for such a dazzling display are starlings. These birds show this wonderful synchronization to protect themselves from predators by evasive manoeuvres.

Murmuration display by starlings

The lessons to learn from wildlife are uncountable, the more we observe and appreciate it, the more we realize to live in harmony with nature.

Yasha Yadav

Department of Zoology, Miranda House

CAN WE BLAME CHANGING WEATHER CONDITIONS FOR OUTBREAKS OF DEADLY HUMAN DISEASES?

Worldwide anthropogenic activities are bringing about drastic changes in the earth's climate. It is estimated that average global temperature will rise from 1 to 3.5°C by the year 2100 increasing the global spread of many human, particularly infectious diseases. The temporal and spatial changes in temperature, precipitation and humidity are expected to occur under different climate change scenarios. This will affect the biology and ecology of vector and intermediate host and consequently the risk of disease transmission.

Weather extremes like floods are usually accompanied by outbreaks of infectious diseases such as cholera, dengue and malaria. In fact, malaria cycles have been strongly correlated with the El Nino cycles in India. El Nino is a climate cycle in the Pacific Ocean with a global impact on weather patterns.

Outbreak of Ebola virus in West Africa is associated with long dry periods followed by excess precipitation. Increase in rainfall also promotes spread of vector-borne diseases indirectly by increasing the number of larval habitats and food supply. Less rainfall can increase vector breeding sites by causing stagnation of water in rivers.

Increase in temperature reduces breeding time and decreases the incubation period of the pathogen, e.g. dengue virus. It affects the probability of transmission by altering behaviour of the vector and human populations and increasing biting behaviour of the vector and by the production of smaller adults which require multiple blood meals in order to reproduce.

Various factors such as land use change (such as deforestation, expansion of agricultural and hydropower projects) and overall increasing trend towards urbanization also influence spread of deadly diseases and increase the interaction between host and pathogens. Thus, is it the cumulative effect of all these factors along with changing weather conditions that is responsible for a drastic increase in the outbreaks of the infectious and vector borne diseases such as H1N1 Avian Influenza, dengue, malaria, ebola, cholera etc. Let's analyse the impact of changing climate on the emergence of some of these diseases in greater details.

Increasing temperatures expand the range and increase the prevalence of cholera, a water-borne diarrheal disease both geographically and temporally. Bacterial strain, *Vibrio cholerae* O1 is responsible for majority of outbreaks whereas *V. cholerae* O139 is confined to South-East Asia. Outbreaks of cholera have occurred in India, Bangladesh, Latin America and Africa. The pathogen is viable at high pH, sunlight, salinity conditions and low soluble iron. The bacterial populations are commonly seen in aquatic environments in association with plankton blooms. A strong correlation existed between the onset of cholera epidemics and increase in sea surface temperatures.

Avian Influenza is a contagious, deadly, zoonotic disease that infects birds and some mammals. The disease is caused by Avian Influenza (AI) virus. Its outbreaks lead to severe economic losses, especially due to H5N1 and H1N1 viruses. A highly pathogenic strain, H5N1, is deadly to domestic and wild birds as well as

humans and can mutate into a strain that spread from human to human. Movement of H5N1 from region to region is largely driven by the poultry trade. Changes in climate, such as severe winter storms and drought can disrupt normal movements of wild birds and bring wild and domestic bird populations into greater contact at water sources.

Under future climate change, AI outbreaks will be higher in China, Malaysia and the United States that produce a high proportion of poultry meat or products. Outbreaks are higher in regions with higher density of ducks. The risk of AI outbreaks increases as future temperature and precipitation changes. The outbreak risk is increased in areas with lower temperature and higher humidity. The risk of AI outbreaks will increase as climate change impacts migratory patterns of birds

Malaria is the most widespread and severe climate sensitive vector-borne disease of the developing countries. The transmission of disease is by *Plasmodium falciparum* and *P. vivax* that are endemic in parts of tropical Asia including India. In Asia, malaria is associated with high temperature and rainfall. Temperature increases lifespan, decreases maturation time and increases biting frequency, hence leading to an increase in the number of mosquitoes. The maturation of malarial parasite inside a mosquito is faster. Rainfall creates mosquito breeding sites for development of eggs and larvae. Humidity increases the lifespan of mosquitoes. In Australia, malaria outbreaks are associated with floods. Urban developments also seem to impact the transmission of the disease. In addition, negative impacts of climate change on economic growth of a country favour the spread of malaria. Currently, all of India's population is at risk for contracting malaria except for those in the areas having a greater altitude than 1700 m above sea surface.

Dengue is a mosquito-borne viral infection. There has been a 30-fold increase in the number of dengue cases over the past 50 years. There has been more than 50 dengue outbreaks reported in India since 1960. The dengue outbreaks are seasonal, associated with warm and humid weather. In Asia, high levels of dengue are correlated to El Nino events. Higher temperatures increase rate of larval development and shorten the emergence of adult mosquitoes, increase the biting rate of mosquitoes and reduce the time required for virus replication within the mosquito. Heavy rainfall may flush away eggs, larvae, and pupae from containers in the short term but residual water can create breeding habitats in the longer term. Temperature and humidity influence the number of blood meals and affect the survival rate of the vector, and the probability that it will become infected and able to transmit dengue.

Ebola Virus Disease is a contagious and deadly zoonotic disease which is caused by Ebola hemorrhagic fever virus. It is spread through infected intermediate hosts (bats, chimpanzees and other primates) and through contaminated body secretions and fluids. Outbreaks occurred in Central Africa and West Africa and are associated with lower temperature and higher absolute humidity. The virus can live for years in animal populations (such as bats and monkeys). Virus enters human populations under scarcity of food when poor communities consume infected bush meat. Dry seasons followed by heavy rainfalls produce an abundance of fruits encouraging aggregations of bats and apes facilitating spread of disease. Social mixing and hunting in wet seasons promotes transmission. Climate change expands the range of migratory fruit bats while land use changes increase spread of Ebola Virus Disease.

Japanese Encephalitis (JE) is a mosquito-borne arboviral infection that is caused by flavivirus. The disease is prevalent in South-East Asia and the Western Pacific regions. Worldwide, 67,900 cases are reported annually with about 50% from China. In India, 24 states are endemic for JE with maximum contribution (75%) from Uttar Pradesh. Temperature and precipitation are correlated with vector density. In UP, JE

cases usually start in the month of June and reach a peak in September and decline thereafter. Agricultural practices and density of virus amplifying hosts such as pigs also play a major role. JE virus may never be completely eliminated due to the migratory nature of their natural host birds.

Melting of permafrost soil in tundra due to global warming has raised concerns about the sudden revival of the many ancient deadly bacteria and virus lying dormant there. An incident of several deaths reported from Siberian Tundra in the year 2016 due to Anthrax infection raised alarms about the possible resurgence of Anthrax bacteria due to thawing of permafrost. In the above case, thawing had exposed the carcass of a reindeer which had died due to an Anthrax infection. Thus, there are high chances of resurgence of those diseases that have been eradicated completely from the world like small pox due to melting of permafrost soil.

In the present scenario, it is evident that changes in climate affect weather conditions and can increase the frequency or severity of extreme weather events such as storms, floods, drought, cyclones etc. Also, changes in temperature, precipitation patterns, and extreme weather events could enhance the spread of some diseases. Outbreaks of vector-borne diseases, in particular coincides with the onset of extreme weather conditions. Variations in the climate regime of the area also results in changes in the human animal interactions enhancing the transmission of the zoonotic diseases from animals to humans. A warmer and unpredictable climate is largely responsible for the emergence, resurgence and redistribution of several human diseases.

Thus, for the benefit of mankind, it would be imperative to develop a warning system to predict the emergence of diseases in response to weather extremes. Such predictions would help to initiate mitigation efforts to control the spread of the diseases. In developing countries like India health providers can play a role in anticipating the health effects of climate change and improving the health by discussing effective preventive health care with their patients.

Jyoti Arora

Department of Zoology, Miranda House

MOSAIC MINDS

From iconic movies like Psycho to iconic characters like The Hulk, we have stumbled upon quite a few pop culture creations through the years, ones we couldn't identify with and if someone did relate to them, they would probably be in an asylum by then.

Dissociative Identity Disorder (DID), also very commonly known as split personality disorder, is a mental disorder where two distinctive personality traits exist in one individual with these personalities often not being aware of each other's existence. With two minds sharing one brain a memory gap is created and one personality does not remember any memory created by the other. As scary as it sounds, it is real and has been documented worldwide on several occasions. It stands as one of the most controversial of neurobiological and behavioural disorders and is still thought to be a work of fiction by many professionals. As if things weren't already so complicated, people with split personality also carry with them the brunt of other problems such as extreme anxiety, bipolar disorder and substance use disorder.

The sheer bizarreness of this disorder almost begs us to ask the question as to how can one split his/her soul?

The answer to this can be that either the person concerned knows what Voldemort did and if not, which is usually the case, the person must have endured some trauma. Facing such situations can cause one to develop another personality to cope with the situation. It is a way for them to escape as they feel helpless otherwise. An alternative hypothesis has been proposed that it is a result of various psychiatric treatments, especially hypnosis.

DID has also been a part of many legal proceedings wherein the convict pleads guilty on the premise of insanity defence. This is still considered a make-believe claim to ensure vindication and has been shaded by its sceptical media portrayal. Misuse of DID in several criminal cases has only aggravated the disbelief.

The alters of a person battling with DID have their own autobiographical memory, different initiatives and a sense of ownership over individual behaviour. The alters may even speak different languages which one never learned, they may have different talents that one never had before. Claims like these make it more arduous to shape something like this into reality.

A very famous account of this disorder can be seen in the 2016 film, SPLIT. It revolves around the main character who suffers from DID, one body with an amalgamation of 24 distinct personalities. It very creatively links the issue of child abuse and the ramification which follows.

In 1976, a woman living in New York was diagnosed with DID and during her therapy sessions her alters showed up one by one, all 44 of them. The woman, Julie Castelli, is now a strong advocate for people suffering from this disorder.

Another famous case is of Kim Noble from Great Britain who was physically abused from a young age. She struggled with depression throughout her youth and started developing multiple personalities in her mid-twenties, some of them so destructive that while driving her car, one of her alters took hold and crashed into already parked cars. She used to hear voices in her head and claimed that they were controlling her, one moment she was there and suddenly she woke up in a hospital bed.

Call it insanity or call it tragedy, all it really looks like is fear of oneself. Going to sleep as an artist waking up as a serial killer, being ten years old one day and 40 years old the other, cutting an apple for yourself one moment and slicing your wrist the next.

Split personality can be treated with the right therapy but one fear a therapist always has is that after the therapy, the patient should not feel like a new person.

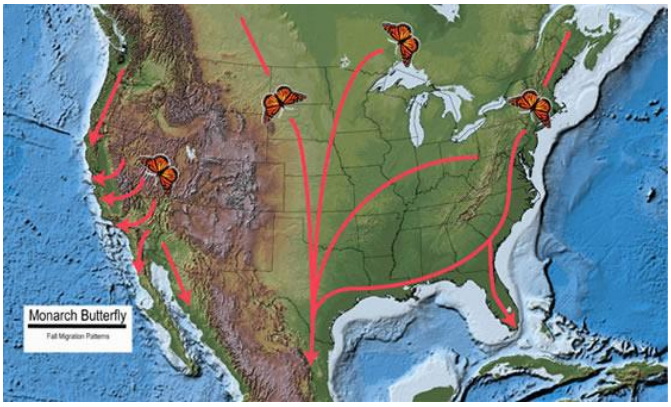
Noor Chhikara

BSc. (Hons) Zoology – III Year

THE WAY BACK HOME

The animal kingdom is an epitome of perseverance. No other phenomenon makes a more compelling case for this statement than that of animal migrations. Animal migration is the relatively long-distance movement of individual animals mostly as part of a group and usually on a seasonal basis. These migrations can be attributed to several reasons such as changes in the local environment and climate leading to unfavourable conditions for the animals, decreased availability of food due to seasonal variation in production or to find a mate. A wide array of animals migrates including insects, fishes, birds and mammals. Whatever may be the reason, each migrator undertakes an amazing journey and has its own fascinating story to tell.

THESE TINY WINGS TELL A TALL TALE



The migration of the Monarch butterflies across the continent of North America is one of the most spectacular natural events on the Earth. Grasping fully well the concept of strength in numbers, they migrate in millions from the north-eastern part of the continent to southern and western regions to survive the cold winters. They commence their annual migration in the fall and cover close to 3000 miles - an incredible feat for such a minute being. They migrate primarily along two routes - the Monarchs that have their summer breeding grounds east of the Rocky Mountains migrate to Mexico and spend their winter in the oyamel fir forests whereas the ones to the west of the Rockies make home in the eucalyptus forests of California. The major cues to migrate come from the environment with the advent of the fall - decreasing temperatures and shortening of the photoperiod. These trigger the mass movement of the butterflies to

their respective wintering grounds where they spend the next few months waiting for the cold weather to pass. Once temperatures begin to rise and conditions become favourable, the Monarchs begin their northward journey back to their breeding grounds. However, this is where the Monarch migration gets really interesting. As the Monarchs move north, they mate and give rise to a new generation of butterflies when they encounter milkweed plants - plants suitable for the caterpillars to feed on and hence grow. This usually takes place in Texas for the first time. These new generation of butterflies then take on the next leg of the journey giving rise to yet another generation on encountering another patch of milkweed. Hence the Monarchs that had left the previous fall are not the ones that return the next year - the returning butterflies are in fact four or five generations removed from them and yet still reach the same spot where their ancestors had once begun their journey. This is believed to be achieved using the location of the Sun and the Earth's magnetic field as an indicator for direction. And if this weren't curious enough there is yet another great oddity that surrounds the Monarch migration - the butterflies moving south complete the journey in eight months and remain as the same individuals whereas the ones moving north complete their life cycle and give rise to a new generation every 5-7 weeks. This is despite the fact that the two migrators belong to the same species.

These tiny butterflies are living proof that no matter how small you may be, the challenge is always smaller if you just rise up and seize the day.

UP, UP AND AWAY

The bar-headed goose is all for testing the limits when it comes to its annual migration. These birds nest in regions of Central Asia and migrate to Southern parts of the continent, including India, for the winters. And they do this in no ordinary fashion - they fly over the Himalayas to make it to their wintering grounds in the peninsular country. These geese have been reported to fly as high as 23,000 feet above sea level while covering this leg of their journey making them the highest-flying birds. At these heights they test the physiological limits of flight with the oxygen levels dropping to only 10% of what they are at sea level and the air being unbearably thin for flight. To combat these conditions, these magnificent birds display a wide array of physiological as well as behavioural adaptations enabling them to achieve this most unattainable of feats. Among the physiological adaptations the two that play a pivotal role are as follows - firstly, their haemoglobin has a far greater capacity to bind to and carry oxygen than human haemoglobin and secondly, the left ventricle which pumps blood to the body is supplied with a much denser capillary network to provide these aerobic muscles with enough oxygen so as to be able to maintain a stable cardiac output. Both of these physiological modifications help counteract the severe hypoxic conditions these birds must endure on their journey over the Himalayas. A few behavioural adaptations also serve these birds well. These majorly include that the birds fly mostly at night when the temperatures are low and hence the air is denser, they fly in giant V-shaped formations in which each bird attains a part of its lift from the aerodynamics of the bird flying in front of it thus reducing consumption of energy and that they fly in a rollercoaster fashion - they attain height only to then come down close to the sides of the mountains thus using the deflected air from these surfaces to carry them forward and then rise again. This too serves to conserve great amounts of energy which is essential considering that when they fly over the Himalayas, they do it in one go without stopping for so much as a meal.

So if ever you feel that something's not possible, look up at the sky. You might chance upon one of these

birds that says to everything impossible that anything is possible.

IT'S ALL IN THE HEAD

For a creature their size and with enough strength backing them to virtually attain anything that fancies their imagination, including flattening an entire forest, elephants truly are gentle giants. They live in closely-knit herds and are highly intelligent beings. The herd, unlike most other animal societies, is led by the eldest female, that is, they follow a matriarchal system of leadership. Entire herds of elephants migrate with changing seasons as availability of food and water dwindles. Ever heard that elephants never forget? Well, it's true. This is especially significant when it comes to their migration and it is exactly what makes their journey so incredibly unique. The migration in elephants relies on the matriarch's memory of previously taken routes to waterholes as the ones present locally dry out. In this sense, the survival of the entire herd depends on the ability of the matriarch to guide the herd to food and water based on her memory alone. Now ain't that a bit of matrilineal magic.

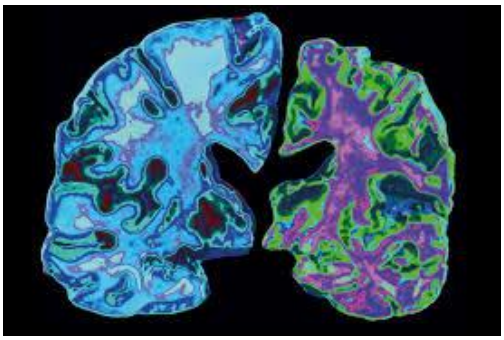
Anubhuti Krishna

B.Sc. (Hons) Zoology – III Year

NEVER TICKLE A SLEEPING PERSON!!!

Alzheimer's disease is a progressive brain disorder in which brain cells die leading to dementia and loss of thinking abilities. It is the leading cause of dementia.

Amyloid beta and tau proteins are the two proteins in the brain that have been focused upon in Alzheimer's research. Amyloid beta protein is involved in learning and ability of the brain to change and adapt, and tau protein is involved in maintaining normal signalling between neuronal cells. Build up of amyloid beta and tau tangles in the brain are the two hallmarks of Alzheimer's patients.



Research studies have found that one single night of sleep deprivation leads to elevated levels of amyloid beta in the brain. This is consistent with the normal fluctuation pattern of the protein that occurs before and after sleeping. Research has also shown that sleep disruption leads to increase in levels of tau protein in the brain. These findings suggest that sleep might help in eliminating excess of amyloid beta before it gets accumulated in brain cells and forms amyloid plaques in brain that may lead to Alzheimer's.

Sleep deprivation also leads to increased production of tau protein, as much as 50%, in the cerebrospinal fluid which is a marker of injury to the nerve cells. The tau protein is found tangled in the brain of Alzheimer's patients.

These findings led researchers to suggest that increased production of amyloid beta and tau protein and their reduced elimination is a primary factor contributing to the development of Alzheimer's disease.

In this fast-paced life people are least concerned about their health and their sleeping hours have been reduced. They are not getting rest which their body needs and that may have led to reduced mental health. A quality sleep is what is needed to eliminate these toxic wastes from our bodies. These findings pave the way for studying and understanding other neurodegenerative disorders and their treatment.

Neelima Sharma

B.Sc. (Hons) Zoology – III Year

ANIMAL ETHICS

For centuries, animals have been the subject of every conceivable experimentation and humans are the only ones responsible for it. Humans might be the most superior beings on the planet, but does it mean we have the right to exploit the rest? How humans have developed to be so selfish and greedy is pathetic and saddening at the same time.

Try and imagine yourself being chained for the rest of your life. Imagine not being able to run under the sun and a life where you get no chance to raise a family. Ever had a thought on what happens in a slaughter house? Imagine the terror of the young goats who died for a piece of mutton. What is the fate of the mother cow who just gave birth to her calves? Are they going to make a meal out of her or is she ready for another round of torture and turmoil? What that sinless pig must be thinking when the butcher was preparing the captive bolt ready to cut open its lifeless body?

The little bunnies, the small chicks, the tiny mice, they all feel pain. Humans just cannot go on comparing size with the extent of pain an animal suffers. Humans can't bear even a tiny cut in their skin, then shouldn't we take a moment and think about the animals cramped in laboratories, whose eyes are subjected to new chemicals and whose skins are scratched and tested upon every day.

What humans are building is nothing more than a stock of suffering animals. Yes, cloning mentally disturbed animals is what we have ultimately come up with. These genetically modified animals would be constantly made to suffer until humans find effective drugs to cure diseases that they themselves have been suffering from.

I ask you this - does significantly reducing human sufferings morally justify hurting or killing of innocent lives?

It is high time that we, as human beings stop violating the rights of other creatures and show some concern about our falling ethical standards.

Mayanglambam Pooja Devi

B.Sc. (Hons) Zoology - III year

LIFE UNDER WATER IS DROWNING IN INDUSTRIAL CHEMICALS

Life under water is under constant threat. All this is due to the toxic substances made by us. We have carelessly destroyed the ecosystems for our comfort. More than half of the world's killer whales are threatened by a group of toxic industrial chemicals that accumulate in their blubber and can be passed on from mother to calf. Many Killer whale populations found in the most polluted seas around Japan, Brazil, the UK or in the northeast Pacific are reported to be "tending toward complete collapse".

Polychlorinated biphenyls (PCBs) are the chemicals which are leading to this vicious cycle. PCBs came into use in the 1930s because of their many applications in the commercial sector. Seeing the problematic nature of PCBs towards the environment, scientists decided to put an end to their use around 1970s. They were mainly used in the electrical industry because of their inability to conduct electricity and their highly stable nature. They were also used as sealants and had many other industrial applications.

The second and a major problem is that PCBs tend to work their way up the food web. They start accumulating in ever higher concentrations as tiny animals (and their unwanted chemicals) are eaten by small animals, who are eaten by larger animals (who take on those same chemicals), and the cycle continues. This process of "biomagnification" is most evident in marine food webs where fatty tissue like blubber (a home for PCBs) is an important feature of animals at the top of the food web such as killer whales.

The complex foodwebs in northern oceans, particularly around Europe and North America (where most PCBs were produced and used) are undergoing subtle alterations. Predators like sharks, large fish or killer whales are changing their diets and exploiting new prey, which in turn alters their exposure to PCBs and other contaminants.

What can be done? Unfortunately, it is impossible to remove the existing PCBs from oceans.

Our key objective is to maintain surveillance of these chemicals, whether they be in air, water, soil or animals. In the most developed countries, end-of-life action ensures that old industrial materials with PCBs are subject to high temperature incineration (an effective way of ensuring complete destruction). Also, the grossly contaminated industrial sites are subject to expensive clean-up and incineration activities.

The legacy of PCBs will continue to haunt us for some while to come. Scientists have estimated that the final resting place or “sink” for PCBs is likely to be organic rich soils across the Northern Hemisphere or even ocean sediments. However, these substances continue to cycle around the environment and are still present in mother’s milk.

LIFE UNDER WATER is very essential for the earth’s ecosystem.

The oceans cover more than 70 per cent of the surface of our planet and play a key role in supporting life on earth. They are the most diverse and important ecosystem, contributing to global and regional elemental cycling, and regulating the climate. The ocean provides natural resources including food, materials, substances, and energy.

It is the need of the hour to move towards sustainable development and take immediate measures to prevent further deterioration of our ever so precious ecosystems.

Jasmine

B.Sc. (Hons) Zoology -II Year

CLIMATE CHANGE & ITS EFFECT ON THE ANIMAL KINGDOM

What is climate change and why do we need to care about it? In simple words, climate change is the change in global climate patterns caused mainly due to the increased atmospheric carbon dioxide level. And we need to care about it because we, humans, are the reason that climate change is happening at such an accelerated rate. According to the estimates of the World Health Organisation, if the current trends continue, climate change will result in 2,50,000 additional deaths per year between 2030 and 2050.

So, what is the major cause of climate change? Global warming, which in turn is caused by the greenhouse effect. The greenhouse gases have heat trapping characters and hence absorb the heat from sunlight and trap it in the Earth’s atmosphere thereby increasing the temperature. Greenhouse effect is a natural phenomenon but the increased emission of greenhouse gases, especially carbon dioxide, has caused increased heat trapping thus causing global warming.

Impact of climate change-

The evident effects of climate change are global temperature rise (since 19th century average surface temperature has risen about 1.62 degree Fahrenheit), warming of oceans (0.4 degree Fahrenheit rise in temperature of top 700 m of ocean since 1969), shrinking ice sheets, glacial retreat, decreased snow cover, rise in sea levels, etc. All these have adversely affected all life forms.

How has climate change affected the animal kingdom?

Most of the organisms belonging to the animal kingdom have been affected by climate change and the impact has mostly been negative. It has forced much of the animal population to leave their natural habitat in search of a more comfortable home leading to increased wildlife-human conflict. According to a report by World Wildlife Fund, population of mammals, birds, reptiles and amphibians has declined by 60% since 1970 because of climate change. Not just these groups but marine life (corals, fishes, etc.) and insect population have also been adversely affected.

Impact on few organisms being affected by climate change:

- **Corals**

High marine water temperature has caused coral bleaching which can lead to coral death. According to UNESCO, the coral reefs in all 29 reef containing heritage sites would cease to exist by the end of this century if greenhouse gas emission continues at this rate.

- **Insects**

Many insect species use thermal cues to match the timing of life history events with changing season. Thus, the warming temperatures have affected insect life cycles. Climate change affects insect development, reproduction and survival and has caused a major shift in the geographical range of insect populations (shifts in insect pest species have also affected crops of the area adversely). Insects are a vital part of this ecosystem and climate change has caused decline in insect species which is only accelerating more and more with time. Insects also play a major role in pollination which is also affected due to climate change.

- **Fishes**

Higher water temperature has caused decreased availability of dissolved oxygen in many parts of the sea and this has affected fish distribution. This is also causing shrinking of hundreds of fish species both marine and fresh water.

- **Amphibians**

1/3rd of the amphibian species are at risk of extinction and many like golden toad, harlequin frog, etc. are already extinct. Climate change majorly affects the species with narrow range of tolerance.

- **Reptiles**

Climate change affects many varieties of snakes, lizards, crocodiles and turtles. The reproduction in lizards is linked to the seasonal temperature changes, alteration in which causes reproductive failure. In some snakes like rattlesnakes, climate change has made climatic range smaller. Rising sea levels has

caused problems for sea turtles which lay their eggs on the beaches. Increasing temperature has also caused a turmoil in the sex ratios as in sea turtles sex of the offspring is determined by nest temperature.

- **Aves**

Global warming has greatly affected the migration patterns of birds. Warming temperature has forced many bird species to shift northwards. Birds at higher risk are of the species depending on high elevation forest habitat, long distance migratory birds and coastal breeders.

- **Mammals**

Mammals at a higher risk are those that have special requirements for snow, sea ice and those with narrow range of tolerance. Climate change has pushed many mammalian species on the verge of extinction and some of them are: Polar bears (affected due to melting of glaciers), American Pika (affected due to sensitivity to temperature and water balance stresses), etc.

Climate change also adversely affects human beings, yet we are the ones causing it. Instead of keeping ourselves in check, we curse nature for the major devastations occurring all around us. In the words of John Milton, "Accuse not nature, she hath done her part; do thou but thine." We need to stop the condition from worsening.

If the current trend of climate change continues, it has the potential to obliterate life on the only planet that nurtures it. We need to prevent climate change for the sake of this planet and our future generations. Many steps have been taken to combat climate change globally like Kyoto Protocol, Paris Agreement, etc. but there's still a long way to go.

Srijan Singh
B.Sc. (Hons) Zoology- ll Year

MICROBES AND THE BRAIN

Every time we make a cheek cell smear, we find some bacteria on our slide when we view it under the microscope. Likewise, bacteria can be found in various other tissues and organs of the body like lung, gut, skin etc. These microbes associated with humans along with their genes are termed as human microbiota. These microbes coevolved and coexist with humans. Thus, it isn't wrong to call humans a "superorganism" or "holobiont".

The brain and gut are connected via hardwire connections consisting of vagus, spinal nerves, spinal cord and their ganglia. These hardwire connections form brain-gut axis. Along with the gut microbes, this axis is termed as microbiota-gut-brain axis through which bidirectional communication occurs between gut microbes and brain. Communication occurs through the formation of neuroactive chemicals like brain neurotransmitters in their structure, that is, short and long chained fatty acids of bacteria (bacterial metabolites). So, gut microbiota can modulate mood, behaviour, immune response, peristaltic movements in gut and overall brain chemistry. Not all bacteria are involved in communication. This suggests that balanced gut microbiota composition is utmost necessary for efficient body functioning. Any deviation from normal gut microbiota composition affects the communication between gut microbes and brain, thus, lead to a diseased state. Hygiene hypothesis also supports this concept. During stressful conditions, the gut microbiota composition balance gets disturbed causing gut dysbiosis. This often can result in an

inflammatory condition. On studying the microbiota composition of healthy individuals and those suffering from Parkinson's disease, it was observed that there is a change in microbiota composition in Parkinson's patients. Altered microbial population of gut increases production of rogue proteins leading to Parkinson's disease. Altered gut microbiota can also lead to autism. Moreover, the germ-free mice exhibit impaired social behaviour. Certain microbes, if ingested, can reduce or inhibit visceral pain induced by gut distension in rodents. For example, *Lactobacillus rhamnosus JB-1* reduces visceral pain perception due to altered signalling in dorsal root ganglion. In germ free mice, reduced neuron density and increased proportion of myenteric net region neurons is observed.

Use of probiotics helps to restore/improve gut microbiota composition thus improving brain- microbiota communication and thus, improving health of individuals.

In November 2018 in a poster presentation at the Annual Meeting of the Society for Neuroscience, neuroanatomist Rosalinda Roberts of The University of Alabama in Birmingham (UAB) talked about her lab's recent finding about microbes which are either inhabiting or penetrating healthy human brain cells. Her lab examined brain tissue of healthy individuals and those suffering from schizophrenia and looked for differences. On observing these healthy and schizophrenia infected brain tissue slices at higher power, they could see bacteria inhabiting or even penetrating brain cells. Initially, they thought there may be some contamination or problem with preservation technique used for those samples or possibly the microbes in blood leaked into brain tissue after the mice were killed. So, to re-check, they took healthy mice brains and germ-free mice brains which were preserved immediately after mice death. They could observe bacteria in tissue sections of healthy mice brains but not in germ free mice brain tissue sections. On further examination, they observed that these bacteria were present near astrocytes and myelin sheath of neurons. RNA sequencing data suggested that these bacteria belonged to 3 main phyla of gut- Fermicutes, Bacteroidetes and Proteobacteria. This suggests that either they were gut microbes which could pass blood-brain barrier and interact with neurons or they may constitute brain microbiota. More studies need to be conducted to have better understanding of these microbes found in the brain.

Nevertheless, this does indicate that gut microbes are important for healthy neuronal interactions. Disruption of gut microbiota due to any factor like antibiotic consumption, diet etc. can take a toll on brain health and thus, affecting overall health by modulating brain chemistry. This reiterates the importance of maintaining a healthy gut microbiota and having a healthy diet.

Sakshi Saini

B.Sc. (Hons) Zoology- ll Year

ETHICAL CONSIDERATIONS OF USING GENETIC MODIFICATION IN SPORT

Genetic engineering, also known as genetic modification, is the direct manipulation of an organism's gene using biotechnology. It has the potential to synthesize artificial hormones and correct genetic diseases, making it an invaluable resource for research and healthcare. Gene therapy can also be used as a method of performance enhancement in sports to create "super-athletes".

Two types of genetic modifications exist. The first is somatic gene modification which deals with treating or changing gene cells in an adult. The second is Germ line therapy in which changes are made prior to birth and all manipulations become hereditary. The principal function of this is to treat genetic disorders and hereditary diseases. Another application of this technique is to alter embryos to incorporate desired genetic characters to produce physical excellence, which can be used as "gene doping" in sports.

Very little research exists on the application of genetic technology (or gene doping) for the benefit of sports, but several pieces of research on the theoretical implications of this technology have been published. These indicate that many ethical implications need to be examined before considering the implementation of this technology. Arguments both for and against the use of this fairly new technology need to be examined before we can conclude about the practicability of using genetic modification in sports.

There are several practical, health and ethical reasons against the use of gene doping. Since there is no definite ideal body type suited for all kinds of sports, parents must make genetic choices for their children prior to birth. This takes away the individual's right to be able to choose a sport of his or her own choice. Another concern is that genetic engineering is risky for overall health. Preliminary tests on gene modification have been unpredictable, and it is still not certain how the body would react to gene therapy. Also, genes are not destiny. Other factors like ambition, diet, willpower, practice, training and environmental conditions play a role in the success of a sportsperson. Therefore, gene doping is not a fool proof method. A major concern about genetic modification is that it could have unexpected consequences and alter sports in permanent ways. The new class of humans that would result from germ line enhancement would interact with un enhanced humans in sport, thereby creating a potential disadvantage for the unenhanced. This would create a state of inequity and question the fairness of sport. An additional normative argument against the use of gene doping revolves around the issue of privacy. Genetic engineering involves testing of genes and DNA. If genetic modification becomes acceptable in sports, guidelines regarding the protection of personal info, especially DNA, would need to be established due to the confidential nature of this information. Expanding beyond sport, the lack of privacy in this matter could lead to genetic discrimination from life or health insurance companies.

Research also exists that supports the idea of genetic modification in sport. Modified athletes would reach higher, unimagined levels. This would bring more excitement to sports and increase the fan base. Moreover, genetic modification would ensure pure competition in sports as the physique of players would be predetermined, and outcomes would depend entirely on psychological, moral and intellectual strength. Supporters of gene doping claim that genetic modification should be experimented with as it is our responsibility to use scientific knowledge to improve physical wellbeing. It is impossible to look into the future, so there is no way to know the actual benefits or harms of using genetic technology for performance enhancement. However, just keeping the status quo for the sole purpose of fearing risk or change does not allow for improvement.

The conflicting nature of the above arguments indicates that a concentrated effort needs to be made to determine the risks and benefits of genetic modification in sport. Policy makers and governing bodies should stay engaged in dialogue to determine what kinds of genetic modification, if any, are acceptable in sport and additional research needs to be done in this direction. The need of the hour is to maintain the relevance of sport in modern times while ensuring the safety of the individual.

Devanshee Prakash

B.Sc. (Hons)Zoology- ll Year

AIR POLLUTION IN DELHI - NOT JUST A SEASONAL CRISIS

Introduction

The industrial and technical advancement in India leading to its development at a high pace after India's historical struggle for independence has come at a great environmental cost.

According to the Global Environment Performance Index (EPI) 2018, developed by Yale University and Columbia University, India is ranked 177 among 180 countries linked to its poor performance in the public health category and the number of deaths due to air pollution, showcasing its inability to maintain a healthy ambience. Also, India has 9 out of the 10 most polluted cities of the world.

Furthermore, Delhi has been tagged as one of the most polluted capital cities of the world with an unhealthy Air Quality Index (AQI) swinging mostly in 'poor' and 'very poor' categories. This quality of air is experienced by people throughout the year, but the condition just becomes worse in winters when fog envelops the city converting into toxic smog. Over the years, Delhi's problem of air pollution has become more complex. The population of Delhi is basically living in a gas chamber with lethal air quality.

A lot of factors contribute to the poor AQI in Delhi with the condition worsening during a few months. The majority of blame is attributed to burning of paddy straw by farmers and fire crackers during the Diwali festival in the months of October and November. But stubble burning by the farmers in neighbouring states is episodic and lasts for a few days only and the Diwali festivities also contribute to the poor Air Quality Index (AQI), but they are not the sole reasons of pollution.

Air pollution in Delhi is a complex reaction which involves various industries as catalysts, including the transport industry, industrial emissions, biomass burning and dust. Furthermore, political will also adulterates the AQI.

Air Quality Measurement Facts-

According to the WHO, air pollution is the fifth largest killer in India. There are a variety of ways in which the air pollution of an area can be measured. One of the ways is the measurement of particulate matter in air. Particulate matter is a mixture of extremely small particles and liquid droplets like acids, chemicals, gas, water, metals, soil dust particles, etc. These particles cause major health hazard in India. The changing temperature and slowing winds trap soot, dust and fine particulate matter. The particulate matter is present in a variety of sizes ranging from coarse, fine, to ultrafine.

Most important to note is PM2.5 (particles with a size less than 2.5 micrometres) readings recorded by forums and government organizations during environmental studies. These particles are emitted by various sources like industrial exhausts, vehicular emissions, forest fires, rapid construction, agricultural burns, volcanic eruptions, etc. They are considered to be the most dangerous even more than their PM10 counterparts because they can stay in the atmosphere for long due to light weight and small size thereby increasing the chances of humans and animals inhaling them into their lungs, eventually leading to respiratory and cardio-vascular disorders.

- According to the Ambient Air Pollution (AAP) report for the year 2018, Delhi had PM 2.5 pollution levels which are one of the highest in the world. This result was based on the monitoring of PM measurement of outdoor air pollution from almost 1,600 cities in 91 countries.
- Last year, a public health emergency was declared in Delhi as pollution levels crossed 70 times the safe limit.
- The **UN Environment Programme's recent report titled 'Air Pollution in Asia and the Pacific: Science-Based Solutions'** has sounded a warning, pointing out that **only 8% of the population** in the countries of the region get to breathe air of acceptable quality.
- One study of **degradation of Delhi's air** over a 10-year period beginning 2000 estimated premature mortality to have **risen by as much as 60%.**

Sources of Delhi's degraded AQI -

According to research conducted by the Automotive Research Association of India (ARAI), Pune and The Energy and Resources Institute (TERI), New Delhi, various sources of pollution in Delhi and other nearby areas have been identified by assessing PM2.5 levels.

Vehicular emissions contribute to 28% of total pollution. It includes emission of harmful gases by tractors and trucks, two-wheelers, cars and buses and other light commercial vehicles.

The contribution of dust from construction sites is 3% and industries like power plant generators, brick kilns, stone crushers and other small industries contribute 30%.

Delhi's residential areas contribute 10% to pollution.

The study made it clear that stubble burning by the farmers in Haryana, Punjab and western Uttar Pradesh contributes to only 4% of the pollution. However, this value spikes during the winter season, contributing 30% of the total pollution.

Therefore, the report clearly suggests that industries and vehicular emissions are the real culprits of pollution. It is only in one season that we see the drastic effects of stubble burning.

Politics and Pollution- Failure of the Legislation, Executive and Judiciary

India has one of the best policies and program makers in the world but the implementation remains a matter of concern because of political will. Moreover, the government-run, coal-fired power plants are setting wrong examples for other private industries by disrespecting the timelines and deadlines to clean up emissions from their chimneys. The withdrawal of the Odd-Even Vehicles rule (private vehicles could be used on the road only on certain days which depended on their license plate number) implemented by Kejriwal Government in the year 2016 remains unexplained. Subsidized machines are largely unable to reach the farmers and even if they do, they are too low in numbers.

'The Right to Clean Air' bill is not able to find its acknowledgement in the discussions and debates of parliamentary sessions despite the country's deteriorating air quality. This is because most of the Indian politicians take air pollution to be a seasonal crisis whereas in reality it is an annual menace. Moreover, Indian politicians do not participate actively in environment related issues globally and maintain a low profile. Both the Health Minister and the Environment Minister of India did not attend the World Health Organization's (WHO) first global conference on air pollution and health at the General Assembly of Global Urban Air Pollution Observatory (GUAPO) in Geneva, Switzerland.

During Diwali, the festival of lights India's Supreme Court banned all the firecrackers except those certified 'Green'. The court allowed citizens to burst crackers only between 8-10pm. The orders of the court were violated with impunity. People burst crackers beyond the limit and there was no check put on them by police officials. The outcome of this was that a thick layer of smog covered the sky of the city the next morning.

India is gearing up for parliamentary elections in 2019. Every party is securing their 'vote bank'. The key causers of air pollution- industrial and vehicular emissions- are also the major source of 'vote banks' for the parties. So, clearly no party is willing to take on these groups. It is going to be the general public who will be the victims.

Conclusion:

It has been proven by various studies that the problem of air pollution in Delhi is not seasonal but an annual threat. A variety of sectors add to the problem. Therefore, sector by sector monitoring, analysis, regulation and implementation of policies can help solve the problem.

Solutions:

Strict road pricing mechanisms can help in the reduction of private vehicle use. Escalated parking fees can also reduce private vehicles on road. The city should reorient its investment to prioritize public transport and switch over to electric mobility. Also, mechanized cleaning of roads and sprinkling of water can check pollution. The entry of illegal trucks should be stopped in Delhi. Switching over to CNG and LPG by the households can check residential pollution. Strict fines for the violators of traffic rules should be imposed.

The government can use climate change funds to turn farm residues into a resource, using technical options like converting them to bio fuels or fertilizers. It is also necessary to invent new ways to use stubble which may encourage farmers to look for alternative income sources.

Enforcement of pollution control and PUC norms in thermal power plants and other industries can help reduce industrial emissions.

The problem of air pollution is mammoth and needs to be dealt by analysis and implementation of strong policies pertaining to each factor contributing to the problem. By political will and co-operation of its citizens only Delhi can solve its pollution problem.

Amisha Sanwaria

B.Sc. (Hons) Zoology – III Year

WHAT MAKES US UNIQUE

- The fingerprints of a Koala are so indistinguishable from humans that they have on occasion been confused at a crime scene.
- Kangaroos use their tails for balance, so if you lift a Kangaroo's tail off the ground, it can't hop.
- The placement of the eye of a donkey always enables them to see all four of their legs .
- It is possible to hypnotize a frog by placing it on its back and gently stroking its stomach.
- Ostriches can run faster than horses and the male ostriches can roar like lions.
- The slowest fish is a sea horse, which moves along at about 0.01 mph.
- Nearly three percent of the ice in Antarctic glaciers is penguin urine.
- Frogs cannot vomit. If one absolutely has to, then it will vomit its entire stomach.
- A tiger's legs are so powerful that they can remain standing even when dead.
- Hummingbirds are the only birds who can fly backwards.
- Pig hearts have been used in human heart transplants.

- An elephant can smell water up to 3 miles away.
- Ants never sleep. Also, they don't have lungs.
- The bat is the only mammal that can fly.
- It takes a sloth two weeks to digest its food.
- Elephants are the only animals that can't jump.
- An Ostrich's eyes are bigger than its brain.
- The Heart of a shrimp is located in its head.
- If you cut off a snail's eye, it will grow a new one.
- A moth has no stomach.
- Deer have no gall bladder. Giraffes have no vocal cords.
- A snail can sleep for three years.
- Slugs have four noses.
- Snakes don't blink.

Anuradha Kashyap

B. Sc. (Hons) Zoology – III Year

IT WAS ALL WORTH THE EFFORT WE MADE GOT OUR BREAK AFTER A DECADE

DEHRADUN HERE WE COME

On March 27, we gathered in our campus around 10.30 p.m. and started from college at 11.30 p.m. with the guidance and company of our department teachers and other lab staff members. We reached our destination- Dehradun at 8.00 a.m.

The study tour as per the curriculum was an exposure trip to a place of educational importance.

In the afternoon we visited the Regional Sericultural Research Station, Sahaspur, Dehradun. It is administered by Central Silk Board, Ministry of Textiles, Govt. of India.The head of the centre delivered a talk regarding silk production of India and its current development status. We saw rearing of silkworms and its various stages of development. We also visited the mulberry plantations and were explained the various measures taken in healthy moriculture.

The next day we visited the Wildlife Institute of India, Chandrabani, Dehradun. It is an autonomous institution under the Ministry of Environment, Forest and Climate Change, Govt. of India. It is an internationally acclaimed Institution, which offers training programmes, academic courses and advisory in wildlife research and management. The Institute is actively engaged in research across the breadth of the country on biodiversity related issues. It offers master's in wildlife science and many other master's and certificate courses. A lecture was delivered to us by the officials of WII regarding it's functioning, role of WII in controlling animal poaching and ways to distinguish between animal made articles and artificial ones.

We returned to our college campus on March 30.

Our journey through all these centres offered us all the sights and feels of a wonderful experience.

Jasmine

B.Sc. (Hons) Zoology-II Year

THE LAST SESSION WAS A WRAP
THIS IS HOW WE DO IT AT SYNAPSE
(2018-19)

FARE THEE WELL, BATCH OF 2018

WELCOMING FRESHMEN 70'S STYLE

CELEBRATING THE ONES WHO GUIDE US EVERYDAY

THE ZOOLOGY DEPARTMENT HAD ITS FIRST SERIES OF COLLOQUIAL LECTURES

THE ANNUAL CAMPUS BIRD COUNT

IMPULSE, THE ANNUAL FEST OF DEPARTMENT OF ZOOLOGY IN LIGHT OF WORLD SPARROW DAY

Taking the Oscar Home, a Star was Born

Its Time for Magic, Grab your Popcorn

SHAPE OF WATER: A SILHOUETTE OF LOVE

The movie opens with a young woman, Elisa Esposito, who is mute and lives alone. She floats in her agony of being lonely and yearns for love. Her only friend is her next-door neighbour Giles who is struggling as an advertisement illustrator, advancement in the field making him too old for it.

She works at a secret government facility in Maryland as a cleaner and lives a very monotonous life. Her day begins with hope for something more but ends with dispiritedness. One day, when she least expects it her life changes forever as a new creature caught from the Amazon river is brought to the facility by Colonel Strickland, who is the evil doer in the story and tortures the creature. Being intrigued by all the blood spilled from the abuse inflicted on the creature, she finds that it is a humanoid amphibian.

Although hesitant at first, the Amphibian Man warms up to her, as she brings him food and talks to him via sign language. Even though they can't communicate through words they do connect through love. Upon learning the fact that the Colonel is planning to vivisect the Amphibian Man, the frail Elisa takes it upon herself to save the man she loves. The movie portrays her determination remarkably well. When a young woman tries to go against the government there sure are going to be some repercussions, especially when the person helping you is a soviet spy. When the colonel finds out that the creature is missing, all hell breaks loose with him killing everyone in the way.

Meanwhile at Elisa's apartment, the two love birds (belonging to entirely different species), shielded from reality of the approaching danger, put their relationship to every physiological test and as they say love conquers all. When Elisa is warned of the Colonel's wild chase and that he could be knocking at her door anytime, she goes on the run again.

According to the plan she was supposed to release the Amphibian Man in a canal that day and fighting all odds she reaches on time but guess what the Colonel's there too. He knocks down Giles and shoots Elisa too. The creature now enraged slits the Colonel's throat and jumps in the water with Elisa. Did I mention the creature also has magical healing powers (Jaadu did it first though), which he uses to revive Elisa. Now the plot twists. As Elisa stirs back to life, gills can be seen sprouting from her neck. The movie concludes with a thought that whatever afflictions one endures because of love, only love can provide you its remedy.

Noor Chhikara

B. Sc. (Hons) Zoology – III Year

FOLLOWING THE DREAMS, THEY HAD IN THEIR EYES

LET'S SEE WHO TOOK HOME THE PRIZE

ANTIBODIES OF HOPE

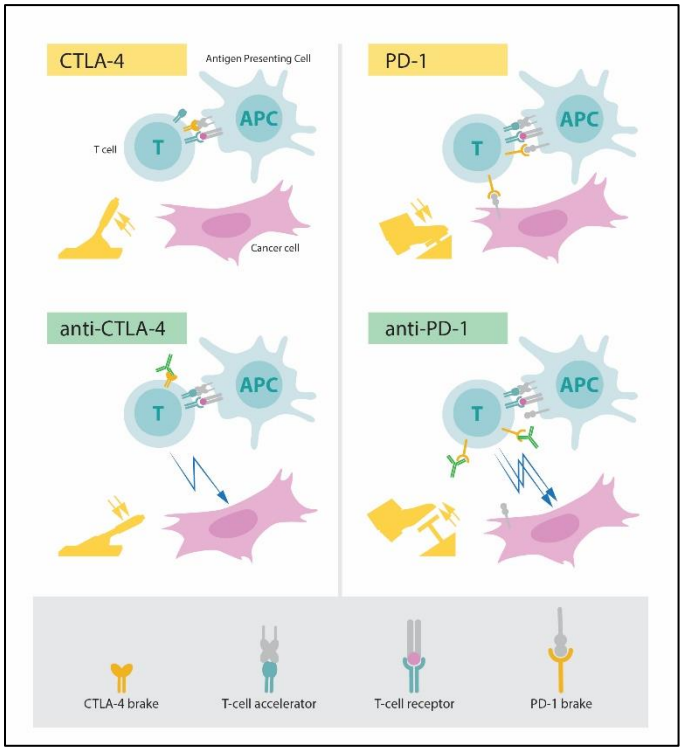
Cancer is considered one of humanity's greatest health challenges and even today being diagnosed with cancer, in many cases, is equivalent to being handed a death statement.

The 2018 Nobel Prize in Physiology or Medicine was awarded to James P. Allison and Tasuku Honjo for their independent work in developing a novel way to treat this beast of a disease.

Cancer, put simply, is the uncontrolled proliferation of abnormal cells in our bodies and even though our immune system is a highly effective defence mechanism working to keep our bodies out of harm's way, these cancer cells are like moles within the system. They hide in plain sight from the immune system and are not attacked by the immune cells for they are a part of our own bodies, no matter how rogue they may have gone.

Allison and Honjo made extraordinary strides in understanding what exactly it is that pulls the immune system's breaks and stops it from attacking these rogue cells and also worked on how to disarm these inhibitory mechanisms.

They discovered two T-cell surface molecules which act to inhibit these cells from attacking the cancer cells. These were CTLA-4 (discovered by Allison) and PD-1 (discovered by Honjo). They believed that if these inhibitory molecules could somehow be blocked, the immune system could be awakened to the presence of cancer cells hence leading to these abnormal cells being targeted and destroyed. They developed antibodies against these two molecules which they then used to block these inhibitors. As a result, a marked rise in immune response to the cancer cells was observed. Both the approaches showed promising results in animal trials against previously untreatable cancers including metastatic cancer.



This novel approach for treating cancer by inhibiting negative immune regulation has been welcomed with great cheer amid an ever-increasing cancer struggle. It provides new hope to many combating this disease as well as to their loved ones that all is not lost, and the battle is still out there to be won.

ANUBHUTI KRISHNA

BSc (Hons) Zoology- IIIrd year

Words are a writer's delight
Now explore the pen's might

CHILD LABOUR: A SOCIAL EVIL

India has moved leaps and bounds in improving the technology, economy and law and order of the country but there are a few social evils that have crept into our society like termites. Child labour is one of them. It is so common to find young children working in dhabas, restaurants, factories and homes that people find it simply normal. But it's not normal.

Why do you think little children are forced to bear the burden of their families at such a tender age? The most obvious answer is poverty. Poor parents think more children imply more working hands and more income for the family. But they do not realize that by making children work, they take away the most beautiful part of their life-childhood. The word itself brings sweet memories full of all the fun and frolic. But these children do not remember it as fondly as most of us do. This is because their shoulders are overburdened, and the sunshine of childhood gets lost in a gloomy dark night.

Another reason is lack of parental education. The parents of such children are illiterate and do not understand the importance of education. So, they do not encourage their little ones to go to school. They do not realize that investing in education once gives better results in future. The result is the children who should be carrying the weight of their bags and books are carrying all sorts of things. These seeds never get the desired water, sunshine and minerals to bloom into a beautiful flower. Unemployment is also responsible for child labour. The parents who want to invest in their child's bright future do not have assured income to do so. This forces children to dropout from schools and do odd jobs to support their families. These plants try to grow but the bad weather conditions do not let them.

India wants to grow into a superpower. It has a huge population of young children with their veiled talents and dreams. The government needs to work against child labour with their heart and soul to eradicate it. There are laws like The Factories Act, The Mines Act, The Child and Adolescent (prohibition and regulation) Act, The Juvenile Justice (care and protection of children) Act, and The Right of Children to Free and Compulsory Education Act. Non - Government Organizations are also working towards it. But still a lot of work needs to be done. These children want some special care and nourishment so they can also remember childhood with joy and not pain.

Shtakshi Sharma

B.Sc. (Hons) Zoology-ll year

DISCRIMINATION: A STIGMA THAT'S STILL PERVASIVE

For the last few days, my mind has been completely occupied with the thoughts of prevailing discrimination in our country. Discrimination has several forms. It could be religion based, cast based or related to a person's race.

Just a couple of days ago I saw a six year old girl playing with other kids and suddenly that girl gave an awkward look to the boy who was swinging in the park. Her strange reaction was due to the fact that he was a dark-complexioned boy.

Discrimination is ubiquitous, so much so that it gets germinated even in these tender minds. Honestly speaking, soon a day will come when doctors will insist on checking the clans of their patients before treating them.

Moreover, discrimination is not only limited to race but also to religion. I saw a news telecast on TV regarding the statement of a renowned singer, Sonu Nigam. The matter was that the singer got irritated and disturbed by the loud noise created by the loud speakers on the mosque. Someone said that in the wake of noise pollution, every person has a right to protest against hazardous loud noises.

Now, the point that I want to establish here is people have presented this incident altogether in a different manner. This statement has pervaded social networking sites like a forest fire. The members of Hindu community have also started fitting loud speakers on the temple, accounting that if mosque has this freedom then why we Hindus are deprived of the same. A group of people have even announced a hefty amount of reward on insulting that singer in public.

This incident has been moulded into religion-based discrimination by none other than we, human beings. Racial segregation against black people in America has, largely, nothing to do with immigration or nationality. There is no home country for African-Americans to connect to. Instead it is essentially a status quo of domestic alienation, dehumanisation, criminalisation, and terror. During Barack Obama's presidency, Michael Brown, Eric Garner and countless other unarmed African-Americans were killed by police, but with a black president many Americans felt progress was attainable.

All said and done, India still has a long way to go if it wants to pay genuine tributes to the champion of Anti-apartheid movement, Nelson Mandela, and Mahatma Gandhi who sacrificed their lives fighting this stigma called discrimination. We as a society must create an environment where no Cassius Clay is compelled to change his religion and become Mohammad Ali and no Olympic champion should be so dismayed of racial slurs that he is forced to throw his Gold Medal into a river.

Poonam Singla

B.Sc. (Hons) Zoology- I year

THAT LAST HOUR

BY NOOR CHHIKARA

Not a single flicker of eye,
Garden of machines; where you lie.
Muffled and incoherent and far from med,
Thriving agony; as you stay in death bed.

Soul is withering, spiralling into infinity,
Your face shows no signs of serenity.
Dark room; even darker than your fate
Hopelessness, anger and bottled up hate.

Now you will twinkle as a star,
Waving from here; as you have gone way too far,
That last year; that last day and that last hour.
That moment dark clouds replaced our bright sky,
If love was still there why did you die.

When you were declared at twilight,
Dawn never cracked after all insufferable nights.
That last gift; that last hug and that last hour,
A father's love would now never shower,
Keeping you awake was not in my power.

Life is smooth, like cream on milk,
Now it is no more that blood smeared silk.
That last spring; that last summer and that last hour,
No longer will bloom; when equinox brings flowers.

As silence surrounds; only your heart beeps,
Soft as feather; but canary too weak.

As seconds tick away your soul does too,

It arrived; I wonder how time flew.

Time of your death will remain a big scar,

That last beep, that last breath and that last hour.

LOSS AND REJECTION

BY NOOR CHHIKARA

Wet and cold; away from light,

Testing every time, my brave, my might.

Walking on the less trodden road,

Will I ever have my name on destiny's board?

I doubt myself and that's my biggest flaw,

Trying to save myself from shame's jaw.

Failing every time carrying out perfection,

I fear loss and rejection.

I lost my light years ago,

I need directions wherever I go.

Hard to calm my nerves; I lost the function,

I fear loss and rejection.

Train of my hope; now on track,

Life taught me how to fill the cracks.

My heart not anymore seeking attention,

Fighting my fear of loss and rejection.

BACK BENCHERS

Every class is blessed with a set of back benchers,
Regular in school/college, rare in class, with sole aim of fun,

Last desks are their favourite locations, Wonder God! What kind of creations!

The unfortunate teachers who ask them questions, get an altogether new and magical solution, Studies to them are bore,
Teacher's comment they easily ignore.

Front Benchers, they hate them from their heart's core, Who are eager to answer more and more,
Late in assignments, late in class,
Finally when exams come , Alas! Little do they write.

But they carry exams with great pride, Semesters come, and semesters pass, Habits remain constant in class,
Only enjoyment, no frustrations.

Wonder God! What kind of creations!

Arzoo

B.Sc.(H) Zoology- I year

JUST ONE

One song can spark a moment

One flower can wake the dream

One tree can start a forest

One bird can herald spring

One smile can begin a friendship

One star can guide a ship at sea

One word can frame the goal

One vote can change the nation

One sunbeam can light the room

One candle wipes out darkness

One laugh will conquer gloom

One step must start each journey

One word must start each prayer

One hope will raise out spirits

One touch can show you care

One voice can speak with wisdom

One heart can know what's true

One life can make a difference

You see it's up to you!

Arzoo

B.Sc. (Hons) Zoology- I year

A WINNER'S GREED

If you think you are beaten, you are,
If you think dare not, you don't
If you like to win, but you think you can't, It's almost a cinch you won't.

If you think you will lose, you are lost, for out in the world we find— Success begins with a person's faith, It's all in the state of mind.

Life's battles don't always go
To the stronger or faster man, they go to one who trusts in God And always thinks."

Arzoo

B.Sc. (Hons) Zoology- I year

LIFE

Is full of emotions and enthusiasm;

From giant redwood to tiny mycoplasm.

Senses the pain, many loses and gain;

Is a 'LIFE' that dies again.

From zygote until death;

Cyclosis, metabolism and breath!

Little placenta and deep emotions;

Connects mother n child with heartiest notions.

Not simple but very complicated;

Teaches a lot, with time belated.

Beauty of living lies in the ‘SYNAPSE’

Like presence of acetylcholine in the gaps.

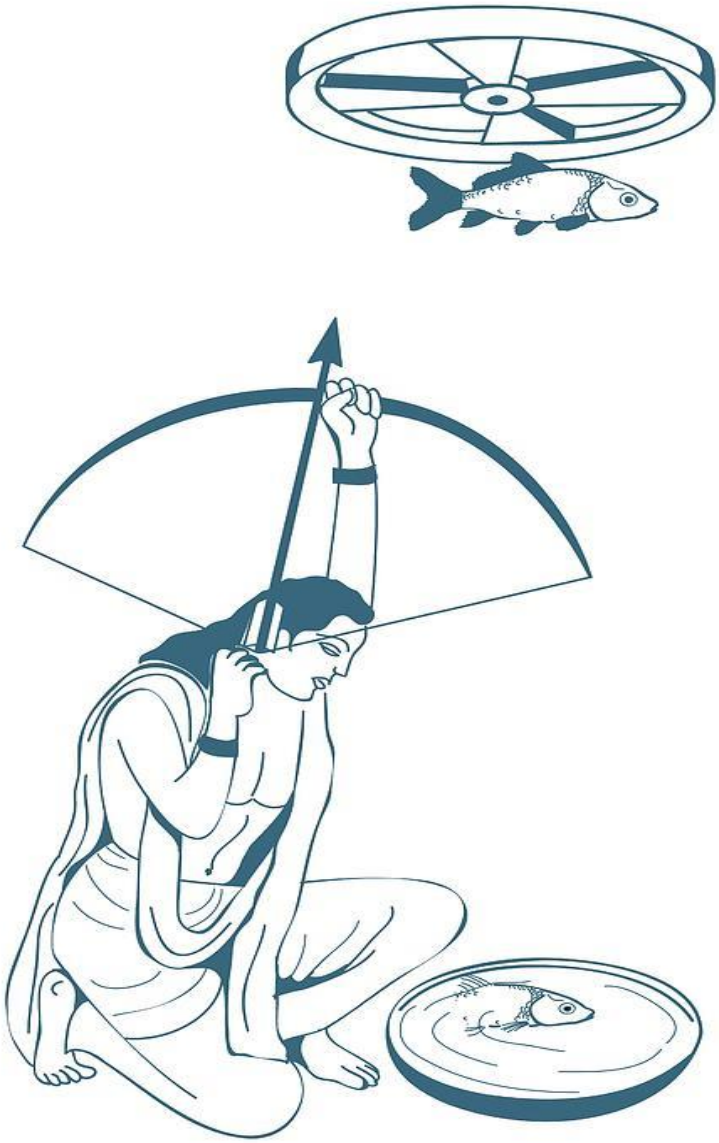
Sharing, caring, loosing and giving;

Makes the life worth living....

Nitul

B.Sc. (Hons)Zoology- I year

LIKE A TREE MADE GREENER BY LEAVES
WE SHINE MORE FROM WHAT WE ACHIEVE



STUDENTS' ACHIEVEMENTS

ACADEMICS

- Amisha Sanwaria, Vibhuti Bhatt and Zeba Mallik of III year represented Miranda House at Zoo Hackathon New Delhi- U.S. embassy, New Delhi, WWF India and TRAFFIC India – 21 to September 23, 2018.

- Amisha Sanwaria, Shreyata and Tamanna of III year stood **2nd** in Inter-college Quiz competition on Classical Zoology held at Shivaji College, Delhi University.

- Amisha Sanwaria, Anuradha, Shria Mattoo and Tamanna of III year did a summer internship on the topic "Assessment of Immunogenicity of *Mycobacterium tuberculosis* genes by in silico analysis, Molecular Cloning and PBMC stimulation" under the DSKC Summer Research Internship scheme in June 2018 under Dr. Sadhna Sharma and Dr. Monika Sharma, Miranda House.

- Amisha Sanwaria of III year attended Online Certificate Course on STEM CELLS TECHNOLOGY- BioLim Centre for Science and Technology.

- Anubhuti Krishna and Tamanna of III year received the Science Meritorious Book Award 2018.

- Rachna of II year got acceptance for oral presentation by abstract selection on "Remedies of water pollution in Delhi" at National conference on Urban Environmental sustainability by MGICCC.

- Vartika Srivastava of III year participated in Summer research programme, 2018 at School of life Sciences, JNU, Delhi under guidance of Assistant professor Abhishek Bansal on the topic- Cell and molecular biology of the malarial parasite, *Plasmodium falciparum* and drug resistance.

- Yamini Gupta of II Year presented poster on "Assessment of Immunogenicity of M. TB Rv 2389c GENE product by insilico analysis". 6th world congress on nanomedical sciences. Vigyan Bhawan, Delhi, India 7-10 January 2019.

- Yamini Gupta of II Year presented poster on "Assessment of Immunogenicity of M. TB GENE product by insilico analysis". DST Science Conclave at Miranda House, university of Delhi 16-18 January 2019. **Won Best Poster award.**

- Poonam Singla of I Year received IIIrd prize in Biology Base Line test organized at Miranda House.

- Haripriya won Ist prize, Poonam Singla won IInd prize and Nitul and Monika Devi won IIIrd prize in quiz competition organized at workshop on Biofertilizers organized by Department of Botany, Miranda House under DBT star college scheme.

SPORTS

- Anju Panghal of III year stood 1st in 200m race (state level) organized by Delhi Physical Education Aman Vihar, 2018.

- Anju Panghal of III year Participated in Delhi Athletic Meet held in JLN Stadium Delhi from 1st September to 3rd September 2018- Secured 2nd position in 400m.

- Anju Panghal of III year Participated in Junior National Athletic Meet held in Ranchi from 1st – 5thNovember 2018.

- Anju Panghal of III year Participated in North Zone Sports Meet, 17 -19 September 2018 held in Rohtak, Haryana- Secured Bronze medal, 2nd position in 4x100m relay race. 2018

- Anju Panghal of III year Participated in intercollege sports meet held in Polo Ground University of Delhi from 21st – 23rd October and secured 3rd position in 400m race.

- Parul of I year stood 1st in State taekwondo championship held on 25th July 2018 in Thyagaraj stadium, New Delhi.

- Parul of I year stood 1st in inter college taekwondo championship held on 30th January 2019

- Parul of I year ranked 5th in India according to international ranking system in 2018-19

- Parul of I year stood IInd in KCC inter -SAI tournament taekwondo held on 1st February 2019

- Parul of I year stood 1st in sports fest Erobern held on 21st February 2019 and Vibhuti Bhat of III year won silver medal in the under -67 female weight category.

- Vibhuti Bhat of III year Participated and represented Miranda House in the inter college taekwondo tournament, February 2019 held at multipurpose hall, Delhi University and won gold medal in the under-67kg female weight category. Further represented Delhi University in the same weight category in the All India University taekwondo tournament held in Rohtak, Haryana from 14-17th March 2019.

- Sumedha of II year stood 3rd in 18th Kumar Surendra Singh Memorial shooting championship.

- Sumedha of II year won silver medal in Haryana State Shooting Championship.

- Sumedha of II year won Bronze medal in Inter-college Shooting Championship (Team).

- Sumedha of II year qualified for International trails by scoring in top 20 in 2nd National Shooting Championship for Small bore Rifle.

OTHERS

- Arukshita Tyagi of I year from MH NCC company represented Delhi Directorate at Chief Minister's rally 2019.

- Amisha Sanwaria of III year was an intern in United for Social Change, Argumentative Writing Internship- United 4 Social Change is a non-profit start-up that develops effective civic leaders who write persuasively, speak passionately, and actively participate in the creation and dissemination of ideas.

- Amisha Sanwaria of III year is Member of the Rotaract Club of Delhi Femina. It is a non-profit international organization to unite leaders all over the world. Through Rotaract clubs, people aged between 18 to 30 develop leadership and professional skills, exchange ideas with community leaders and fellowship. She is currently serving the club as *THE MULTIMEDIA SERVICES DIRECTOR* for the year 2018-2019. She also bagged the title of the ROTARACTOR OF THE MONTH for August 2018 and January 2019.

- Amisha Sanwaria of III year attended Online Winter Training- Business Communication Skills from 15th December 2018 to 1st January 2019 at Intern Shala.

- Amisha Sanwaria of III year is a Member of National Service Scheme, Miranda House. Currently serving as the *Public Relations Head*.

- Shatakshi and Rachna of II year won 1st position in video making competition organized by MH Vatavaran on “Biodiversity in and around the campus”.

- Srijan and Nikita of II year won 1st position in PowerPoint making competition organized by MH Vatavaran on “Biodiversity in and around campus”.

LAB STAFF

RAKESH KUMAR
RAMESH SHARMA
SANJAY DUTT

UDAY CHAUDHARY
MUKESH MANIK
DAAN SINGH

SURESH PRAJAPATI
PUNEET RANGA
KULDEEP SINGH

FIRST YEAR

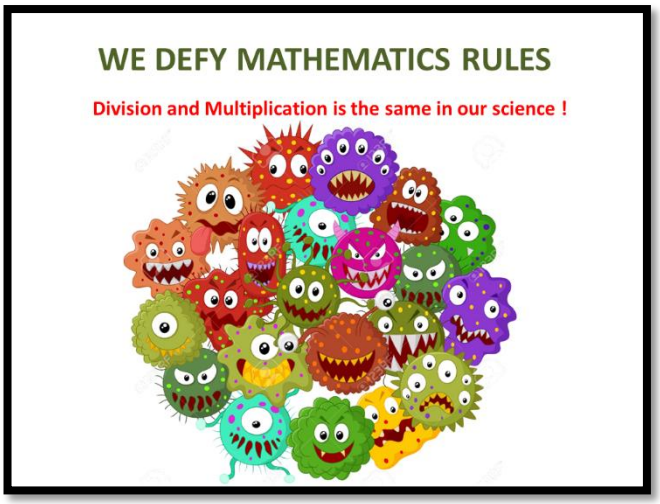
SECOND YEAR

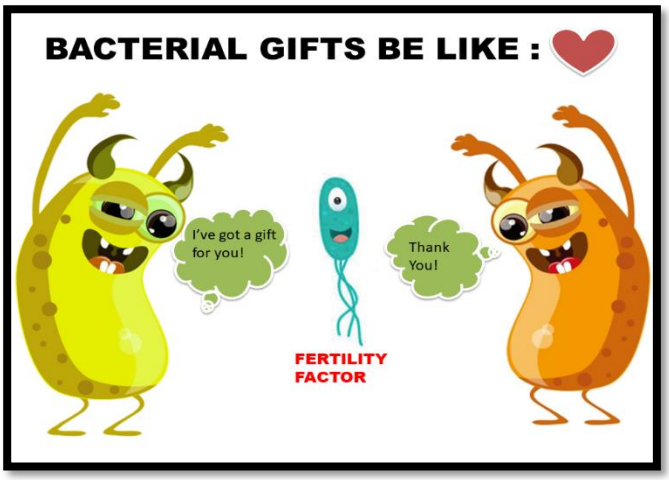
THIRD YEAR

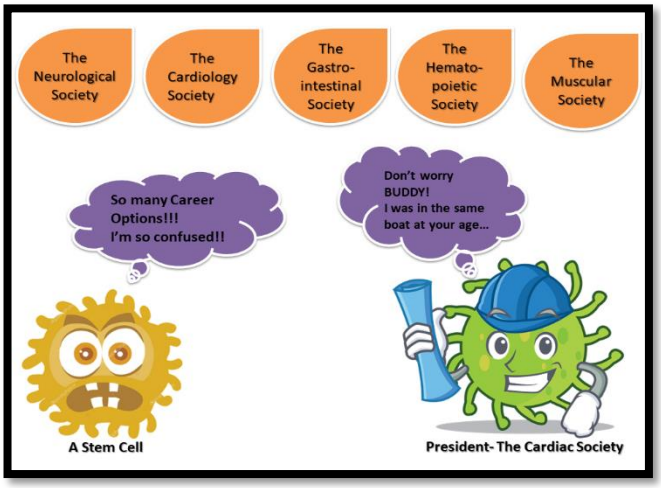
ART IS WHAT GIVES MEANING TO US IMANGINE, MAKE THE WORLD YOUR CANVAS

BY: AMISHA SANWARIA

IIIRD YEAR







JINIYA, IInd YEAR

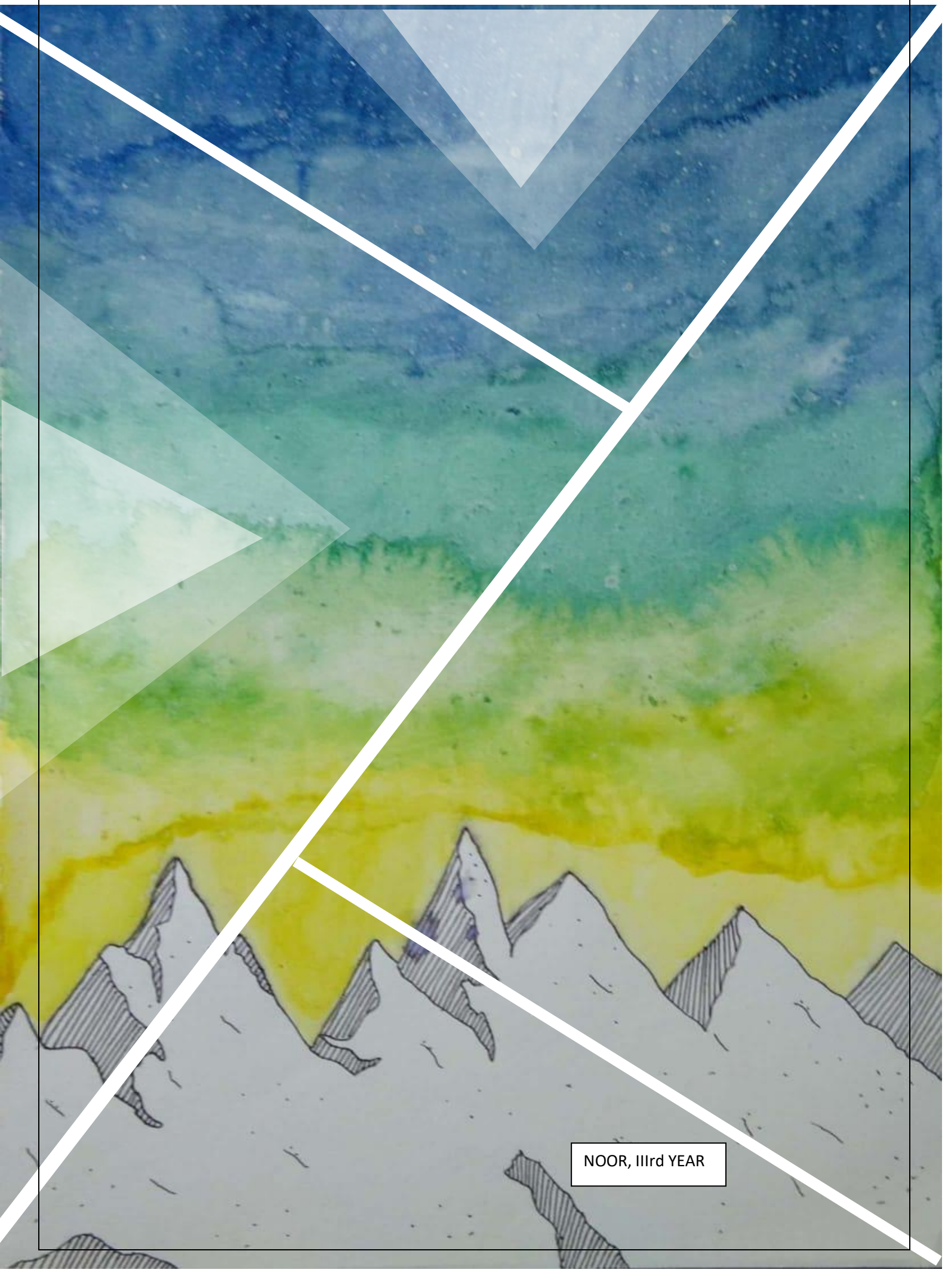
SRIJAN SINGH, IInd YEAR

BEHIND THE CAMERA: VIBHUTI,
IIIrd Year

POOJA, IIIrd YEAR

MASTER GAVE DOBBY THE MAGAZINE

DOBBY IS FREE!!!!!!!


NOOR, IIIrd YEAR