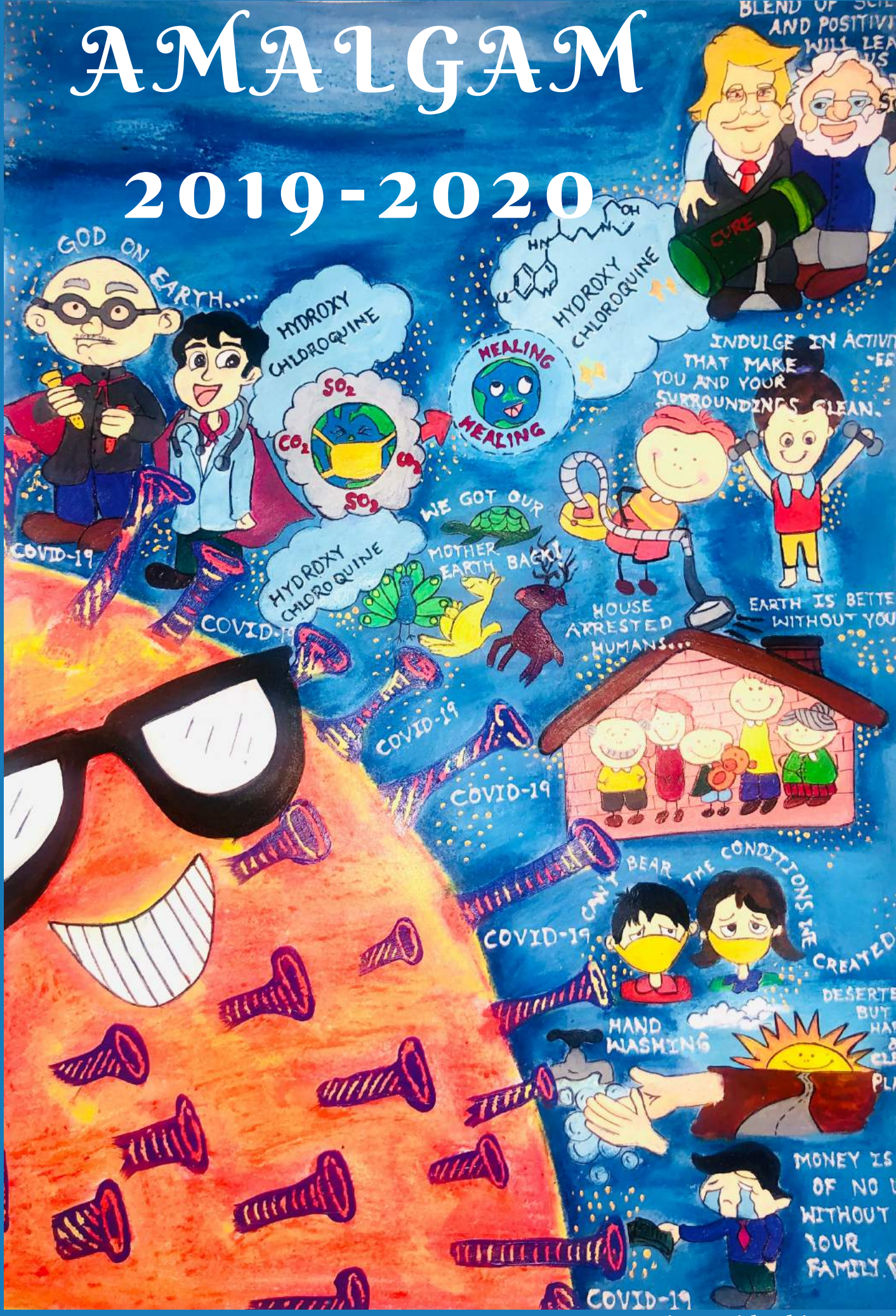
Issue 12

AMALGAM

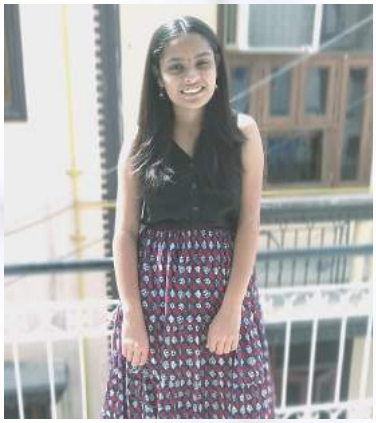
2019-2020

Rasgandhayan, The Chemical Society
Gargi College, University of Delhi



Cover Design: Vidushi Gupta

The Editorial Team



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Address by Editorial Board

It has been a thought-provoking experience to be in the magazine's editorial for this session. We received an amazing response from the students and got the chance to read and edit several astonishing articles. The creative writing submissions were no less and left us in awe of the writers' thoughts. We've learnt to work and coordinate as a team, which will help us in similar situations ahead in life. For the first time, the department decided to launch an E-Magazine as we were unable to publish a hard copy due to the *nationwide lockdown*, a preventive measure against COVID-19. Working together without being able to organize proper meetings and one-on-one discussions was another challenge for us, but we successfully fought against the odds and learnt that no task is difficult once we're determined to work honestly. It is with great pleasure that we bring forth this magazine despite the crisis situation lingering worldwide. We have introduced new segments in the current issue - Ex-Amalgam-Editors Column, Contact Information of the last and current year graduating batches (to be able to stay connected to them), a list of Old Classical Books of Chemistry (courtesy our senior faculty members) apart from the glimpses of many new activities and events that were done this year. The editorial team has worked hard to bring out a good-to-read magazine and we hope you will have a great time going through it during the lockdown phase. The editorial board extends heartfelt gratitude to the teacher conveners, Dr. Tripti Kumari, and Dr. C. Kathing who assisted us at every step of the process and made the magazine's formulation a success. Sending our wishes to all the readers with a hope that the world never sees this crisis again. Happy Reading. Cheers!!!

From the Principal's Desk

It gives me immense pleasure to know that the Chemical Society of Gargi College is about to release its annual magazine "AMALGAM 2020".

Corona virus started its journey from Wuhan, China and spread across the world horrifying every individual in the same manner irrespective of their caste, religion, ethnicity, economic status or citizenship. It made us realize that - The lines marked on the globe defining different countries are *meaningless,* that the pandemic will *not* differentiate on the basis of religion, that your status *can't* protect you from universality.

Even a minute commotion anywhere on the Earth has its impact on the universe at a very subtle level. The race to conquer everything, including Mother Nature, made us deaf to these signals that the world had been screaming in terms of climate change, unprecedented situations like forest fires in Australia, flood in the desert of Saudi Arabia, uncontrollable air & water pollution in India to name a few. Finally, an invisible virus arrived as "**देवदूत**" on Earth teaching us the basic lessons of life such as cleanliness, respecting the coexistence of every living being: human, animal, plants as well as Mother Nature. On one hand, it's a challenging situation to handle but on the other hand, it's helping the whole universe in a big way - air quality has improved drastically; rivers are cleaner beyond imagination; birds are happier and are visibly more in number; dolphins are seen in the sea near Mumbai.

Apart from this a change in human behaviour has also been observed. The majority of the population is locked down in their houses and the professional activities are also executed through online modes. To cope up with this unprecedented situation, people of all generations are learning and using technology enthusiastically. Initially, there was panic but gradually people have started certain good practices like a healthy lifestyle, yoga, meditation which is making them calm and composed. The journey within oneself has started. The student fraternity deserves salutation because inspite of so many technical glitches they are making the best use of their time and talent. I am sure that very soon we will win over this pandemic and bounce back with greater force. I appreciate the entire editorial team & contributors for this effort of releasing upcoming online issue of "Amalgam 2020" in this lock-down period. I look forward enthusiastically to read our students' perspectives on the subject undertaken.

Dr. Promila Kumar
Principal (Offg.)

TIC's Address

I feel delighted to be associated with *AMALGAM 2019-2020*. Amalgam is not just the annual magazine of The Chemistry Department, it is actually an amalgamation of thoughts and ideas bringing the best out of young, budding talents. I wish all the students and faculty members good luck for their endeavours. My heartfelt appreciation goes out to the editorial board, office bearers and the teacher conveners, Dr. Tripti Kumari and Dr. C. Kathing, for working relentlessly to make every event successful and guiding the editorial team at every step. Best wishes to everyone!

Dr. Keya Banerjee, Teacher-in-Charge, Department of Chemistry

About the cover page

The painting on the cover page is a depiction of the various perspectives (both positive and negative) to the Corona-virus crisis that the world is facing currently. While we are inside our homes, the world is healing, the environment is rejuvenating, and the birds and animals are having a carefree life of their own. This time that all of us have for ourselves is a time for reality-check and introspection to mind our actions for a better tomorrow and to channelize our energies in the right direction. The painting also highlights the role of science in making our lives better. The only hope for a better tomorrow is finding the vaccine for the virus. The world is feeling grateful to doctors and scientists (like Acharya Prafulla Chandra Roy) whose selfless efforts in saving humanity is commendable. No money can save us if it is not for these people.
Mostly bright colours are used in the painting which symbolizes the hope for the better tomorrow.

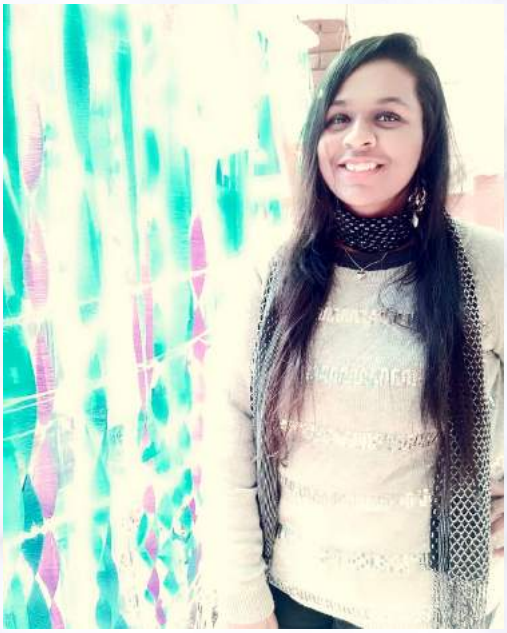
Vidushi Gupta, III Year

President's Address

I believe everyone is blessed with some talent but it remains hidden until we come out of our comfort zones and introspect ourselves. One should try to find something in themselves that will make them stand out. These three years in college helped me understand the uniqueness of every individual. The insecurities and fear that I once felt are now replaced by a positive attitude and self-compassion. I learnt many things, especially how to identify, accept, and rectify my flaws to be a better version of myself. And all this would not have been possible if I didn't have the support of my friends, teachers, classmates, juniors, and seniors. All the memories of classes, labs, and the outdoor visits especially the Chandigarh-Kasauli trip which was my life's first trip (outside Delhi) with friends and teachers will always be cherished. While writing this message, I realize how much I enjoyed my college years and all this will forever remain with me in my heart. The past is gone, the future is yet to come but what's important is the present. As the President of the Chemical Society, Rasgandhayan 2019-2020, I feel proud to lead an enthusiastic and committed team.

Rachna Singh

Vice President's Address

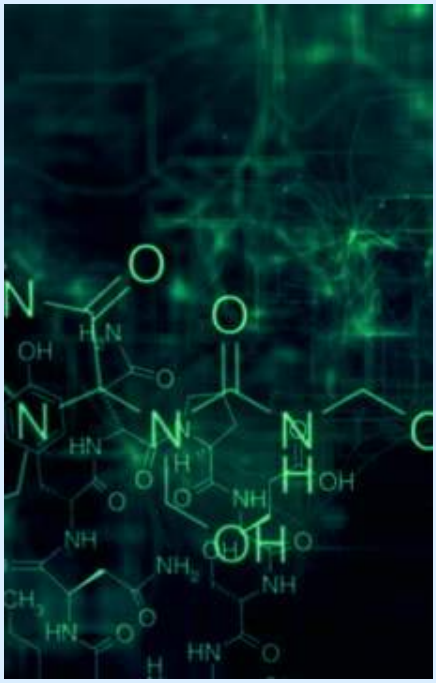


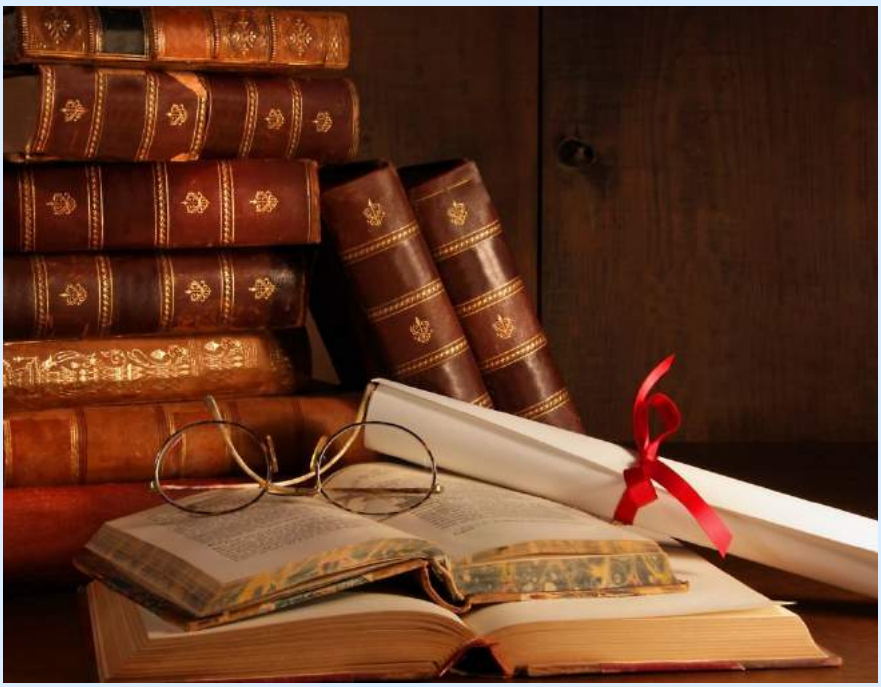
"*The things taught in schools and colleges are not education, but the means to education.*"

—Ralph Waldo Emerson

Entering college is a big transition from school life and it brings a lot of new challenges in front of students. Initially, like every other student, I was terrified of this new phase of my life. But as time passed, I realized that it was a fascinating panorama of enjoyment, freedom, and friendship. I want to take this opportunity to thank my teachers who have been an immense support in my journey at Gargi. They helped me compete with the world and are a symbol of strength and support. They may have scolded me when I committed mistakes but they also patted my back when I achieved something. They have proved to be a guiding light for me. As for my friends and classmates, I don't know if I would have come this far without their love and support. These three years will remain in my heart forever. I am immensely honoured and proud to be a part of RASGANDHAYAN, THE CHEMICAL SOCIETY. It gave many new experiences and helped me understand the hidden qualities in me. It helped me to accept and rectify my flaws, and be a better version of myself. As I write this, the memories and the highlights of the year flash in front of my eyes. I would like to appreciate and thank my team who were a great support, and worked very hard to organize the departmental events. Also, without the constant support and guidance of our conveners, Dr. Tripti Kumari and Dr. C. Kathing, nothing would have been possible. Their appreciation, enthusiasm and zeal, their out-of-the-box ideas pumped in excitement to complete all the work without any pressure. I am grateful to my destiny for bringing me to Gargi, and ultimately paving the way for working with Rasgandhayan. These beautiful memories are precious, and will forever hold a special place in my heart.

G.Vaishnavi





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Global Warming and Chemistry

The world is at the brink of a catastrophe. Climate change and global warming threaten to destroy the planet that we've called home for the last 4.5 billion years. The warning signs are glaring at us, urging humans to try and undo the excessive harm that we have inflicted upon the planet. Yet, a large population still remains indifferent to the disastrous implications. If we hope to thrive for a few more centuries, it is imperative that we step up, educate ourselves and turn into environment-conscious and environment-friendly citizens. Global warming has serious implications in the present as well as in the future. It is responsible for 150,000 deaths every year and has the capacity to push 100 million people towards poverty. It cannot be reiterated enough that if we do not act now, there may be no future for our planet.

We, as budding chemists, are at a huge advantage. Chemistry is like the over-achiever of the sciences, nosily finding a place in almost every arena. Thus, it shouldn't come as a huge surprise if the solutions to climate change may be provided by chemistry. The following article is about the solutions to only one aspect of climate change- global warming due to the greenhouse effect.

Before delving into the solutions, let us consider the problem that global warming has caused the average temperature of the planet to increase by 0.8°C-1°C. This number might seem tiny, but it has several significant consequences - glaciers will begin to melt, rivers will start to disappear, the sea level may rise by a meter by 2100, mountainous regions will start experiencing more landslides, several living species may face extinction (already more than 30,000 species are threatened with extinction according to the IUCN red list) and the list does not end here.

The greenhouse effect has been recognized as the primary cause of global warming. In general, the greenhouse effect causes the natural warming of the Earth. About one-third of the sun's radiation hitting Earth's atmosphere is reflected back out into space by clouds, ice, snow, sand and other reflective surfaces. The other two-thirds is absorbed by the Earth's surface and the atmosphere. As the land, oceans and atmosphere heat up, they re-emit energy as infrared thermal radiation, which passes through the atmosphere. Heat-trapping gases like carbon dioxide absorb this infrared radiation and prevent it from dissipating into space, giving rise to the greenhouse effect. The current problem faced by us is an increased concentration of greenhouse gases like water vapour, carbon dioxide, methane and chlorofluorocarbons (CFCs). Human activities such as burning of fossil fuels (greatest contributor), clearing of forest and agricultural land, and vehicular pollution among others release CO_2 in the air far beyond the permissible limit.

According to an article by the World Economic Forum, carbon dioxide emissions have reached their highest level in 3 million years. This is a record-breaking concern. Emissions from factories, air conditioners etc. also release CFCs into the air. The high concentration of greenhouse gases in the air has led to the significant warming of the planet.

An important key to combat global warming is to reduce our carbon emissions. Globally, we emit almost 36 billion tonnes of carbon dioxide annually, which is an alarmingly huge figure. While it is true that there is no single solution that can undo aeons of destruction, green chemistry proposes certain eco-friendly solutions. For instance, if each of us washed our clothes in cold water, it would cut residential carbon pollution by a total of 4 percent.

Examples of other green chemistry solutions include - a new technology to make house paint that reduces the paint's carbon footprint by over 22%, water consumption by 30% and harmful emissions by 24%. A vegetable oil-based fluid has been introduced to be used in oil-filled high-voltage electrical transformers that substantially lowers the carbon footprint and is much less flammable, less toxic, and provides superior performance compared to mineral oil based fluids. A technology that will effectively and economically turn carbon dioxide and carbon monoxide into plastics and coatings (that could be used in electronics, food or drink cans) and that require 50 percent less petroleum to produce.

Green Chemistry has been pivotal in coming up with ways to use CO_2 as a resource instead of having it become a waste product loitering in our air. For instance, chemists found that when CO_2 molecules are kept in a transitive state, often known as transcritical CO_2 that is the dynamic state in which CO_2 is at the point of converting from a liquid to a gas, it can be used as an industrial refrigerant to keep things cool. If such technologies are effectively implemented into the community, it is estimated that large amounts of annual carbon dioxide emissions may be avoided. Plastics and other non-biodegradable polymers can be replaced by more sustainable versions. For instance, a new biodegradable plastic has been innovated from fish waste and such plastics will not harm the environment in any way. This may be a difficult, expensive process, but it's extremely necessary.

In traditional selfish human style, we have ignored the needs of our planet and traded a safe, and healthy environment for the glamour of "advanced" world. It is ironic that we have destroyed our home planet in the process of creating a better world. Chemistry plays an important role in undoing the damage that we have inflicted upon Earth. Learning about the developments in green chemistry and the ways in which they can be implemented is the first step.

Ramya Vishwanath, II Year

Apoorva Singh, II Year

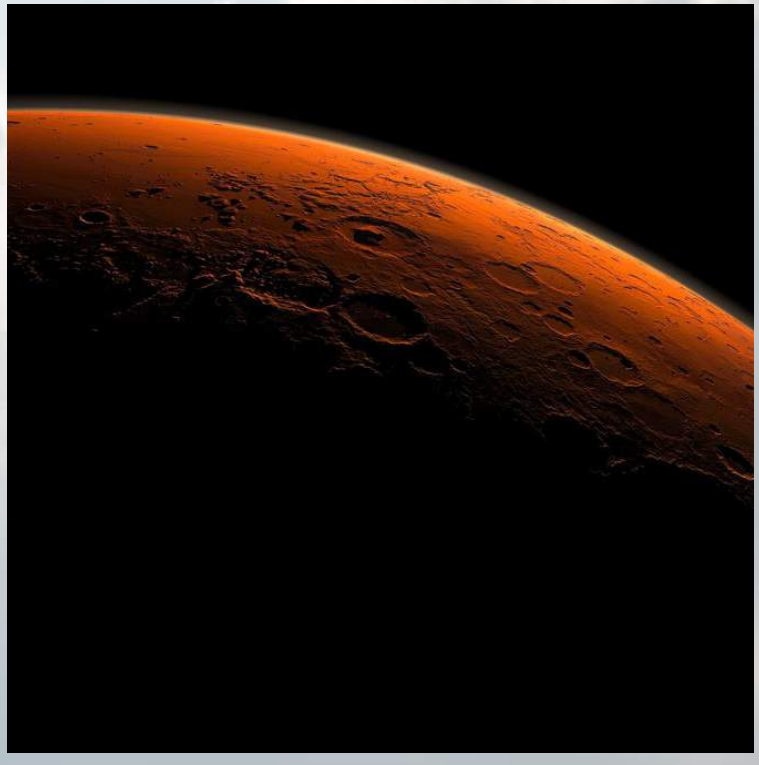
ESA's ExoMars program-Extraterrestrial Life on Mars

Over the years, Mars has always been a planet of curiosity and is known for extraterrestrial life. Recently, scientists have discovered that Mars' environment is quite similar to that of the Earth and have also found the existence of water on Mars in the form of glaciers. The ExoMars program to Mars, a joint venture between the European Space Agency (ESA) and Roscosmos (Russian space agency) is launching a rover to study the environment of Mars. The project will be timed sometime in July or August 2020.

The program's Rover is named Rosalind Franklin rover after a British scientist and will primarily search for the existence of extraterrestrial life on the neighbouring red planet. The Rover has a Panoramic Camera system (PanCam) which is on top of a mast, 2 m above ground level, and will be fundamental in the day-to-day scientific operations of the rover to help with scientific decisions on where to drive and drill. According to a report by CNN, the PanCam consists of three cameras, two wide-angle devices that take panoramic images and a filter wheel that enables them to image at 12 different wavelengths. There is also a high-resolution camera that takes further coloured images. The PanCam, with its stereo and high-resolution cameras will provide detailed views of geologically interesting features in visible and near-infrared wavelengths. This, alongside measurements made by the spectrometers will tell which material the rocks are made of and if they were influenced by water in the past.

The rover is nearing its completion at the Airbus Defence and Space in Stevenage, UK. In select locations on the Earth, a drill is going to be retrieving samples from up to 2 meters below the surface and deliver them to the onboard lab for a detailed analysis to seek out the signs of biological signatures. Once it's fully completed, ExoMars program's Rosalind Franklin rover is to be shipped to Toulouse, France for a program of environmental testing to evaluate it for the conditions on Mars. After this, it'll be sent to Cannes, France for the ultimate integration with the lander platform.

Akshita Jain, II Year



Chemistry in a Cup of Coffee!

Coffee has become a universal and almost indispensable beverage in modern dietary. It is a very reliable friend - the kind of who plays an important role in the various activities of day-to-day life. Thanks to its high levels of antioxidants and beneficial nutrients, it also seems to be quite healthy. Caffeine is the chemical compound's name that immediately springs to our minds while mentioning coffee. However, coffee is a cornucopia of many chemical compounds that together create a unique aroma, flavourful taste, and kick of energy.

Composition of coffee

Coffee contains about 1500 chemicals. The different groups of chemicals present in coffee are -150 Aliphatic compounds, 56 Carbonyl compounds, 9 Sulfur-containing compounds, 20 Alicyclic compounds, 10 Ketones, 60 Aromatic benzenoid compounds, 16 Phenols, 300 Heterocyclic compounds, 74 Furans, 10 Hydrofurans, 37 Pyrroles, 9 Pyridines, 2 Quinolines, 70 Pyrazines, 10 Quinoxalines, 3 Indoles, 23 Thiophenes, 3 Thiophenones, 28 Thiazoles, 28 Oxazole. It also contains about 800 - 1000 aroma compounds caffeine, carbohydrates, chlorogenic acids, trigonelline, lipids, melanoidins, and some volatile compounds.

How coffee keeps us awake?

It's a normal practice to drink coffee to stay awake. Here is how it works. Caffeine present in coffee works by blocking the action of a natural brain chemical, adenosine, that is associated with sleep. The binding of adenosine to the brain causes drowsiness by slowing down nerve cell activity. In the brain, adenosine binding also causes blood vessels to dilate. Adenosine is produced by our daily activities. Caffeine and adenosine look similar. Caffeine, therefore, binds to the adenosine receptors. However, it doesn't slow down the cell's activity as adenosine would. The cells cannot sense adenosine anymore because caffeine is taking up all the receptors adenosine binds to. So instead of slowing down because of the adenosine level, the cells speed up. Caffeine also causes the adrenal glands to produce adrenaline (epinephrine). Adrenaline is, of course, the 'fight-or-flight' hormone and it has several effects on your body due to which you stay awake.

G.Vaishnavi, III Year

Environment Etiquettes

Nowadays when we think about the term 'Environment', it no longer displays a green splash of land before our eyes. It's more of burning forests, melting glaciers, toxic air, and dying creatures. It is high time for us to take action and bring back the green and beautiful surroundings we once had. But have we ever thought where the change should exactly come from? It should come straight from your heart and make our brains work purposely towards a greener future. We have come across the word 'environment' from people standing on podiums, delivering endless speeches, or perhaps on social media. But we should not just think about it and should put in feasible efforts to bring about a change. Just follow a few rules and make the world a safer, greener, and brighter place to live in!

A few points to ponder are:

1) when the lights turn **RED**
   Put your engines at **REST.**
2) A steady **PACE**
   Will make us win the **RACE.**
3) When using **PAPER**,
   Use every **BIT**.
4) Your left over **WATER**
   means **LIFE** to someone.
5) Why use **LIGHT**
   When the **SUN's** shining bright.

Let us make environmental conservation our dream,

And take small steps towards making the world green!

Tulsi Sharma, I Year

Amazing Facts about Chemistry

1. Lightning strikes produce ozone, hence the characteristic sharp and clean smell after lightning storms is observed.
2. Unlike other substances, water expands on freezing.
3. Glass is actually a liquid and flows very slowly.
4. Every hydrogen atom in our body is 13.5 billion years as they were created when the universe was born.
5. The rarest naturally occurring element in the earth's crust is Astatine.
6. DNA is flame retardant. So, in the future, researchers are planning to coat fabric with DNA to make inflammable clothing.
7. The rubber tyre is technically a giant, polymerized molecule.
8. The planet Mars is red because of iron oxide deposition on its surface.
9. Some lipsticks contain lead acetate. This compound makes the lipstick taste sweet.
10. Lobster blood is colorless until it exposed to air. The blood appears blue on exposure to air.
11. If we expose a glass of water to space, it starts boiling.
12. 78% of the average human brain consists only of water.
13. A fire spreads rapidly uphill than downhill because the region above the fire is much hotter than the area below it, plus it may have a better supply of fresh air.
14. The hardest substance in our body is tooth enamel which is made up of calcium phosphate, which is why doctors recommend having calcium for healthy teeth.
15. The ethylene gas released by ripening apples ripens other apples.

Anshika, I Year

First Ever Video of Bond Formation!

The chemical bond formation and bond breaking between Rhenium metal atoms has been filmed for the first time, something scientists say they only dreamt of seeing. That appears as a dance of two atoms as they bond with one another, break apart and come back together again. Scientists have captured this footage of bonding and breaking in real-time at a scale half-a-million-times smaller than the width of a hair!

Watching this in real-time “was absolutely unbelievable” says Andrei Khlobystov at the University of Nottingham, UK, who headed the team that recorded it.

A sequence of images from an electron microscope showed two atoms of the metal rhenium, bound together to create a molecule, shimmied around one another, moving closer, and then farther apart. In videos of such molecules, this atomic reaction revealed the bond order, or the number of chemical bonds between the two atoms, and how that bond order changed over time. The closer the atoms were to one another, the greater the number of bonds. At their closest approach, the atoms had four bonds tethering them together. To make imaging easier scientists trapped the molecules inside carbon nanotubes. But then, in a fortuitous accident, one molecule escaped its confinement and nestled into a gap between two nanotubes and there, the bond between rhenium metals completely broke before soon reforming.

Link to the video: https://youtu.be/gr4jLuqrzbw

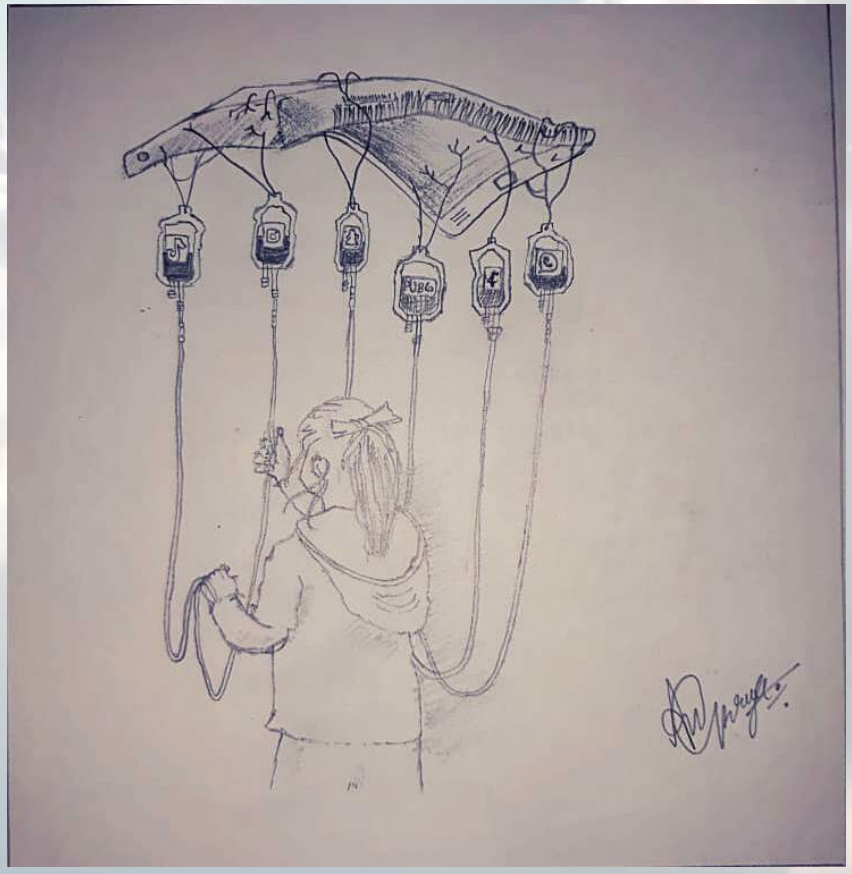
Akshita Jain, II Year

'Blood Charged'

For some, getting charged refers to having a good night's sleep and waking up zestful, but for some it means something entirely different. They need to be 'blood charged' (now do not fantasize of vampires). Before you presume, I should deduce that there are indeed some *Homo Sapiens* that need blood charging, *i.e.* blood transfusions to stay up and about. Every year, over 10,000 children are born with *β*-Thalassemia in India. Also known as Cooley's Anaemia, it is a genetic blood disorder that occurs when there is a defect in genes controlling the production of proteins (*α*-globin and *β*-globin) responsible for the production of haemoglobin in our body. *β*-Thalassemia occurs when the body is unable to synthesize *β*-globin, which leads to a deficiency of haemoglobin in the body and causes a decrease in MCV (mean corpuscular volume). This leads to a decrease in the size of erythrocytes (RBC). As a consequence, patients need regular blood transfusions at least once or twice a month. On one hand, there is no easy treatment for this condition and on the other, regular blood transfusions lead to iron overloading in the body which can further cause organ failure or other diseases. Patients have to depend on regular iron chelation medicines like Deferoxamine and Deferiprone for remaining functional.

At present, the only known and successful treatment for this condition is Bone Marrow Transplant, which requires a bone marrow donor with matching HLA (Human leucocyte antigen) and is very difficult to find. It is not easy at all to live such a life, but it can be made easier by the moral and emotional support of loved ones, as all that you have read above is just the tip of the iceberg!

Divya Chawla, III Year



Anupriya Malik, II Year

Odours and Disorders

Sense of smell is a blessing. Just think about how many significant smells you experience in your daily life; the smell of freshly brewed coffee, petrichor, the smell of old books & of petrol, the aroma of a home-cooked meal, perfumes, and your favourite person. These are just some examples - as you read this, you will think of smells that you like or dislike. The world would be a completely different place without the sense of smell. Diane Ackerman said, "Smell is mute sense, the one without words", and it is beautiful even without words. The chemistry and biology of the fragrances and sense of smell are very intriguing and interesting.

The sense of smell is called ***olfaction.*** Our nasal cavity contains receptors which are called ***chemoreceptors.*** These chemoreceptors are located in the olfactory epithelium. The sequence that is followed in smelling something is - the odourant molecules get dissolved in mucus and bind with the receptors. This binding activates a protein that further activates an enzyme and ATP gets converted to AMP. This is followed by the diffusion of sodium ions into the cell, facilitated by a potential decrease across the plasma membrane and is adapted by olfactory nerves. Our brain smells the substance which is the source of the odourant molecule.

Have you ever wondered why a certain thing smells the way it does, why we can smell something that is far away and can't smell things that are just beside us? Chemistry plays an important role in deciding the odours of different substances; pleasant and unpleasant, intense and faint odours. When we sense a smell in the air, we're sensing the presence of small, vaporized molecules. Some substances are more volatile than others and have intense smells. There are so many different kinds of odour-causing molecules. There are about 340 different types of odour receptors in humans that work together in different combinations to identify specific smells. Ammonia, formaldehyde, sulphur compounds, caffeine, hedione, *etc.* are examples of odour-causing substances.

Having a running nose, a cold, flu affects our sense of smell and it is disturbing not being able to smell anything. Have you ever thought what would it have been like if there was no sense of smell? I just wonder how disturbing it can be for people who suffer from smell disorders. Smell disorders are a reduced ability to smell or changes in the way they perceive odours. There are so many reasons behind these disorders, some being more common than others. Ageing, head injuries, illness, exposure to certain chemicals, dental problems, exposure to radiation, *etc.* these disorders can lead to various problems and are treated by an otolaryngologist, also referred to as ENT.

The human body is so beautifully designed that it can sense so many different smells, can remember them and recognize them. Smells bring back memories, flashbacks, dreams, people and relationships. According to an article, the researchers found that the human nose could smell many more than 10,000 scents based on the fact that a typical nose has almost 400 olfactory receptors. Thalassa Cruso said, "The sense of smell can be extraordinarily evocative, bringing back pictures as sharp as photographs of scenes that had left the conscious mind." The sense of smell is so amazing that it alone deserves the appreciation as of the whole human body.

Mansi Pareek, III Year

MOM's Venture into Space

After the failure of GSLV, due to lack of funds, and time, India had no choice but to start this venture and complete it within the nearest launch window which was only a few months away. Losing this chance would mean to delay the project for 780 days by which many countries would have already created history. With heavy hearts, weather complications and many technical issues, Mangalyaan set forth its journey on the last scheduled day of the launch window on 5 November 2013 by ISRO. The Mars Orbital Mission (MOM) probe lifted-off from the First Launch Pad at Sriharikota Range in Andhra Pradesh using the less powerful PSLV rocket C-25. The MOM probe spent about a month in Earth's orbit, where it made a series of seven apogee-raising orbital manoeuvres following the fuel-saving Hohmann Theory before trans-Mars injection on 30 November 2013 at 19:19 UTC when a 23-minute engine firing initiated the transfer of MOM away from Earth's orbit and on the heliocentric trajectory towards Mars.

After enduring a 298-day and 78,00,00,000 km transit to Mars, it was inserted into the Mars orbit on 24 September 2014.

The 1337.2 kg MOM probe is currently monitored by The ISRO Telemetry, Tracking and Command Network performing navigation and tracking operations for the launch with ground stations at Sriharikota, Port Blair, Brunei and Biak in Indonesia, and after the spacecraft's apogee became more than 100,000 km, an 18 m long and a 32 m diameter antenna of the Indian Deep Space Network were utilized. NASA's Deep Space Network is providing position data through its three stations located in Canberra, Madrid, and Goldstone during the non-visible period of ISRO's network. The South African National Space Agency's Hartebeesthoek ground station is also providing satellite tracking, telemetry and command services.

The 15 kg scientific payloads aboard consists of five instruments: Lyman-Alpha Photometer (LAP), Methane Sensor for Mars (MSM), Mars Exospheric Neutral Composition Analyser (MENCA), Thermal Infrared Imaging Spectrometer (TIS) and Mars Color Camera (MCC).

The primary objective of the mission is to develop the technologies required for designing, planning, management, and operations of an interplanetary mission. The secondary objective is to explore Mars' surface features, morphology, mineralogy and Martian atmosphere using indigenous scientific instruments. Also, using MSM payload (found defective), specific research for methane in the Martian atmosphere will indicate the possibility or the past existence of life on this planet.

MOM was manufactured in a mere 15 months while NASA's MAVEN took five years to complete. On 24 September 2015, ISRO released it's 'Mars Atlas' - a 120-page scientific atlas containing images and data from MOM after completion of 1 year in its orbit around Mars, although the designed mission life was only 6 months, releasing over 980 pictures.

Prime Minister Mr. Narendra Modi said, "ISRO carried out one of the most creative interplanetary mission costing Rs. 450 crores which is less than the budget of Hollywood movies." Mangalyaan's trip to Mars costs about Rs. 6.7 per km which is cheaper than what auto-rickshaws charge in Gujarat. Make in India made this budget-friendly mission possible.

On completing 50 years of ISRO, Akshay Kumar and Vidya Balan's movie, Mission Mangal highlights the work behind the monumental mission undertaken by ISRO that created history and made India proud by placing us as the first country to reach Mars in its maiden attempt.

The exemplary and accomplished team of scientists at ISRO and their one after the other attempts to explore the interstellar space left no stone unturned to gain the confidence of the world over India's capabilities in Science.

ISRO also plans to launch MOM2, a second interplanetary mission in 2024.

Ananya Thukral, I Year

What is COVID-19?

An outbreak of Coronavirus disease (COVID-19), that began in Wuhan, China at the end of 2019, has now reached over 100 countries and possesses a huge threat to the global public health and economy.

A β-coronavirus, SARS-CoV-2, was recognized in a cluster of patients with community-acquired pneumonia in Wuhan, Hubei Province, China, in December 2019. Due to the high-speed rail network within China and international travel, this novel coronavirus rapidly disseminated to all provinces of China and 25 countries in the Asia-Pacific region, North America, Europe, and South America within 1 month of its official discovery. Similar to the other β-coronaviruses, such as severe acute respiratory syndrome–associated coronavirus (SARS-CoV) and Middle East respiratory syndrome–associated coronavirus (MERS-CoV), the SARS-CoV-2 is postulated to have originated from bats and to have been transmitted to intermediate hosts before jumping to humans, causing community and nosocomial pneumonia. Before February 11, 2020, the disease caused by this novel coronavirus was temporarily named the 2019 novel coronavirus (2019-nCoV) disease. On February 11, 2020, the World Health Organization renamed the disease the corona virus disease 2019 (COVID-19), and the virus was classified as SARS-CoV-2 by the International Committee on Taxonomy of Viruses (ICTV). By February 17, 2020, a total of 71,429 people had been infected globally, including 70,635 cases (98.9%) in China. With the addition of 3 patients who died in the Philippines, Japan and France, 1772 deaths have been reported in China, with a crude mortality of 2.5%.

All populations are generally susceptible to SARS-CoV-2. The elderly and people with underlying diseases or low immune functioning are more likely to end up becoming severe cases. In addition, pregnant women and infants infected with SARS-CoV-2 are also prone to develop severe pneumonia. Thus, these vulnerable patients should be considered as a focus in the prevention and management of SARS-CoV-2 infection.

"COVID-19 has the potential not only to cause thousands of deaths, but to also unleash economic and social devastation. Its spread beyond major cities means the opening of a new front in our fight against this virus," said Dr. Matshidiso Moeti, World Health Organization (WHO) Regional Director for Africa. This requires a decentralized response, which is tailored to the local context. Communities need to be empowered, and provincial and district levels of government need to ensure they have the resources and expertise to respond to outbreaks locally. There is concern about the impact of the pandemic on countries with fragile health systems and those experiencing complex emergencies. The international community should extend technical and financial support to these countries to enhance response capacities and minimize the spread of the outbreak. Some countries may not have adequate intensive care unit capacity such as beds, ventilators and trained personal.

It is critical that countries do all they can to prevent this outbreak from intensifying further. This means a strong public health response by every arm of the government and the society. WHO is working across Africa to deliver essential equipment, train health workers, clinicians and public servants on how best to respond to COVID-19, and to tailor global guidance to challenging local contexts. In the face of the rapidly spreading disease and a large number of infected people, there is an urgent need for effective infection prevention and control measures. However, some of the measures that have been introduced have no scientific basis and have proven to be ineffective.

First, although COVID-19 is spread by the airborne route, air disinfection of cities and communities is not known to be effective for disease control and

needs to be stopped. The widespread practice of spraying disinfectant and alcohol in the sky, on roads, vehicles, and personnel has no value; moreover, large quantities of alcohol and disinfectant are potentially harmful to humans and should be avoided.

Second, in the use of personal protective equipment, we should try to distinguish different risk factors, adopt different epidemic prevention measures, and reduce the waste of personal protective equipment, as these resources are already in short supply. Although surgical masks are in widespread use by the general population, there is no evidence that these masks prevent the acquisition of COVID-19, although they might slightly reduce the spread from an infected patient. High-filtration masks such as N95 masks and protective clothing (goggles and gowns) should be used in hospitals where health-care workers are in direct contact with infected patients.

Third, the practice of blocking traffic and lockdown of villages is of no value for the prevention and control of COVID-19. Since the outbreak of COVID-19, some countries have suspended flights to and from China, and prevented Chinese people from travelling to their countries; both of these actions violate WHO International Health Regulations. Similarly, in community prevention and control of the disease, the measures taken by individual villages and communities to seal off roads are of no value. Such measures could result in civil unrest and reduce compliance with infection prevention and control advice.

Fourth, public health education must be based on scientific evidence to reduce the anxiety and distress caused by misinformation. In particular, epidemiological findings need to be reported in a timely and objective manner so that they can be accurately assessed and interpreted. The risk of transmission with brief contact (less than 15 min face-to-face contact) or infection onset after 14 days of exposure to a known infected person (the estimated maximum incubation period) is low and should not be over-exaggerated. Misinformation spreads panic among the general population and is not conducive to implementation of epidemic control measures.

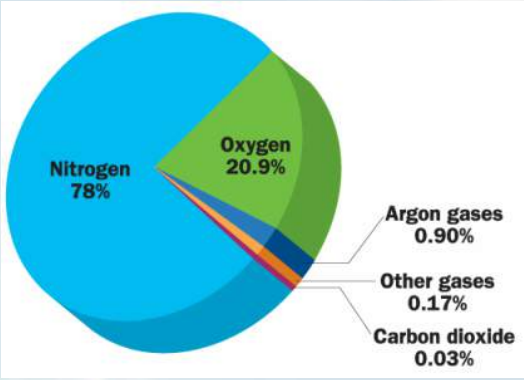
Fifth, WHO has made it clear that there are currently no known effective treatments for COVID-19 and does not recommend the use of antiviral drugs, antibiotics, glucocorticoids, or traditional Chinese medicine. Despite this, there have been reports of the use of oseltamivir, lopinavir/ritonavir, prednisone, antibiotics, and traditional Chinese medicine for the treatment of patients with COVID-19. Care should be taken to not give patients drugs of unknown efficacy, which might be detrimental to critically ill patients with COVID-19; clinical trials are urgently required in this context. Likewise, the development of a vaccine is an urgent public health priority. COVID-19 is an emerging infectious disease of global public health concern. Efforts to control the COVID-19 epidemic are likely to require an evidence-based, multi-factorial approach. First, there is a need to limit human-to-human transmission, including reducing secondary infections among close contacts and health-care workers, preventing transmission amplification events, and preventing further international spread. Second, there is a need to rapidly identify, isolate, and provide optimized care for patients. Third, we need to identify and reduce transmission from the animal source or sources. Fourth, we need to address crucial uncertainties such as clinical severity, extent of transmission and infection, and treatment options, and accelerate the development of diagnostics, therapeutics, and vaccines. We also need to minimize social disruption and economic impact through international, collaborative and multisectoral approaches. Most importantly, we need to communicate the epidemiology and risks of COVID-19 clearly, both to health-care workers and to the general population, and to implement infection prevention and control measures that are based on sound scientific principles.

Sharon Tribhuvan, I Year

100 Years of Nobel to the Noble Ammonia

What comes to your mind when you hear Ammonia? A pungent smelling colourless compound. And of course, the famous Haber's Process. How can a chemist not think of the Haber's process when we have been taught about it and have written the answer to this question in almost every exam where ammonia was a part of the curriculum! This gives an inkling of how important the Haber's process is.

As a kid, when they taught us the composition of air in school, I always wondered as to why nitrogen constitutes a huge 79% while the life-saver oxygen only 20.8% in atmospheric air? Was Nature imperfect and had gone wrong, or was nitrogen really that important? It was only later that I realized that Nature cannot go wrong, that even the little bacteria Rhizobium were interested in fixing it in the roots of leguminous plants indicating Nature very well knew that having nitrogen was important, that industrial preparation of ammonia was indeed so important to be always asked in exams and that in the big scheme of survival of life, 79% ammonia was worthy of its weightage.



Nitrogen (N_2) is extensively present in living systems (have your ever thought how abundant is N in RNA, DNA and the very proteins and enzymes that govern our biological functions, and for that matter the physiological functions in all flora and fauna). What mess life would be in without this particular atom N? The problem, however was that nitrogen existed in nature as N_2 (g) and therefore although available in abundance, it was necessary to convert it to forms which could be assimilated and used by living systems. N_2 had to be fixed as N-containing compounds.

But fixing nitrogen was not easy. Atmospheric nitrogen has three bonds between two N atoms (one sigma and two pi) and the bond dissociation enthalpy is way too high (nearly 945 kJ/mol) thus making N_2 a non-reactive gas. Even the thought of cleaving this bond called for appreciation and here there was a German Chemist Fritz Haber who well back in 1908 was attempting to do this. Great science is the result of some path-breaking attempts and endeavours of many committed, determined and sometimes stubborn scientists who never gave up on an idea that their minds thought sane (it was pure insanity to the world until the results were out). Fritz Haber was one of them.

He undertook the work on the fixation of nitrogen from air which proved a revelation and a revolution that astonished the whole world - for it was a discovery that could be foreseen to benefit mankind in multiple ways. In 1905 he had published his book on the thermodynamics of technical gas reactions, in which he recorded the production of small amounts of ammonia from N_2 and H_2 at a temperature of 1000°C with the help of iron as a catalyst. Later he decided to attempt the synthesis of ammonia and this he accomplished after searches for suitable catalysts, by circulating nitrogen and hydrogen over the catalyst at a pressure of 150-200 atmospheres at a temperature of about 500°C. This resulted in the establishment, with the cooperation of Carl Bosch and Mittasch, of the Oppau and Leuna Ammonia Works, which enabled Germany to prolong the First World War when, in 1914, her supplies of nitrates for making explosives had failed. Modifications of this Haber process also provided ammonium sulphate for use as a fertilizer for the soil. The principle used for this process and the subsequent development of the control of catalytic

reactions at high pressures and temperatures, led to the synthesis of methyl alcohol by Alwin Mittasch and to the hydrogenation of coal by the method of Bergius and the production of nitric acid.

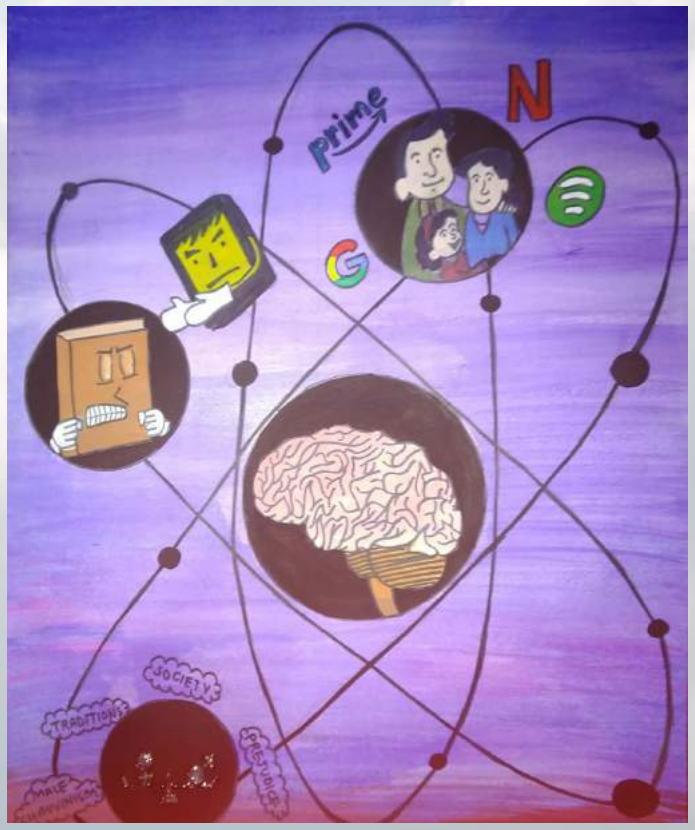
Synthesis of ammonia opened gateways for the preparation of a number of important chemical compounds like fertilizers which ushered in high productivities in agriculture across the world.

Fritz Haber and Carl Bosch were cited as the recipients of the Nobel Prize in Chemistry for 1918 which was awarded to them in 1919. The year 2019 marked the centenary of Nobel Prize to Haber and Bosch for their patent over the very famous equation we have been writing in exams as kids!

Haber lived for science, both for its own sake and also for the influence it has in moulding human life and human culture and civilization. Today we will all agree that Haber-Bosch production of ammonia is one of the most significant processes of the 20th century. As a Chemist, I would always be thankful to Haber and Bosch. I think we all will be!

(Note: While studying about Haber's process for ammonia production, I did come across a few articles that referred to him as the Father of Chemical Warfare. Another article said 'Fritz Haber prevented many from starving and developed chemical gases that would kill many'. During World War I, Haber led a team in developing chlorine gas to be used in trench warfare, along with other deadly gases. As he studied the effects of poisonous gases during the war, Haber concluded that being exposed to the same toxins in a low concentration over a long period yielded the same deadly result. This equation became known as Haber's rule and was used as a form of warfare. But today, I rest my case seeing the half-filled side of a glass of water. We are celebrating 100 years of Nobel prize to ammonia and maybe we will dissect on Haber and his personality, the unfilled-half of the water glass, after the exams!)

Mansi Pareek, III Year



Divya Chawla, III Year

Get Out of Your Screens...

What is the first thing most of us do after the alarm goes off in the morning? Reach for our cell phones most probably even if we are half awake.

Looking around, you find the majority of people staring at their cell phone screens; be it in the metro or a bus or simply while walking around. This is not just common in India, but all over the world. According to reports, people start feeling anxious, if they accidentally leave the house without a cell phone, as if something major is missing.

Technology simplifies and enhances our lives each day. It is impossible to believe what proportion we use technology in several ways every day. The constant advancements have had a huge impact in the field of education, but let's face it: technology also has its disadvantages. The constant online connection and urge to instantly communicate with anyone at any time have made stress in our lives.

Everywhere we go, we cannot seem to flee those sounds and buzzes that are constantly alerting about the arrival of latest messages, new e-mails, or new "likes" on social media. And we feel compelled to respond to those messages and notifications quickly. We have become slaves to devices that were supposed to make our lives easier and less stressful. Do you think there is such a thing as being hooked into or co-dependent on technology, specifically, cell phones? Some people use technology without any problems. But there are quite a few cases where technology has affected both the individual and person's relationships. These dependencies are not usually a serious problem, but there are children who become violently upset or distraught on the termination of these activities. In the case of adults, the addiction includes activities such as online gambling, gaming, pornography, sports, shopping and many others. According to experts, these have caused psychological symptoms in some, and have put an end to marriages and relationships in some others. Because cell phones are with us almost 100% of the time, it can strengthen the connection and dependency on the activities. This is not possible with a computer or TV. Now you can have TV, gaming, porn, gambling, and all the other activities in your pocket or purse.

"Technology are often our greatest friend, and technology also can be the most important party popper of our lives. It interrupts our own story, interrupts our ability to possess an idea or a daydream, to imagine something wonderful because we're too busy bridging the walk from the cafeteria back to the office on the telephone."

–Steven Spielberg

Technology and social media have affected the way we interact and communicate. None of us seems to be engaged in a face-to-face conversation. There was a park near my home. That park was always beautiful, especially when elderly people would gather in the evenings. On most of the days I accompanied my grandpa and I would always walk with them as they chatted with each other. They always looked happy and healthy. Nowadays, we people just have "virtual friends." I often, wonder how my grandpa would have reacted to Facebook, Google, and having friends on the Internet. Recently, I have found that the simplest way to disconnect is by adding more activities to your life.

Also, to avoid misunderstandings with friends while trying to stay disconnected, it is better to let them know that you will not be responding to texts or e-mails immediately anymore. I have started making mindful choices for myself and try to avoid wasting time browsing the Internet. I only use my laptop to write and do not anxiously check my e-mail every two minutes.

Get out, life is beautiful, and it is happening right in front of our eyes, stop being constantly distracted. We often forget that there is a power-off button on our phones. Try to not be that person who can't live without her cell phone. Life is already fast-paced, so why not take back some of what is ours?

Stuti Vashisht, II Year

Shridhara Mathur, II Year

Financial Independence of Women-A Blurry Dream

It's 2020, and we're going strong in our fight against gender inequality's innumerous faces. Education, nationwide agitation and awareness campaigns have paved a way to mould rigid minds, and more families are accepting and realizing that the young female folk aren't to be confined to hearth and home. Women are excelling in places they weren't initially allowed or welcomed to enter- be it technology, finance, sports or Indian temples, and are earning on their own. At large, the nation is succeeding to eradicate deep rooted taboos and apprehensions, but mentioning only the positive would be like serving a burnt egg with its sunny side up. Women may have gained representation in various fields, but their independence is still majorly governed by men in the family.

The unaware homemaker

Indian culture, that happens unanimously to us all, has embossed a gender biased hierarchy in our lives. Women have the unspoken rules of patriarchy inked in their minds, and they do not realise the financial fatalities that may be inflicted upon them in the long run. More women are pursuing higher studies, but only about 40% of Indian female college graduates start to work. The rest are either married off immediately or after they achieve higher degrees. A small fraction of women take up jobs after completing their education, which skews the sex ratio at workplaces. This prevalent trend renders around 60% of educated women jobless and thus threatens their financial security. They depend either on their fathers or spouses for money, and most women don't even consider it as an issue to be addressed. Disguised financial suppression not only makes women helpless and self- insufficient, but also cuts them off the world of money. Women are less likely than men to have bank accounts, and are less aware about financial management and investment procedures. On the contrary, women are also known to have a longer lifespan than men, and in case of a casualty with the family's patriarch, they are left in a quagmire of responsibilities and tit bits of savings that they hid behind the almirah or inside the folds of their boxed sarees.

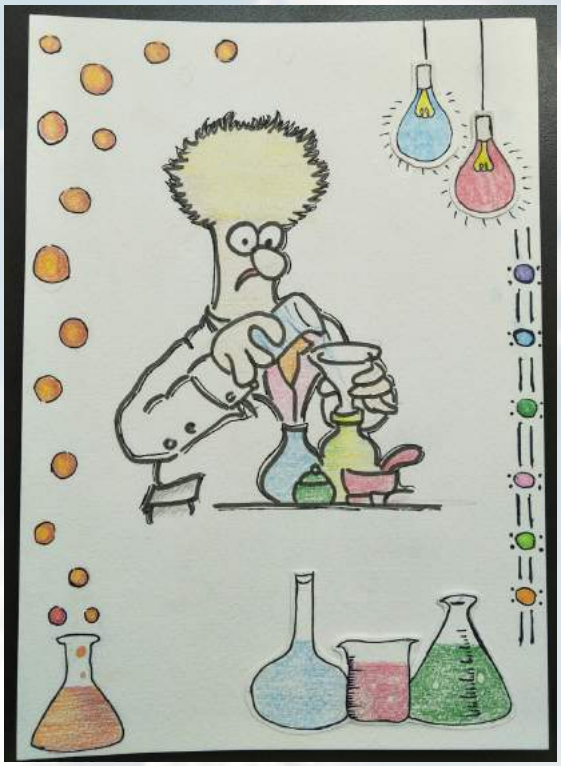
It's almost as if the society was generous enough to provide us with basic literacy, but their ultimate priority still remains to ensure that women do not neglect homemaking for the sake of their careers.

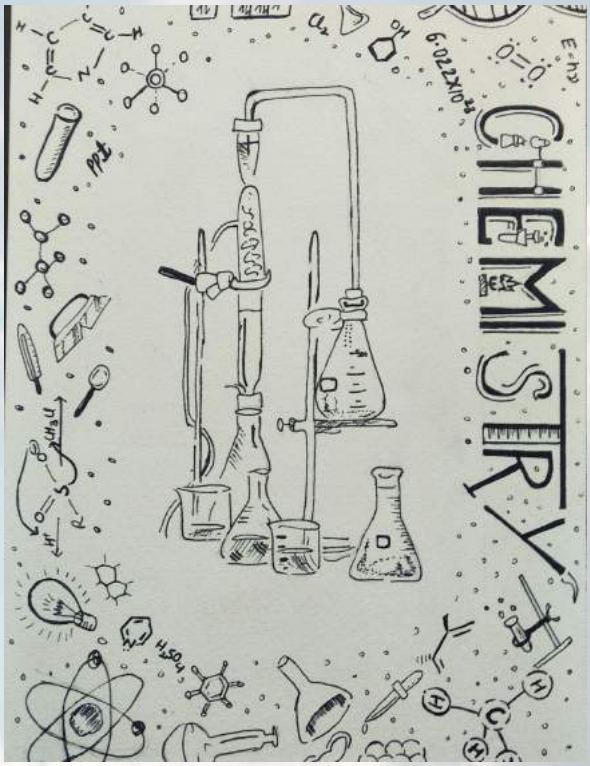
The oblivious professional

An aim for financial independence is rare in the female workforce, and they're happy as long as their salaries are being credited. According to a recent study from UBS Global Wealth Management, 58 percent of women aged 20-34 leave crucial monetary choices up to their male partners. Even before conscious realization, they naturally resort to men for financial management, decision making and sometimes even schedule planning- women tend to adjust and compromise on their jobs, deadlines and leisure for the family's comfort, and men neither feel nor are expected to make any changes in their routines. Also, their careers often take a backseat after marriage and during pregnancies-the break that was supposed to be short timed transforms to a disadvantage in their job profiles. Maternity leave policies are still ill framed in several organisations, and result in more and more woman permanently giving up on their jobs. Apart from this, it is observed that newly married women or young mothers willing to restart their careers are not preferably hired, as there are high chances of them being irregular at work.

It's very important for women to understand and utilize the ownership of their hard earned money, and decide how they choose to save and spend it. Financial empowerment of women is a sphere that needs to be more talked and discussed about in order to raise awareness among our fellows and family.

Shridhara Mathur, II Year





Seveli Kaur, II Year

Movie Review- *Thappad*

Thappad manages to capture the very essence of patriarchy that is deep-rooted in the Indian society. It's a simple movie- hardly wavering from its main theme. Unlike many other Bollywood movies, *Thappad* isn't just another fluff piece cloaked in the garbs of progressiveness. It focuses on the seemingly "silent" consequences of patriarchy- those consequences that have crossed the threshold of normalcy for most Indians.

The stories of all the characters in the film resonate with the main theme. There is no hero in this story, but the life of each woman is given equal importance. The mother, the mother-in-law, the house help, Amrita's lawyer and Amrita herself share similar experiences even though they are from different generations and walks of life. This emphasizes on how widespread the roots of patriarchy are. Over the course of the movie, each woman traverses through a journey of self-realisation, discovery and courage to finally reach the destination of empowerment in their
own way.

We see Amrita trying to steer her way through a world that is highly unfair- a world that expected her to meet all the standards of a "good wife", without having any expectations of her own. Her life is almost monotonous, but she doesn't complain about it. In fact, Amrita doesn't mind the routine of her life. She wakes up much earlier than Vikram, prepares tea, and then breakfast and goes on to wake up Vikram; she helps him in his work, arranging files and folders, happy to assist him and be his pillar of support when needed. And she does all of this without an ounce of bitterness until he slaps her. At that instant, as she says so herself, "everything that was unfair became crystal clear to her" and she wasn't willing to overlook the unfairness anymore.

Thappad doesn't criticize a particular character, but it stands against a mindset that has traversed through the generations. It challenges the role of meek and timid women who put their needs behind those of their husbands'/society. A very telling scene is a one in which Vikram tells Amrita that he doesn't want to work in an office where "he isn't valued". He states vehemently that at some point one must put one's "foot down". The irony in these lines is evident, and a parallel is drawn between Vikram's life in office and Amrita's life at home. And while society doesn't completely blame Vikram for lashing out and slapping Amrita due to complications in his work life, they are weary of Amrita's decision to divorce her husband. Her own lawyer advices her against it for it was a messy option and advises her to stay at home and put on a bold face, because lying to oneself was easier than going through a divorce in a patriarchal and judgemental society.

One of my favourite aspects of the movie is how it differentiates between love and respect. We often tend to accept the two emotions as one and the same. We forgive the people who don't bestow us with the respect we deserve by consoling ourselves with the "I know they love me" line. Our patriarchal society is a strong believer of letting bygones be bygones in matters concerning women. When a woman stands up to seek the respect she deserves, instead of supporting her, society ends up openly shaming her or silently judging her. This is clearly seen in this movie. Everyone, including her own mother and brother, believes that Amrita should "move on" and forgive Vikram for slapping her. Even Vikram, her "loving" husband, instead of apologising to Amrita, tries to justify his act and casually assures her that he loves her. In fact,

he thinks his sadness for not getting promoted is a just enough reason for his violent reaction. In a turning point, when Amrita puts her foot down to reclaim her self-respect and happiness, Vikram ridicules her for being overly dramatic. This scene clearly paints a picture of society's expectations for women- suffering and acceptance are a part of a woman's journey. A good woman should be able to swallow her pride and move on, because after all, it was just one slap. In the climax of the movie, it is revealed that Amrita is carrying their child, and at this point the audience is almost sure that *Thappad* will stay true to the Bollywood style, and Amrita will go back to her husband, ready to sacrifice everything for her child. But there is a happy surprise in store for us when she decides to prioritize on her happiness, stating that she cannot continue to live with the man whom she "doesn't love", even if he was her child's father. One of the most beautiful moments was at the end of the movie. Even when Vikram seemed to have learnt his lesson and understood the major flaws in his behaviour, Amrita doesn't get back together with him, like in several other Bollywood films. Instead, she decides to carve her own way in the world, because even if it was "just one" slap- "just one wrong" decision- it was a slap, and she was clear that she would not forgive him for that. She was not willing to compromise on her self-respect.

Thappad resounds with a quiet anger, the kind that shatters glass ceilings without creating a din. It spoke about an issue that was extremely relevant and often ignored- an almost invisible consequence of the patriarchal society. It challenges an almost imperceptible toxic masculinity that has acquired the status of normalcy- Vikram was not a "bad man", but he was misguided and a victim to the gender roles assigned by a patriarchal society. Despite being educated, he could not rise above the stereotypes and the unnecessary entitlement bestowed upon him by a traditional society. It's important for films to address such issues for they can have a huge effect on changing the age old mindsets of the people. *Thappad* is just the beginning.

Ramya Vishwanath, II Year

Chemical Horoscope 2020

Aries ♈

2020 will be full of personal and professional success. You'll feel more reactive and energetic, enough to cross the threshold to solve problems. Find the active site of your goal and form strong bonds with your success. Even if you haven't found your soulmate yet, don't worry. In this world full of inert metals, you'll find your hydrogen and oxygen soon.

Taurus ♉

2020 promises personal growth and powerful life changes. Just go with the flow and mix yourself up like water and sodium chloride. This year the melting point of your fear will be so high that no problem can make you melt, until impurities like laziness are out of sight.

Gemini ♊

2020 will be the building period of your life where atoms of your hard work, determination and strength will combine to build a powerful future. It's the year of opportunities. Show the world your VIBGYOR colours because they are harmless unlike the UV, X-ray and others.

Cancer ♋

2020 will be more peaceful than the last year and promises lots of revelations like carbon can link itself to not just 4 but 6 other atoms at a time. In the reaction to convert your hard work and determination into success, ill-health and stress might act as inhibitors. Beware, and add suitable catalysts of strength and optimism to reach to the reaction completion.

Leo ♌

2020 has come loaded with luck, cheerfulness, optimism, and opportunities of expansion that are perfect solutes for precipitating out stress and fear, giving a clear solution to the solvent of life. Remember, nothing is as perfect as ideal gases. Don't be too hard on yourself. Your creativity and innovation will bring you prosperity.

Virgo ♍

2020 will be the year of important acquisitions that might give you stability similar to that acquired by halogens after 1 electron gain. Regardless of the problems you need to solve, life will always be peaceful because however hard the mechanism of a reaction be, the final product is always beautiful. Creating a positive environment is the key to your problems because it's your surroundings that govern your characteristic behaviours in today's chemical environment.

Libra ♎

2020 is the year of personal growth, it'll restore your zest in life. Your high affinity for creativity will give you lots of opportunities. Enough sleep, healthy diet and fit body is what you need to keep the ΔG of your life negative to give you a smooth spontaneous year. You will face some emotional ups and downs so follow the Le-Chatelier's principle to undo these effects and maintain an equilibrium in life.

Scorpio ♏

In the past years, your constant efforts & dedication have lowered the activation energy barrier for positive life changes and now that you have overcome the barrier, 2020 is the year to reap the rewards of efforts made in the past. This year will give you the optimum conditions to accomplish what you have dreamt-of. This year you will meet someone as interesting and complex as hydrogen, who will light up the atmosphere.

Sagittarius♐

2020 will be the year of prosperity, fortune and success. You will find happiness in things as small as an atom that will make you realize that little

things can make you feel the luckiest, at times. This year will be that phase of your life where you will observe a triple point at which the three states of mind; focus, confusion, confidence, coexist at the same time. 2020 will give you an extraordinary experience and by its end you will be able to establish principles for a greener life to achieve happiness, without upsetting others in your surroundings.

Capricorn ♑

2020 will be the year where the rate of your life reaction will follow the second order kinetics and the reaction will be directly proportional to the concentration of your focus and creativity. Remember, your qualities are rare and unique like the atomic spectra of elements. Look out for the indicators which when added in your life reaction changes colours, making your life colourful.

Aquarius ♒

2020 will be the year of powerful changes that will take you out of your comfort zone. You might have less optimistic days, feel anxious, stressed but don't let it destroy you. Just as the high surface tension in a water droplet gives it a beautiful spherical shape, these hard times are only going to give you a beautiful personality. This year you need to re-evaluate your relationships and break the unnecessary bonds retaining only the worthy ones for better stability.

Pisces ♓

2020 is about personal growth, adapting new theories for better understanding. Your self linking property *i.e.* the relationship you form with yourself will give you abundance just like catenation gives to carbon. This year is all about yourself. You have to work on your personality and bring the required changes because we can't always explain everything with classical theory, at some point of time we have to adopt the Quantum theory to restructure ideologies.

Vidushi Gupta, III Year

FRAMED

Swinging back and forth in the ancestral armchair,
I relish the ginger tea *badi Maasi* prepared me
And scan the newly painted walls of her room.
I lamentably fail to recall the last time
I made her tea.
She's sitting across me, praying,
Probably for whole family but herself.

As each rosary bead takes turn
To pass through the gentle stroke of her
wrinkled fingers,
I notice protruded veins
Bifurcating across her grainy skin.
The blue lagoon lines on her earth coloured arms
Resemble a familiar sight.

'*Naani's* hands used to look the exact same'– I recall.
It's funny how the dark tones of our skin
And the bruises we get from endlessly touching hot vessels on the stove
Pass down the line as generational curses.

I roll my eyes back to the wall.
A 2005 photograph of me and *maa* with her eldest daughter
Leads the line of 10 frames.
Pictures of her children,
Grandchildren,
Sons in law
Are in abundance.
I ask her,
"Why isn't there a picture of you, *Maasi*?"
Her deep brown eyes, encircled by scars from lost battles of individuality
Glistened through a layer of moisture.
Her defiant glance gave an answer
She didn't want to utter.
Forcing a laugh, she declared
'You'll understand when you have kids, *beta*.
They're my world. I'd rather look at you lot than myself and feel happy';
I flinched, realising
How obliviously she normalised
Losing herself for nourishing the blood
That made her bleed for months after its arrival-
She is just one from the lot of a thousand Indian mothers
Who were fed drugs of sacrifice, timidity and 'grace'
Being told that it made them ideal.
Ideal for family, society, and everything else- nobody taught them
to put themselves first

At that moment,
I decided to be a 'bad woman';
To refrain from the paint patriarchy wanted me to wear
And colour my life in the shades I like.
To behave and sit
Contrary to the world's teachings
And think about myself when I'm (not) supposed to
To counter the sexist jokes my uncles crack
on the dinner table
And 'embarrass' papa by speaking a little too much,
To give up on people who loved me only because
I used to nod at everything they said.

And I decided that someday, when I own money which isn't from papa's bank account
I'll take *Badi Maasi* out
And buy her something other than a Saree.

Shridhara Mathur, II Year

THE CITY

In familiarity
Resides comfort,
And an acceptance
that finds even the flaws
Endearing.
Sitting on the colourful, battered seats of the auto,
The bustling city
Whizzes past my blurry eyes,
A vision of chaos
Even in the early hours of the wintry day.
The cold wind smacks my face,
Ruffles my hair
And threatens to steal the
fragile 30 rupee notes that are clutched in my hand,
And I unflinchingly take in the disorderliness of the roads.
At this time of the day,
the traffic is a little less maddening-
You could almost call it sane,
but the impatience levels of the people
Are still soaring.
The blaring sound of car horns
And the screeching of tyres
Echo on the dusty streets,
Adorned with yellow laburnum trees
That shine bright
Under the clear blue sky.
The footpaths are crowded
With hassled pedestrians
Shoving their way,
And stomping on the dead yellow leaves
as they hurry to their destinations.
On your bad days,
It's easy to lose yourself
Amidst this constant flurry of activity,
But on most days,
This chaos seems like home.
The familiarity offers you solace,
And strangers on the street
Make you feel a little less lonely
In the big bustling city.

STAGNANCE

Have you ever tried staring at a blank page,
Urging your mind to start working,
Listlessly staring at the whiteness,
Wondering if you could stay frozen in the same comfortable position-
Unblinking and stationary,
Till the end of time?
Have you ever wondered
If time was nice enough to stop momentarily,
So that you could revel in your day dream,
Without worrying about the ticking clock
And the endless tasks on your to-do list
That always seem five minutes away from completion?
Have you ever come up with a thousand excuses
To convince yourself,
That the right time to start working
Was still half an hour away-
1 hour away-
6 hours away-
Eventually,
Only to find yourself exhausted
From doing nothing,
But lethargically lazing about,
And actively stressing about what you should be doing?
Have you ever imagined what life would be
If procrastination didn't eat up all the time that we had?
I tried to-
But then, I decided to write a poem
And dwell on this pertinent question
A
Little
Later.

Ramya Vishwanath, II Year

RISE

I will rise
After every fall.
I will rise
And stand tall.
I will rise
Over the wall.
I will rise
Above them all.
Like the sun,
Which never dies.
Though sets every night,
Every day it does rise.
Like the ocean
Whose tides
Many times they are down,
But invariably they rise.
Like the trees,
From seeds they arise,
And heights great
They rise and rise.
After falling once,
Twice and thrice,
Again and again
I will rise and rise.
I will rise
After every fall.
After every fall
I will rise.

Komal, II Year

An anonymous poem from Facebook, very pertinent to the current scenario of COVID lockdown

And people stayed at home
And read books
And listened
And they read
And did exercise
And made art and played
And learned new ways of being
And stopped and listened
More deeply
Someone meditated, someone prayed
Someone met their shadow
And people began to think differently
And people healed.
And in the absence of people who
Lived in ignorant ways
Dangerous meaningless and heartless,
The earth also began to heal
And when the danger ended and
People found themselves
They grieved for the dead
And made new choices
And dreamed of new visions
And created new ways of living
And completely healed the earth
Just as they were healed.

Anonymous (Shared by Dr. Sushmita Chowdhury)

कहाँ गए ?

कहाँ गए वो पुराने ज़माने,
जब सब थे बातों के दीवाने।
कहाँ गयी वो लंबी शाम,
और वो मीठी बातों के जाम।
कहाँ गयी वो रातें सुहानी,
कहाँ गयी वो चाँद की चांदनी।
कहाँ गए वो हँसी के गुब्बारे,
और वो सुनहरे पल हमारे।
कहाँ गयी वो लंबी बातें,
जिसे बताने में बीतती थी रातें।
कहाँ गए वो रंगीन सपनें,
जहाँ होते थे सब अपने |

कहाँ गयी वो गहरी बातें,
जब एक दूसरे को थे समझते।
कहाँ गया एक दूसरे को समझना,
और एक दूसरे को समझाना।
कहाँ गयी वो प्यार भरी लड़ाई,
जिसे सोच कर आज भी है आँख भर आयी।
कहाँ गयी वो खट्टी-मीठी शरारतें,
जिस से हर रिश्ते को थे हम सवारते।
कहाँ गए वो पुरानेदिन,
नहीं रह सकते थे हम जिसके बिन।
कहाँ गए?
कहाँ गए?

रिया रखेजा, द्वितीय वर्ष

हर काम छोड़ने कि ...

हर काम छोड़ने कि तो जैसे आदत हो गई है,
ना जाने क्यों हर बात पर शिकायत हो गई है।

पता नहीं कैसी बुरी यह छाया है,
या नयी तकनीकी दुनिया की माया है।
या है कोई यह मायाजाल,
जवाब एक नहीं बस हैं हज़ारों सवाल।

सवालों का जवाब ढूंढूं या यूँही छोड़ दूं,
या अपनी इस उलझन से भी मुँह मोड़ लूँ।

मतलबी होने लगी हूँ मैं होने लगी हूँ घमंडी,
तभी ख्यालों का सौदा करने जा रही हूँ सब्ज़ी मंडी।
हँसना मानो छोड़ दिया है, छोड़ दिया है रोना,
चुप्पी मैंने साध ली है तभी सब कहते हैं बोलो ना।

इसे भी पूरा करने का मन नहीं लेकिन शायद कोई मजबूरी है
बस इतना मान लेना यह मेरी इच्छा है जो अधूरी है।

रिया रखेजा, द्वितीय वर्ष

मनुष्य जीवन- एक वरदान

वरदान तेरा ही है ईश्वर जो मनुष्य जन्म है मैंने पाया,
मिल गया स्वर्ग-सा माँ का आँचल और पिता-सी पावन काया।
तृप्त हुए नन्हे से पग पाकर प्यारे से आंगन की छाया,
एहसास नहीं कर्तव्यों का, था मुझपर बचपन का साया।
वरदान तेरा ही है ईश्वर जो मनुष्य जन्म है मैंने पाया,
मिल गया स्वर्ग-सा माँ का आँचल और पिता-सी पावन काया।
फिर माँ ने धैर्य तो पिता ने संघर्षों से लड़ना सिखलाया,
देशप्रेम है सबसे ऊपर ये भी पापा तुमने बतलाया।
जामवंत बन हे ईश्वर! तूने ही मेरे सामर्थ्य का बोध कराया,
सीमित थी जो मेरी दुनियां, बन पंछी फिर आसमान से उसको मिलवाया।
वरदान तेरा ही है ईश्वर जो मनुष्य जन्म है मैंने पाया,
मिल गया स्वर्ग-सा माँ का आँचल और पिता-सी पावन काया।
मिल गया उद्देश्य जीवन का मुझको, मानवता शब्द समझ जब आया,
खौफ नहीं संघर्षों से अब, ख्वाब बड़ा है जब से पाया।
जन्म मिला इस मातृभूमि पर, था वीरों ने जिसका अस्तित्व बचाया,
माँ(भारत माँ) ख्वाब तेरा जीवित रखूंगी, वो त्याग न जाने दूंगी ज़ाया ।
वरदान तेरा ही है ईश्वर जो मनुष्य जन्म है मैंने पाया,
मिल गया स्वर्ग-सा माँ का आँचल और पिता-सी पावन काया।

अनामिका अवस्थी, तृतीय वर्ष

Glimpses of Activities, 2019-2020

Inter-College Poster Presentation Competition

Visit to the Glass Blowing Facility, IIT Delhi

With Ms. Priya and Ms. Saguna Mehra (Daughters of Late Dr. C. K. Khurana)

Inaugural Lecture - Lighting of Lamp

Curious Faces- Riddle-it-out

Spread the Light of Knowledge - United we Stand

Teacher's Day Celebrations

NCC Cadet Komal Rohilla being awarded for her participation in the Chief Minister's Independence Day Parade

Amalgam 2019-2020

All work and no play makes Jill a dull girl - Throwball Match, Teachers vs Students

Registration Desk - Inter-College Paper & Poster Presentation Competition

The Quintessential Compere

Prof. A Ramanan delivering a talk on Dr. C. K. Khurana Memorial Lecture

Laboratory Support Staff celebrating with us all

Behind the lovely photos

Judges of Talent-Hunt Competition with Performers & Winners

Winners of the First Prize in the Inter-College Paper Presentation Competition

Welcoming Prof. S. Sivaram in Principal's Room

Glimpses of Activities, 2019-2020

Participants doodle and write science fiction, while teachers and judges pose

Conveners of the Chemical Society 2019-2020

Diwali Celebrations

Teacher's Day Celebrations

Packed Seminar Hall listening to Prof. Sivaram

Happy Faces - Poster and Paper Presentation Competition

With Gargi Alumna Priya Jha of the Life Science 2015 batch at CFSL, Chandigarh

Principal Dr. Promila Kumar addressing the students at the Inter-College Competition

Students from various colleges presenting their projects

Curious Audience at Dr. C. K. Khurana Memorial Lecture

Silver Medal for March Past in SPIN-2020

Enjoying Kasauli Continental Resort

Chemical Society Events

Inaugural Lecture
(August 31, 2019)

The society formally started on August 31, 2019 by hosting its inaugural lecture on the topic "The Future of Chemistry: Research, Education and Society" by Padma Shree Prof. Swaminathan Sivaram, an honorary professor at IISER, Pune. The lecture was applauded by the audience, which included science students from various departments, faculty members from other DU colleges and other universities, and superannuated teachers of Gargi College. Every person sitting in the packed-seminar hall was mesmerized by the speaker's deep understanding of the subject, his command on language and his humility as a person.

Teacher's Day Celebrations
(September 5, 2019)

Rasgandhayan celebrated Teacher's Day with great excitement and zeal. Volunteers presented the teachers with roses as a welcoming gesture. A cake cutting ceremony was held, followed by short performances by a few students.
Beautifully crafted scrolls with heartfelt "thank you messages" were gifted to the teachers. At the end of the program, students and teachers relished their share of the cake!

Ozone Day Celebrations - Science Fiction Writing and Doodling Competitions (September 18, 2019)

Rasgandhayan, organized a Doodling and a Science-fiction story writing competition to celebrate the 'World Ozone Day' and the 'World Biofuel Day'. The theme for story writing was "A world without ozone" and the prompt for doodling was 'Ozone day'. Students from Gargi and a few other colleges participated with great enthusiasm. The judges for the Story Writing competition were Dr. Sushmita Chowdhury and Dr. Keya Banerjee.

Dr. Uttara Dutta and Dr. B. Vaijayanthi judged the Doodling competition. The doodle winning entries are displayed alongside.

Throwball Match (October 8, 2019)

All work and no play makes Jill a dull girl!

We study hard, this time we played hard too. The Chemical Society organized a throwball match between teachers and students. The highly spirited game was enjoyed by teachers and students alike. While most teachers played, the others cheered for them. Students across all three years of Chemistry (H) gave good competition to the teachers. It was absolute fun and relieving for both the teams giving them respite from the monotony of classes, labs and files.

The fun was beyond compare and enthused us for playing sports more so often.

Chemical Society Events

Diwali celebration and Talent-Hunt Competition (October 23, 2019)

While the festival of lights, Deepawali, was round the corner, the society came up with a new idea of lighting lamps so as to propagate the light of knowledge from teachers to students and further, to the support staff. The idea was to brighten all souls and bring the whole department together on the auspicious occasion of Diwali. Everyone enjoyed the Talent-Hunt competition held on this day where girls could be seen showcasing their latent talents like drawing, singing, dancing (contemporary and classical), poetry recitation, to name a few. The judges for the Talent-Hunt competition were Dr. Rita Bhatla and Dr. Renu Aggarwal. Students, in particular, enjoyed this event as it gave them a break from the monotony of labs and studies.

Riddle-it-Out…

January 31, 2020

"The one who knows all the answers has not been asked all the questions".
Rasgandhayan organised a quizzing event in which 19 teams from the various science departments participated. The questions were picked from various fields such as current affairs, logical reasoning, brain teasers, general chemistry and entertainment. The questions required significant brainstorming by the students and they displayed good competitive spirit while giving answers. It was a fun brain exercise and gave the students a refreshing break from their rigorous academic schedule.

Dr. C.K. Khurana Memorial Lecture
February 12, 2020

Celebrating the year 2020 as the year for 100 years of H-bonding, the society invited Prof. A. Ramanan from IIT Delhi to deliver the annual Dr. C. K. Khurana memorial lecture on February 12, 2020. Professor Ramanan spoke on "Molecular Rangolis - Chemical Insights into Crystallization"; and brought out the fine nuances of hydrogen bonding and crystallization, which was very well appreciated. This year, daughters of Dr. Khurana joined all of us (after 26 years) which made the lecture even more special, bringing along fond and nostalgic memories.

Visit to the Glass Blowing Facility, IIT Delhi
February 15, 2020

'Except from the academic world, one could also express themselves through visual art like glassblowing!'

The society organized an educational visit to the glass blowing facility of IIT Delhi on February 15, 2020. Mr. Virander Kumar Sharma showed how glass can be blown to make glassware/apparatus of various shapes and sizes. The students were in absolute awe during the whole course of his demonstration, especially when he blew the glass so thin to make a film out of it. It was surreal to watch the glass being blown precisely to give various shapes to it. The visit proved successful and delighted one and all garnering tremendous feedback.

Inter-College Paper and Poster Presentation Competition
CHEMAROMA, March 3, 2020

The society meticulously planned and put forth a large scale event this year - an Inter-College Paper and Poster Presentation competition, CHEMAROMA, on March 3, 2020, where a total of 16 student teams from various colleges of the University of Delhi (ARSD, ANDC, DBC, Gargi, Maitreyi, Miranda House, Ramjas, St. Stephen's, SVC, ZHDC) presented their undergraduate level project/research work. The society was privileged to have Prof. J. M. Khurana and Dr. Indu Tucker Sidhwani as judges for the oral paper presentations, while the poster presentations were judged by Dr. Vandna Luthra and Dr. Ritika Chauhan. The competition received tremendous appreciation from all students and teachers alike for giving platform to young kids to come forward and present their work to their peer groups and faculty members. The prizes for the oral presentation competition were donated by Dr. Sushmita Chowdhury (in the memory of her father) and Dr. B. Vaijayanthi (in the memory of her parents). The first prize in the Oral Presentation Competition was bagged by Dorothy Sachdeva, Shilpi Lamba and Priyanda Giri of B.Sc. (H) Chemistry III year of Gargi College.

Educational Visit to CFSL, Chandigarh
December 15-17, 2019

The Department Of Chemistry, Rasgandhayan, organized an educational visit to the Central Forensic Science Laboratory (CFSL), Chandigarh from December 15-17, 2019. CFSL, Chandigarh is the biggest forensic laboratory in India under the Directorate of Forensic Science Services, Ministry of Home Affairs, Government of India.

CFSL has various head departments like Physics, Chemistry, Biology, Toxicology, Explosive Materials and Arms and Ammunition (Ballistics), Cyber Crime cell etc. Some of these departments have subunits like the biology department which is further divided into Serology and DNA isolation units and the physics department which oversees the audio/video and electronics department. The departments work hand-in-hand as per the demands of the case brought to them by the Police under the direction of CBI, and try to bring to light the truth through the usage of science.

The biology department works in identifying the criminals by looking for any possibility of involvement/presence of an individual in a particular crime or at the crime spot. The Serology department studies body fluids like blood, saliva, serum, etc. and helps in predicting whether an accused is guilty or not, while the DNA Isolation Units work on obtaining the DNA of the accused and then matching the same with samples received from the crime scene or from the victim's body in cases of rape and murder, thus proving culpability. The isolation of DNA is an integral step (sometimes the analysts have to work with a sample as small as a drop) and once all the tests are carried out, the results are combined and matched with various profiles proposed. One that matches to all the results is considered guilty.

The ballistics department introduced students to various kinds of firearms, pistols, revolver, rifles, different kinds of bullets and also told how to differentiate between two bullets and how to recognize the firing weapon used during the crime. For the first time, we realized that a bullet fired from the same arm each time will have certain patterns exclusive to that particular firearm, which helps in its identification. We also saw under the microscope the difference between two bullets fired from different firearms and it was very fascinating.

The toxicology department made the students aware of poisons/toxins generally used for intoxicating or killing. Being situated in Punjab where agriculture is predominant and fertilizers and pesticides are used in abundance, we saw several post-mortem samples kept for analysis wherein a person was suspected to have committed suicide or was killed by the consumption of fertilizers/pesticides etc. Another section in CFSL was seen working in the custom inspection of alcohol samples randomly lifted from shops and manufacturing industries to check for traces of methyl alcohol - an adulterant in alcohol also responsible for death due to poisoning. We coincidently met our super-senior, Priya Jha, an alumna of Gargi Life Science 2015 batch working in this department and felt delighted to have met her.

While the department of explosive materials familiarized students with explosives and materials used for manufacturing, ways to neutralize them; the audio and video department acquainted us with the interesting voice and accent altering methods used by criminals to hide their identity. They did a hands-on with two of our friends showing that despite severe voice modulations, how the computer can identify from the ratio of Fourier transform of the frequency values, to which person the modulated voice belongs to. We felt thrilled

CFSL Visit Report

listening to these modulated voices still recognizable by the audio forensic experts. The department of electronics specially informed all girl students how to take extra precautions for their safety while using social media platforms and even mobile phones. We were told about cameras in hidden fans, lights, showers and other places and how using an app one can detect if there is a Wi-Fi enabled camera hidden somewhere in the room. We learnt in this division about criminals destroying data from mobile phones, computers and other gadgets and how the forensic team expertises in retrieving this lost data.

Last but not the least, the department of disputed documents made students wonder how people forge signatures, documents, cheques, currency etc. and how are these differentiated from the originals in the presence of an ink detecting UV light.

We as Chemistry students could understand the techniques, and the qualitative methods of analysis mentioned by the instructors in all divisions of the CFSL lab, thanks to our rigorous practical training in college and the knowledge of science. At the CFSL lab, we saw various instruments that are used for analysis - GC-MS Spectrophotometers, UV-light chambers, High-end microscopes, Ballistic microscopes, Super-fast Centrifuge machines (for DNA separation), qualitative determination of Fe(II) of blood, antigen-antibody coloured reactions and many others. Being familiar with the simpler versions of these machines at college and the underlying chemical concepts also aided in our easy understanding of the instructions we were receiving. All the things that we learnt or are learning in College suddenly saw its usage in these labs, which gave us great happiness and satisfaction. We felt in awe with our subject - Chemistry, as it formed the basis of many important analytical tests that are being used to nab criminals and bring justice in society. It also broadened our horizons of pursuing a career in forensic science thus utilizing our knowledge of Chemistry in real-life problems.

Overall the educational trip to CFSL proved to be as exciting as it promised to be. We are especially thankful to Dr. Renu Aggarwal Ma'am because of whose direct intervention into communicating with the Director, CFSL, the trip was made possible. We also thank Tripti Ma'am and Aching Ma'am for working out this trip just for us. We had a gala time during this visit and thank all accompanying teachers and friends who made the visit even more informative and enjoyable - something we will remember a lifetime.

A Visit to the Glassblowing Facility, IIT-Delhi
February 15, 2020

One fine Saturday, as Tripti and I, were waiting on the sixth floor of the Department of Chemistry, IIT Delhi to meet Prof. Ramanan to invite him as a speaker for Dr. C. K. Khurana Memorial Lecture, our eyes fell on a wooden-framed board displaying various apparatus used for chemistry practical work. What attracted our attention was how the apparatus and glassware we so frequently use in our labs were beautifully assembled like adorned ornamental pieces on the board. Alongside was affixed a poster with photographs of students of various schools and colleges attending the glassblowing workshop. It was at this very moment that it came into our minds to organize a visit to the Glassblowing Facility of IIT, Delhi for our students and faculty members. We were excited to see for ourselves as to how was glassblowing done and at the same time also confident that the visit to the facility as a part of the educational trip will offer an opportunity for students and teachers to witness the art of making glassware and will widen one's knowledge besides our classroom teaching. Prof. Ramanan told us about the right person to be contacted for this and they were very kind and welcoming to have our students for the visit.

When the announcement for registration was made, as expected, we received an overwhelming response from students and teachers. The selection of students was based on a first-come-first-serve basis as the seats were limited, however we were firm on giving special preference to B.Sc. Chemistry (H) II Year students as they earlier could not make it to the Educational trip to CFSL, Chandigarh, held in December 2019. Meanwhile, to our sheer surprise, the person in-charge of the Glassblowing Facility, happily agreed to accommodate all our registered students and teachers even though the number was around 100, way more than their prescribed batch size of 40 around.

On 15th February 2020, "Rasgandhayan" the Chemical Society, Gargi College, visited the Glassblowing Facility at IIT, Delhi. The students were split into batches, each batch comprising around 15-20 students and 2-4 teachers, thereby enabling the smooth execution and no overcrowding.

The technical in-charge of the Glassblowing Facility, Mr. Virander Kumar Sharma commenced the session by showcasing attractive glass decorative pieces placed on the table like - Ganesha glass figurine, lamp-stand of different designs, decorative bird-filled with fluorescein solution, paperweight and coloured glass items that had been fabricated in the facility. He revised with students the names of various kinds of commonly used glassware in undergraduate level such as condensers of different types and its uses, round bottom flask of various sizes with 1/2/3 neck, burettes, boiling tubes, pipettes, test tubes etc. He familiarized us with the basic tools required for glassblowing namely - burner, flame sizes, temperature control, glass types, cutting files and calipers etc. The basic technique involved in glass blowing is heating glass at high temperature (~1200°C) and inflating the molten glass with the help of a blowpipe. The working environment was furnished with the latest fire-safety equipments, and he himself was geared with protective glass, lab coat, gloves and shoes, conveying to us all a clear message that safety is the topmost priority while working in any lab.

Mr. Sharma started his demonstration by taking a long glass tube and heating one end of it while the other side (tube-end) was constantly rotated to melt it uniformly. We were amazed to see that in no time, with great precision and control of his hands and blowing, he converted this tube and fabricated a Round-

Glassblowing facility visit

Bottom flask out of it. The students were in absolute awe in the whole course of his demonstration, especially when he blew the glass so thin to make a film out of it. He further explained about the fabrication of different types of inner tubes (bulb/spiral/coiled) of condensers. The demonstration continued with the fixing and explanation of the inlet and the outlet in a condenser. He also taught us how to use a filer for cutting and smoothening of glass edges. Finally, he showed bending of glasses at different angles which was interesting to see and learn.

As the demonstration concluded, the spectacular scientific art demonstrated skillfully by the glassblower was applauded by everyone present there. The glassblower was also pleased with the students that he handed over the round bottom flasks to few students blown by him during the demonstration. Infact, on the request of Dr. Sushmita Chowdhury and Dr. Sushma Bhan, he also fabricated a sample glassware (as per their requirements) for testing borate ion during qualitative mixture analysis. The confidence and skill to fashion the molten glass perfectly into glassware for laboratory and aesthetic purposes left all of us with great admiration for people working in this field.

The visit was both educational as well as recreational, as we gained an insight into how the various apparatus we used so frequently were made and how one can design an apparatus of their choice using knowledge of glassblowing. Students and teachers were all in absolute awe after the visit, substantiated by the tremendous feedback received from everyone. It motivated and inspired students towards a different dimension to learning using their creative skills. The enthusiasm made them think of glassblowing as a career option especially for those who are inclined towards art and designing. The visit proved successful, and we were more than delighted to have our society spend a day together in a cosy bright sun (of Delhi winters) that too in the vast and spacious campus with greeneries around, memories that will be long cherished. A fun atmosphere of learning, what else one could desire?

Chingrishon Kathing

Memoirs from the Chandigarh-Kasauli trip

'Travel is the only thing we buy that makes us richer'.

The intervening night of December 14-15, 2019 was different. It was exhilarating because we all were excited to reach college by 06:30 a.m. to board the bus of our dreams. There was a rush, an excitement that didn't let some of us sleep the night before. Getting early has never been easy but even for those of us, that morning, it didn't look any difficult. As soon as we departed from the college, our thoughts were filled with what to eat first because we got many different varieties of snacks, courtesy our thoughtful teachers. On our way to Chandigarh, we stopped for breakfast at a Dhaba. For the rest of the ride we busied ourselves with the game of 'Antakshari', teachers *vs* students. On one hand where the teachers were surprised that their 21st century students could sing the retro numbers, we were dumbfounded that we were again losing to our teachers, first the throwball match and now this! We reached Hotel Sun Park, Chandigarh around noon. After freshening up and having mouth-watering lunch, we all headed to take in what Chandigarh had to offer. Our first stop was *The Rock Garden* where the celebrations of the 95th birthday of Shri Nek Chand Saini ji (creator of the garden) was in full swing. The exquisite rock structures and beautiful waterfalls in the garden were a sight to behold. After the garden, we proceeded towards the *Sukhna lake* where we got the much-needed rest after a tiring day. We munched on snacks and sipped tea in the winter chill, and enjoyed long walks with our friends along the banks. After shopping at the sector 17 market, we called it a day. Next day proved to be equally exciting when we discovered so much at Central Forensic Laboratory. After which, we began a stimulating journey through mountains of Kasauli. We sang and danced through every bend of the road without caring about anything. Some of us slipped over each other but who cared when you are having so much fun!

It was almost evening when we reached Kasauli Continental Resort. As soon as we entered our allotted rooms, we dashed towards the balcony to see the amazing view outside and started comparing who got a better view of the mountains. Even our teachers, who shall not be named joined us in our childish antics and started comparing who got a bigger room or a better closet. That's not it, it kept getting more and more interesting as the evening approached. At around 7 pm, we all gathered at the terrace to enjoy the bonfire. The view from there was stunning. We all decided to play musical chairs and every time somebody got out, they were made to dance on a song. It was so much fun! But the night didn't end there, we all sang , and danced and played many games until late midnight.

The next day early morning, we all went for trekking to the monkey point or the Manki point. On the way, we observed that roofs of houses acted as the ground floors where vehicles were parked! There were many buildings from the colonial era still intact, the best example of which was the beautiful Christ Church. En route we all decided to see who among us all is a real sports person by racing to the monkey point. Of course, after 5 minutes of that competitive session, we stopped caring about the racing (well at least I did) and focused on what nature had to offer us. The best and worst part was climbing stairs to the monkey point. Best because it was worth the amazing view that greeted us when we reached up there. And worst because there were too many monkeys who kept scaring the hell out of us! But if it wasn't for them it wouldn't have been so perfect. This was not like an outing with parents or hanging out with friends. It made me realize that I am grown up now and I can enjoy something else except lecture with my teachers. We got to know them as an individual not just as a teacher which I think was the best part of this whole experience.

DIVYA CHAWLA, III Year

Highlights of the Trip

At lake side - Sukhna Lake, Chandigarh

Day 1 Halt - Hotel Sun Park, Zirakpur

Posing at Rock Garden, Chandigarh

Rock Garden

Trekking to Manki Point via Air Force Station, Kasauli

Music and Dance around Bonfire on the terrace of Kasauli Continental Resort

Amalgam 2019-2020

Things to Cherish Forever

The clear blue sky of Kasauli

Loved the Bonfire and Manki Point

Felt so proud seeing our senior, Priya

All the forensic knowledge we got

Amazing food

The techniques to detect forgery were something new that I learnt from CFSL.

Being with friends

On the way - in the bus

Winter chill with Bonfire and delicious food - a perfect combination

Back to Delhi -Outside Gargi College

Heartfelt Thanks

Thank you Tripti ma'am and Aching ma'am for making those 62 hours the best of my life till now.

The trip was very well organized.

All the three days were very well spent and the bonfire night would be most memorable in my whole life.

The seniors and teachers were very welcoming. It was a very nice opportunity for me to bond with them.

March Past 2020

Annual Sports Day - SPIN

February 28, 2020

"And the SILVER goes to... The Chemistry Department for their wonderful, disciplined and synchronous March Past in the annual Sports Day, SPIN-2020"

"Our hearts swelled with pride watching our girls perform! Thank you for bringing the laurel. All of you were amazing. Hard work and dedication definitely brings success and you all proved it."

Special thanks to Komal Rohilla and Himani Saini for taking charge and showing what team spirit and solidarity really means. You never let your department lose!

- Message received from the teachers after we won the Silver Medal for the department in the march past

ACT-CONTECH 2019 - A Report

(C/o Homi Bhabha Center for Science Education (TIFR), Mumbai)

The Department of Chemistry coordinated at the college level, the ACT-CONTECH test (Association of Chemistry Teachers - CONcept TEst in CHemistry), a National level test in Chemistry organized by ACT under the care of Homi Bhabha Center for Science Education (TIFR), Mumbai. 182 students across all science departments of the college took the test held on November 9, 2019 to judge their level of knowledge and understanding of Chemistry. Out of all who appeared, 13 students received 60% and more. The 7 best performing students are mentioned below along with their class, course and obtained percentage marks.

Name	Class	Percentage Marks (%)
Priyanda Giri	B.Sc. (H) Chemistry III year	78.75
Anchal Arora	B.Sc. Life Science II year	71.25
Mansi Pareek	B.Sc. (H) Chemistry III year	70.00
Shilpi Lamba	B.Sc. (H) Chemistry III year	63.75
Stuti Vashisht	B.Sc. (H) Chemistry II year	63.75
Tanupriya	B.Sc. (H) Chemistry II year	63.75
Pratyasha Kumari	B.Sc. Life Science IIi year	62.50

ACT approved **Certificate of Participation** to students scoring 30% or more whereas **Certificate of Excellence** for students scoring 60% or more. As per the directions of ACT, at local level, Centre Heads (Principals / College Coordinators) have freedom to give away the awards to the meritorious students. In view of this, the College Coordinators will be awarding the above seven students with a stationery hamper for their performance. With happiness and humility, the College coordinators will like to share that Dr. S.P. Singh, National Coordinator of ACT-CONTECH congratulated them through a mail for their "exemplary" role in ensuring maximum participation (≥ 100).

Gargi College is one of the five colleges across India to have had a huge number of participation. The College Coordinators were informed by Dr. Singh that they deserve to receive an annual subscription fee for the Journal Resonance for their work" and were requested to send their bank account details. The College coordinators felt that since it was a department endeavour, the subscription of the Journal should

be received by the department instead of the individuals and the details were provided, so that all students and teachers can benefit from the Journal.

As per this mail received dated March 21, 2020, we were also informed that the Certificate of Participation, Certificate of Excellence and Certificate of Appreciation for College Coordinators have been dispatched through Speed Post. Letter of appreciation to the Principal of College for her support in organizing the test has also been dispatched. The details about Journal subscription have not been received from them as things got stalled due to the COVID-19 pandemic.

The College Coordinators extend a warm thanks to the Principal, Teacher-in-Charge of the Department and faculty members for their support and cooperation in invigilation and evaluation process.

Dr. Uttara Dutta & Dr. Tripti Kumari
College Coordinators, ACT-CONTECH test 2019

Chemistry: Far from home

Dear readers,

It has not been long ago, when 20 minutes of walking and 2 buses landed me in my 'Temple of Chemical Education': Gargi College. Now this might have sounded like our older generations talking about fetching water from rivers 10 kms far away, but those who know the likes of such travelling, have both despised and taken pride in it. As a proud Alumna of Gargi and a former editor of Amalgam, I present to you an amalgam of thoughts, memories and experiences. Well, my journey took a turn when I decided to pursue PhD abroad at Iowa State University. While still taking baby steps in my research and academics, realization strikes me then and again like the soft evening breeze that sometimes gushes across your face, bringing back unsuspecting memories. It would be unwise to use the phrase – 'I still remember', for I heard someone tell that 'Only those things that are prone to be forgotten, need to be remembered'. Times and memories at Gargi are ingrained. Chemistry at Gargi for me spans from sitting in the quiet classrooms, to waiting in line to get Ninhydrin sprayed on chromatography paper, peering over each other's' shoulder's to look over the board during lab periods, scrambling for solutions to assignments, day-dreaming in class, paying attention in class, feeling proud over a perfect recrystallized compound, shattered over a bad graph, preparing for the viva (and being asked a way too easy or difficult question, completely out of syllabus), songs getting stuck in mind during exams, planning what to do after exams during study break; the list goes on. Teachers, friends, classmates, staff, chemicals, just the whiff of the wet earth off the brick walls of Gargi on a rainy day (at this point, I feel like a poet) all are a part of my journey. Enter: Iowa State University, new country, new people, new everything, Same Chemistry (well, with some different perspective to it) (almost like the entry of SRK in K3G). It is a good feeling to be able to progress onwards in the field of my choice. But for research and Chemistry in general, what matters most are the little nuances, concepts and fundamentals developed on the way. These need to keep piling up and complementing each other. For which, I am more than indebted to my teachers at Gargi. There is never an end to learning, also there is a persistent need to keep revisiting fundamental concepts (it is just like revisiting people, old and young, relatives and friends who have played an essential part in your life but are often forgotten in the hustle of life). Learning Chemistry amidst a different community is a really good experience. In my opinion learning seems to be more application based here at ISU. Solving and troubleshooting being individualistic and independent attributes. Also, safety has a much higher priority than Chemistry itself. Safety training and personal protective equipment are taken quite seriously here. Transitioning from Gargi to ISU has allowed me to get the best of both worlds, for which I am immensely grateful. I hope I have done justice providing glimpses of Chemistry as I know it at home (which is Gargi) and beyond. Wishing all the readers the best in what lies ahead. Cheers to the teachers: superannuated, retiring and incumbent. Cheers to the students, who have future plans (or those who don't have any plans; which trust me, is fine as long as you wish to keep going). Cheers to the random reader (Amalgam sure is a good read, isn't it?).

Cheers!

Aparna Krishnamurthy
Editor, Amalgam 2014-15

Reminiscence

Being asked to write a short column piece for your old magazine on a topic of your choice can be more challenging than it looks. What do you say when your alma matter bestows on you the honour of wanting to hear back after you have stopped being an active contributor? Do I give advice to juniors I haven't met about things I haven't yet figured out myself? Take time deciding your future steps, don't do masters because someone said so, do it because you want to, push your boundaries, join societies, volunteer, make friends from commerce and learn how to do taxes and manage your money. Useful stuff to know but hardly worth repeating what has been common knowledge. I could thank my teachers that took my mistakes and triumph and made them into memories worth keeping. A hurray, perhaps, for the walls that witnessed our panics and pranks, all small but significant, all recalled in broken detail. I have nothing. I have achieved little worth noting yet and have time enough to look back at the rosy pictures of my time in the Chemistry Department of Gargi College, pictures that I painted myself. Gargi might not have been my first choice but was best one I ever made. Hard work was and still remains the motto of the institute. For every facility or opportunity missing from our premises, you could find a student or a teacher defiantly bringing gritty ambition too huge to contain anywhere else. I found it a place where friends and mentors came from unexpected places, silly pleasures came from our seniors (teachers and students alike), wit and care from our juniors. It was a three year long journey, moving through irritation at the seemingly random changes in curriculum, frustrations of that one extra drop tipping the pH meter over the line, of old apparatus, dirty cupboards, fights over getting the cleanest pipette, of repeating experiments to the brink of insanity. It was wild and fluorescent, the joy of getting the colour right, of figuring the correct compound out and finally getting that melting point right without breaking the thermometer. It was not perfect and it was never meant to be. Perfect was an idea believed, imperfect was the reality we made. Rasgandhayan and the entire department was the imperfect, dazed but functional group of people that we made our own. It is the one time when working without pay has felt right because that last piece of cake was always ours. Amalgam was the magazine created by students and rolled out with care and profession acuity, except of course for the one year yours truly almost caused it to not be on time. For all the heart thumping thrill of finishing the practical file on time there was always the steady trust placed in me- in us- that instilled ownership and responsibility. I said mentorship often came from unexpected places- for many of my classmates they found confidants and guides in friends, teachers, seniors, juniors or other society members. No matter the stage in my life, I can always go back to those people who have guided me and they can come to me. It's this sense of an imperfect family that makes me think of those three years and even the smells of sulphides (or even chlorides), so fondly. I know how hard it was in the moment, but now on the other side of it, all I see is golden.

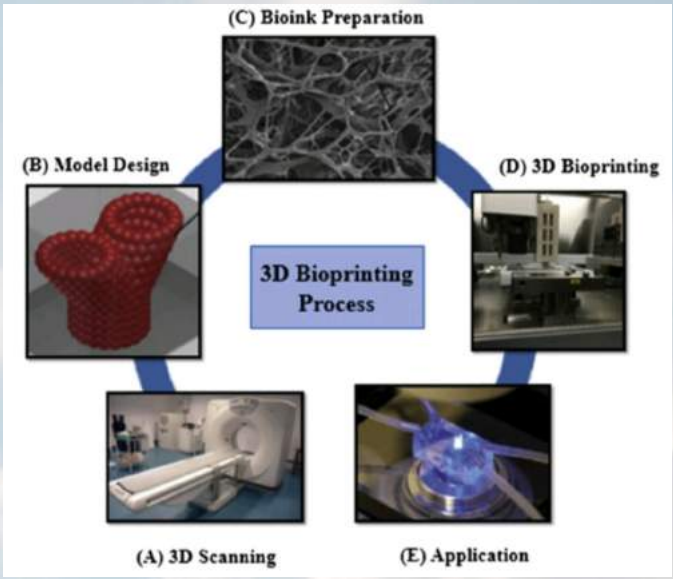
P.S.- To whoever read this far, I say just this- there is absolutely nothing wrong in taking a breath and taking your time in deciding your next step. Taking advice is excellent, but thinking on it is better. Whether it proves to be the correct or not, the choice will stick with you- at least make it your own.

Shivangi Aggarwal
Editor, Amalgam 2015-16

3D Bioprinting- A Chemical Revolution

Ever wondered what it would be like to print your own living cells. Well with chemistry and the new developing science, nothing is impossible.

The 3D printing buzz began a few years ago, making 3D printing as the latest watchword in the field of technology. But the 3D bioprinting is an entirely new discovery making it one of the most promising technologies. Bioprinting is an additive manufacturing process where biomaterials such as cells and growth factors are combined to create tissue-like structures that imitate natural tissues. The technology uses a material known as bioink to create these structures in a layer-by-layer manner. Using 3D printers and inks made out of living cells and also biomaterials and growth factors, chemists and biologists have managed to fabricate artificial tissues and organs almost indistinguishable from their natural versions.



Chemistry plays a central role in all the steps of this very complex process. First, organs and tissues need to be “scanned” in order to have a computational model. This is done using imaging techniques like computerized tomography (CT) scans and magnetic resonance imaging (MRI), both of which usually require chemical contrast agents such as gadolinium dyes. Then, bioprinting itself requires a myriad of chemicals to stabilize the bio-inks, trigger the assembly of the cells, or act as a scaffold for the printed tissue. And finally, the 3D-bioprinted object needs to maintain its structure and form over time, a process for which both physical and chemical stimuli are required. The greatest importance of bioprinting lies in the resulting tissue-like structures that mimic the actual micro- and macro-environment of human tissues and organs. This is critical in drug testing and clinical trials, with the potential, for example, to drastically reduce the need for animal trials. When living tissues and organs need not come from humans, this budding technology offers other massive opportunities. One example is testing treatment for diseases using artificially affected tissues. The process could also eradicate the headaches associated with organ donation and transplantation. Moreover, much like in any transplant or surgery, there is always the risk of the body rejecting the printed tissues. Understanding the chemistry of cell-cell recognition, mostly ruled by sugars that coat the membrane in the form of glycolipids and glycoproteins, is key to minimize rejection. Organ replacement is the main objective, but tissue repair is also possible in the meantime. With bioink, it’s much easier to solve problems on a patient-specific level, promoting simpler operations. Thus Chemistry, in the center of all the crossing disciplines behind the highly-complex 3D-bioprinting, will be the key in the further development of this fringe technique that, could even build new organs that are better than the existing biological ones.

Vaishnavi Rana
Editor, Amalgam 2018-19

An interview with Dr. Sushmita Chowdhury

1) Hello ma'am! You'll be retiring by the end of this semester. Do you still feel like time flew with the speed of light and you haven't had enough of the experience? What are your true feelings about retirement?

Yes, time flies! I joined Gargi in 1982 with many wishes and dreams, some of which were fulfilled and some still stay with me. Now on the verge of retirement, I can't fathom as to how these thirty-eight years passed; I still feel I could have done much more than what I did. How I wish time flew backward! I have been trying to prepare myself with the fact that I won't be here in the next academic session, I have mixed feelings, really can't express. I know that all good things come to an end but I'll miss my girls (who always had and will have a special place in my heart), will miss the incessant chatter while taking the roll call, the lab sessions and the smell of H_2S among many other things. However this forced lockdown has started giving me a feel of what life will be from July onwards. The life-long regret which I will have is that due to the unforeseen circumstances which are beyond our control, I couldn't complete the syllabus for my last batch of students in the way I had wanted to. This batch was very special to me.

2) Did you always want to become a teacher? Do you find your profession interesting?

Yes, I always wanted to be a teacher. I remember when I was very small (my mother often spoke about this) I would hang something called a slate (a mini blackboard) on the wall, stand in front of it and 'teach' my dolls! My profession has allowed me to follow my passion. Teaching is so much more than standing in front of a blackboard, it is a profession by which one can make a difference in the lives of many individuals. I never regret my decision to be a teacher.

3) You've taught and inspired hundreds of girls, and most of them are doing immensely well with their careers. As a woman, how do you think the knowledge you imparted helped change their and their families' lives in a non-academic aspect?

Looking back I feel I, along with many others, have shaped the lives of so many girls. I am fortunate that a huge number of my students are in touch with me and many of them say that I have motivated them. I find myself blessed to have been approached by students across batches for many life-decisions besides the career-based decisions. When I had just started this profession, I met a very senior male faculty member who had come as an external examiner and I'll never forget what he said. He told me that "as a young woman in a girls' college you have a two-fold job, you will teach the girls chemistry and you will also teach them to have an independent mind and be self-reliant women". How correct he was! I followed this advice and have encouraged each child to follow her dreams, choose her career without interference from others, and be happy. I will share an incident: there was a brilliant girl who had an M.Sc. and M. Tech from IIT and had a very lucrative job in the R&D sector. After her marriage and a baby her family made the domestic situation so difficult for her that she was forced to quit, she had almost become a nervous wreck and was withdrawing from her friends.

We had long-distance phone calls regularly (there was no WhatsApp those days) and I suggested that with her wonderful academic record, she could perhaps think of teaching in an engineering college. The hours would be flexible and she could devote more time to her family. Today she is a successful teacher, her daughter is doing well and her family too is very proud of her.

Nowadays many students come from small towns, stay in PG accommodations and some have various types of problems, I have always tried to be very vigilant and in many instances have even spoken with their parents. In fact I do get New Year and Diwali greetings from some such parents whom I have never met!

4) How did you like working at Gargi? Describe your experience with the department and one memory that you'll cherish forever.

I enjoyed each day at Gargi. It was a young college when I joined and I grew with the college. I was fortunate to work for over ten years with Dr. Khurana, the founder member of the department, and learnt a lot from her. The senior teachers were affectionate and we were like a family, they were not critical and gave me ample freedom. At that time it was a small department as we did not have the Honours course, later the department grew.

Speaking of memorable incidents there are so many that I can't recollect any specific one but will share what Dr. Krishna Sharma, the Principal told me after joining, this doesn't directly relate to the department but to the college as a whole. She explained the meaning of the time table - it tells my teaching schedule but not the time I will spend in the college, regarding off day she said it's a no teaching day but not necessarily a no college day. If there is an event or a meeting I should be there. I thank her for her advice and have always followed this.

The biggest gift which I got from this department is a few friends who have given me unconditional support and have stood by me whenever I went through a tough time.

5) Describe one thing you learned from your student(s) which had a deep impact on you.

Oh, so many things! There were times when I felt low, but one look at their bright faces changed my mood completely. They helped to build my confidence and made me more patient. Patience is often underrated, a child can take ages to grasp a concept, it can be frustrating but the process cultivates patience. I can now understand that every child thinks, works and acts in different ways and this has helped me to become a better teacher. I will be honest, all my students have contributed to making me what I am.

6) Being a science teacher, do you think students in science have relatively less exposure and information about social issues, political issues and art? How do you think can we bridge this gap and provide students with the basic minimum knowledge of these subjects, since they're too an important part of life?

This is a wonderful question, something close to my heart but very difficult to answer. The problem should be addressed early in life and parents too play a huge role in this. I remember in our childhood we were forced to read the newspaper, initially it wasn't interesting but gradually it became a habit. In those days this was our only source of information. Now you have multiple sources and lots of diversions.

Very early in life a student opting for science is brainwashed to be a doctor or engineer, sent to coaching classes and pushed constantly. The child is under tremendous pressure from family and peers and not getting admission in a 'professional course' is sometimes frustrating. Thankfully this trend is changing slowly. At the college level the students should be involved in co-curricular activities, join some society and attend seminars and lectures organized from time to time. The departmental associations should also focus on getting speakers from various fields to give the students adequate exposure. I often find students staying away from

departmental functions, this should be discouraged, these events are organized for their benefit. The college could also conduct music appreciation and art appreciation classes, say once a month during EC break, departments could also think of add on courses targeting these areas.

7) You've been teaching for almost 30 years now. What is the one thing that you'd love to change about the curriculum?

I would like to make the curriculum lighter, reduce the emphasis on rote learning and encourage analytical thinking and reasoning. There should be workshops for students and every student must be involved in a group project. Many students who did projects with us told at a later stage that it was a great learning experience. I also feel that students should be asked to read journals, pick up a paper and discuss it with others. Instead of evaluating students on assignments (which are all copied) and tests, students should give presentations that will involve independent reading and improve their communication skills.

8) A piece of advice that you'd like to give to your 20-year-old self which your students should also implement?

Learn to take your own decision regarding your future, take suggestions from others, analyze them but do what you want to do. Be sincere and honest, everybody is not equally intelligent, don't compare yourself with others. Every individual has her strengths, introspect and see what you would really like to do and do that. Don't run after money, do what makes you happy. Cultivate a hobby, reading, listening to music, art ..... A hobby is a great stress buster and finally be economically independent and never compromise at the cost of your self-respect.

9) Are there any messages you'd like to leave for your colleagues and the department's supporting staff?

For my young colleagues, who have started their profession a few years ago - Never discourage a student, encourage them to participate in class discussions. Be a good listener and try to reach out to them. They should not hesitate in approaching you in case of any difficulty, maybe even for a personal problem. Every individual has her strengths and weaknesses, highlight their strengths and don't publicly discuss their weaknesses. If you note something tell them individually. And most important - be there for them and follow the advice given to me by the senior teacher.

For the supporting staff: You are an important part of the department, you and teachers have a common goal - to give the best to the students. Be united and work for the common cause and don't say that if X doesn't work and gets his salary why should I work? We have to justify our job requirements.

10) What are your post-retirement plans? Are you going on holiday anytime soon? (Interviewer giggles)

Vacation plans????? With COVID-19?? Let's see when.

For my dear students:

Arise, awake and stop not till the goal is reached - Swami Vivekananda.

May God bless each one of you.

(Interview by Shridhara Mathur, II Year)

A note from ma'am

Thanks for giving me an opportunity to express my thoughts, girls. My compliments to the quality of the questions, they cover almost all aspects and some are indeed thought provoking. I thought of sharing a bit of history about our society and magazine. Incidentally I was one of the teachers involved in the 'namkaran' in both the cases. The Chemical Society was named 'Rasgandhayan' by late Dr. Santosh Luthra of the Hindi Department. In those days we had an inter college Chemistry festival called 'Chemaroma' (this name was given by the talented students who graduated in 1996)and we wanted a name for the society on similar lines and Rita and I (the advisers) went to Dr. Hema Raghavan, the Principal for her suggestion. Dr. Luthra was present there and she gave this name. The name Chemaroma was lost as we have a science festival and I am so happy that the name will relive through the paper/ poster competition.

'Amalgam' (named by Divyangana Dhankar of Life Science) was initially the joint effort of students of Chemistry Hons and III year Life Science(who were members of Chemical Society as Zenith was not yet born). The first issue was released in 2009 and the Principal, Dr. Meera Ramachandran gave a little note praising the issue. It's a coincidence that I had written an editorial note for the first issue and here I am writing for the last issue of my tenure.

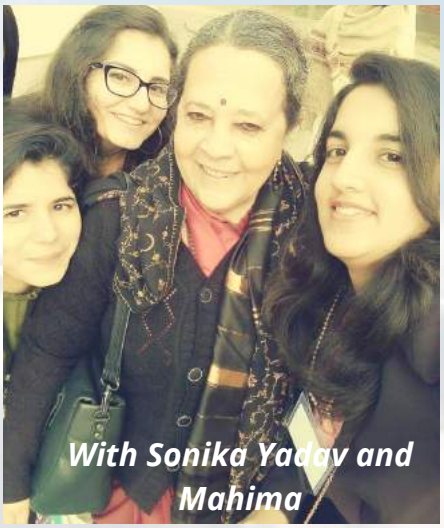
Down the Memory Lane - some messages for Sushmita Ma'am on her super-annuation

Thank you for imbibing in us the love for learning science and teaching us the value of persistence and hard work. Your charismatic personality and zest for life is truly inspiring! You hold a special place in my heart ma'am.

Swayang (L.Sc.2012-15)

Gargi college is a place so close to my heart ,a place that I can never forget and the journey I will cherish for the rest of my life. One person who has been a motherly figure, mentor, guide, motivator, whom I consider as my role model is Dr Sushmita Chowdhury. I was fortunate enough to work under her and Indu ma'am's guidance for the Innovation project. Not only has ma'am supported me morally, *but has also been a guiding light. No one can teach mixture analysis as perfectly as she did.The college (Chemistry department) cannot get a gem of a teacher like you.You are my role model to which I look upon in every aspect of my life.*

Chahat Chhabra (Chemistry (H) Batch:2017)



With Sonika Yadav and Mahima

With Sanjana Kaushik

With Ichchha, Harshita and students of Chem (H) 2019 batch

Vidhya, Kajal (photograph sent by : Chanchal Saini

With Dr. Asmita Sharma

With love, for you..

This June, we will bid farewell to our very own Sushmita Ma'am. But how can I bid farewell to someone whom I admire and respect so fervently?

They say, love and admiration need to be expressed. But for someone like me, a proponent of the old school thoughts, love unexpressed is still love. Words only belittle the gravity of pure, unconditional and boundless love. And if for this very reason, I haven't voiced out my care, admiration or love as routinely I was supposed to, then I take this opportunity today to pen them down, for you..with love!

Long back in 2006 as an undergraduate student, I had my first rendezvous in Gargi, in an auditorium under maintenance, with a teacher - short in height, fair and cuddly, brimming with energy and so motivating to an outsider from Miranda. Never did I or she knew then that it was a beginning of a long association with her, an association of a lifetime. August 2013, I joined Gargi and ever since then, with Ma'am, it has been a journey worth a million words and a zillion feelings of warmth, joy, guidance, love, protection, selfless giving, scoldings, pamperings, learnings, laughters and what not!

What can I say about Ma'am - that she gives a part of herself to every student, to every young mind whom she has ever met, an inseparable part that just intertwines you with her. With me, it was no different. She touched my life in numerous ways - in her little praises every now and then to motivate the new teacher in me, in her staunch support towards me despite all odds, in her unfathomable love and protection shielding me against anything that was unpleasant, in pushing further the limits at her end to just accommodate my interests, in caring and thinking of my interests, in every which way, I was and am blessed to have had felt the purest form of her love, which I still claim to be mine and can boast of.

But it's not just these personal feelings for which I look up to her. In my 7 years of knowing her as a senior colleague, I have learnt from her so much. Her unquestionable and highest order of dedication and commitment for the department is commendable and truly inspiring. I have never heard Ma'am ever complain of spending more hours for any college work, or denying a particular thing because it was more demanding or challenging. She took up every work without any complains and executed them, with utmost zeal and enthusiasm. That's a trait we all must imbibe from her as teachers. No doubt Ma'am has received so much love from students across batches. She invested time and nurtured every small relationship with her students with care, that made all her students feel special and wanted. Of her many qualities are her impeccable memory and her strength as a woman that always told young girls to never compromise on their self-respect and to be independent career women.

Every practical class shared with Ma'am was a learning experience (whatever I know of mixture analysis today is because Ma'am taught it, and would bring up those concepts again and again in her discussions until they were etched in memory). Why some cation/anion should be avoided with another came from her spontaneously and casually, but it took beginners like me hours of background reading to understand. That was the kind of command she had over her subject. Quoting senior professors and anecdotes for certain topics/situations, referring to books so spontaneously, knowing almost everyone in the University from then to now, sharing interesting anecdotes of her MH life, PhD life and family life, she left me awestruck not once or twice but umpteen number of times. What tenor, what rigour, what superfast brain that could analyze and foresee problems and situations even before one could comprehend it. Her drop-of the hat command on syllabus of all courses, paper numbers, who's who of the university, exam patterns and her ability to register anything once heard permanently into her memory left me surprised thousands of time. There have been so many nuances where she has said something scientific and it has taken me so long to interpret, comprehend the same. When I joined Gargi, I felt fascinated by some phrases that she used and even noted them down in my copy to quote it later - like tasted heavenly, she had the cheeks to tell me and so on. In PhD, one looses the usage of such vocabulary, but she revived them back in my life.

With Sushmita Ma'am not around in the department July onwards, it will be a tough time managing many things for which we took her so-very-granted. With the strongest pillar of the department gone, the burden of weight and work on all the other pillars will surmount exceedingly. But as much as I have known Ma'am, I believe Ma'am will be there for me, for the department forever and ever and her love and blessings will nurture us in years to come. Will miss u Ma'am. Sure the department won't come to a halt, it never has, but many old students will miss the very reason they felt like revisiting college, many lab staff will feel not being treated with coffee and samosa for solutions/mixtures well made or a practical class nicely gone, many teachers will feel not being praised after a good instruction delivered in practicals, many of us will miss not being treated with delicacies on days of practical exams, or those beautiful cotton sarees of yours, or being guided like a naive child in crisis situations. Many of us will fiddle around here and there looking for information that you would have so easily passed on, many of us will miss you for a lot many things. But I will miss not getting to see my short-heighted, super-intelligent, cuddly (always adored how your cheeks and face goes red when you laughed your heart out), reasonably and logically thinking, staunch supporter Sushmita Ma'am who protected me when I wasn't well, who highlighted my good qualities to one and all and who made me be a part of her. Love you Ma'am and respect for all you have been and are. Bows, salute and gratitude!

Be proud of yourself for you have had a greatly blessed journey as an academician and a person, one you will sure cherish forever.

With sincere regards,
Tripti

Achievements-Department of Chemistry

First Year:

Shraddha Bhat

- First position in Science Fiction writing competition organised by Rasgandhayan

Nisha Jakhmola

- First position in the inter college Volleyball tournament (team event) organised by BITS Pilani.
- Third position in the inter college Volleyball tournament organised by IP College for Women.
- Second position in the inter college Volleyball tournament organised by PGDAV college.

Second Year:

Ananya Tiwari

- First position in the group folk dance competition at Asia's largest fest MOOD INDIGO, IIT Bombay.

Apoorva Singh

- Organised an exhibition of her paintings at Jawahar Kala Kendra, Jaipur.

Arushi

- First Position in Science Exhibition held at Atma Ram Sanatam Dharma College.
- Consolation Prize in PowerPoint Presentation on Waste Management at Zakir Husain Delhi College.

Jyoti

- First Position in Kho Kho and Saraki at Gargi Olympiad.

Ramya Vishwanath

- Awarded distinction certificate in grade 1 of the Trinity Piano Curriculum.
- Third position in Ink Spilled, a creative writing competition organised by Quilluminati, the English creative writing society of Gargi College.
- Published a poem on Gender Equality in a book "My Powerful Pen" (a GirlUp and UN initiative)
- Received a scholarship for scoring the highest GPA in the University for session 2018-2019.

Shridhara Mathur

- First Position in Spill the Syaahi, an English creative writing competition organised by the Literary society of Shivaji College.
- Second Position in Spilled Ink, an English Creative writing competition organised by Vellore Institute of Technology.

Stuti Vashisht

- First Position in an Online Creative Writing Competition organised by NSS Gargi.
- Second Position in an Online Poster Making Competition organized by NSS Gargi.

Third Year:

Anamika Awasthi

- First position in Poetry, Talent Hunt Competition organized by Rasgandhayan.

Komal Rohilla

- Awarded for her participation in the Chief Minister's Independence Day Parade
- First Position in Dance Competition in DCAC.
- Second Position in Dance Competition held at Atma Ram Sanatam Dharma College.
- Second Position in Singing Competition in NCC Camp.
- Second Position in Dance Competition in NSS Camp.

Vidushi Gupta

- First Position in Doodling competition organised by Rasgandhayan.

Dorothy, Shilpi and Priyanda

- First Position in Paper Presentation Competition organized by Rasgandhayan.

Dr. Minakshi Sharma Memorial Award 2019-2020

The Minakshi Sharma Memorial Award committee comprising Dr. Uttara Dutta, Dr. Rita Bhatla & Dr. Geeta Saini after much deliberation decided to present the award to **Sarika Yadav**, B.Sc. Life Science III year for her all round achievements in academics and extra-curricular activities.

Dr. Minakshi Sharma

Sarika Yadav

Some Old Classical Books of Chemistry

Bibles for Chemistry

INORGANIC CHEMISTRY

Fundamental Concepts of Inorganic Chemistry by E. S. Gilreath.

Valency and Molecular Structure by E. Cartmell and G. W. A. Fowles.

Inorganic Chemistry by T. Moeller.

Inorganic Chemistry by J. J. Lagowski.

Inorganic Chemistry by Heslop and Robinson

Advanced Inorganic Chemistry by Cotton and Wilkinson

Coordination Compounds by Fred Basolo and Ronald C. Johnson.

Chemistry in Non-Aqueous Solvents by Harry Hall Sisler.

Lanthanides and Actinides by Moeller.

Isomerism in Coordination Compounds by Murmann.

Inorganic Polymers by O'Driscoll.

Concise Inorganic Chemistry by J. D. Lee.

Quantitative Chemical Analysis by Vogel.

Modern Aspects of Inorganic Chemistry by H. J. Emeleus and J. S. Anderson.

Structural Inorganic Chemistry by A. F. Wells.

Introduction to Modern Inorganic Chemistry by Mackay and Mackay

Concepts and models of Inorganic Chemistry by Douglas and McDaniel.

Inorganic chemistry by Barnett and Wilson.

Theoretical basis of Inorganic Chemistry by A. K. Barnard

Comparative Inorganic Chemistry by B. J. Moody

Inorganic Chemistry by H. J. Emeleus and A. G. Sharpe

ORGANIC CHEMISTRY

Applications of Absorption Spectroscopy of Organic Compounds by John Robert Dyer.

Spectrometric identification of organic compounds by Robert Silverstein.

Organic Spectroscopy by William Kemp.

Reaction Mechanism by Peter Sykes.

Reaction Mechanism in Organic Chemistry by S. M. Mukherji & S. P. Singh.

Advanced Organic Chemistry: Reactions, Mechanisms, and Structure by Jerry March.

Modern Synthetic Reactions by H. O. House.

Advanced Organic Practical Chemistry and Basic Organic Practical Chemistry by Vogel.

Practical Organic Chemistry by Mann and Saunders.

Organic Chemistry by Brewster and McEwen.

Reagents for Organic Synthesis by Fieser and Fieser.

Organic Chemistry by I. L. Finar.

Organic Chemistry by Morrison and Boyd.

A Handbook of Organic Analysis: Qualitative and Quantitative by Clarke.

Some Old Classical Books of Chemistry

Bibles for Chemistry

Stereochemistry by Eliel.

Organic Chemistry by Fieser and Fieser.

Mechanism and Structure in Organic Chemistry by E. S. Gould.

Physical Chemistry

Molecular Spectroscopy by Banwell & McCash.

Principles of Physical Chemistry by S. H. Maron and C. F. Prutton.

Electrochemistry by Bockris and Reddy.

University Chemistry by Bruce H. Mahan.

Ionic Equilibrium by Cogley and Butler.

Physical Chemistry by Peter Atkins.

Physical Chemistry by Robert Mortimer.

Physical Chemistry by Daniels and Alberty.

Physical Chemistry by Ira N. Levine.

Physical Chemistry by G. W. Castellan.

Physical Chemistry by Walter J. Moore.

Chemical Kinetics by Laidler.

Elements of Quantum Chemistry by Frank J. Bockhoff.

Practical Physical chemistry by Shoemaker and Garland.

Symmetry in Chemistry by Jaffe and Orchin.

Quantum Chemistry by Donald A. McQuarrie.

Photochemistry and Molecular Reaction DePuy and Chapman.

Electrochemistry by Glasstone.

Principles of Instrumental Analysis by Skoog, West and Todd.

Instrumental Methods of Analysis by Willart Merritt, Dean, Settle.

Quantum Chemistry by Lowe and Peterson.

An Introduction to Practical Biochemistry by D.T. Plummer.

Miscellaneous

Chapman and Hall series.

Inorganic and Physical Chemistry: An Integrated approach by R. S. Lowrie, H. J. Campbell-Ferguson

General Chemistry book by Anderson.

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Chemistry Department Faculty Members

Row 1 (left to right): Dr. Geeta Saini, Dr. Neha Sharma, Dr. Sushmita Chowdhury, Dr. Tripti Kumari, Dr. Nisha Saini, Dr. Niyati Singh
Row 2 (left to right): Dr. Manju Saroj, Dr. Sushma Bhan, Dr. Rita Bhatla, Dr. Chandana Mukherjee, Dr. Anita Chugh, Dr. Chingrishon Kathing, Dr. Beena Negi **Row 3 (left to right):** Dr. Salma Khan, Dr. B. Vaijayanthi, Dr. Indu Tucker Sidhwani, Dr. Uttara Dutta, Dr. Renu Aggarwal, Dr. M. Sarath Babu. Regret missing pictures of faculty members Dr. Manisha Singla, Dr. Himani Chauhan, Dr. Garima Khanna, Dr. Renu Gautam, Dr. Poonam Kumari & Dr. Divya Katyal, who were also a part of our department during this academic year.
(Photo taken from 2015-2016 session, as due to Corona lockdown this year, a fresh click could not be managed).

Chemistry Laboratory Support Staff

From Left to Right: Mr. Satish Giri, Mr. Avinash, Mr. Naresh, Mr. Satyapal, Mrs. Manju Sati, Mrs. Lilima, Mrs. Anita, Mr. P. N. Gairola, Mr. Shailendra Kumar, Mr. Nadeem, Mr. Radha Raman Shakya, Mr. Soumya, Mr. Swami, Mr. Inderjeet Yadav

RASGANDHAYAN UNION 2019-2020

From Left to Right:
Front row: Ayushi Masand, Divya Chawla, G. Vaishnavi, Rachna Singh, Ishika Aggarwal, Rishita SIngh
Middle row: Tanupriya, Khushboo Munjal, Kanishka Singh, Mansi Kapoor, Swati, Shruti Goel, Stuti Vashisht, Akshita Jain
Last row: Riya Rakheja, Shraddha R Bhat, Vidushi Gupta, Komal Yadav, Apoorva Singh, Mansi Pareek, Shridhara Mathur

Cover Page by: Vidushi Gupta, III year

Rasgandhayan Union 2019-2020

Akshita Jain

Cultural Coordinator

Ed. Board

Anusha Anver

Comperer

Ayushi Masand

Executive Member

Apoorva Singh

Social Media Head

Photographer

Divya Chawla

Ed. Board

Ishika Aggarwal

Executive Member

Kanishka Singh

Executive Member

Komal Yadav

Executive Member

Khushboo Munjal

Cultural Coordinator

Mansi Kapoor

Executive Member

Mansi Pareek

Chief Editor

Rachna Singh

President

Rishita Singh

Cultural Coordinator

Riya Rakheja

Cultural Coordinator

Shraddha R Bhat

Executive Member

Ed. Board

Shridhara Mathur

Chief Editor

Shruti Goel

Cultural Secretary

Stuti Vashisht

General Secretary

Ed. Board

Swati Sharma

Executive Member

Ed. Board

Tanupriya

Executive Member

Vaishnavi Gurusamy

Vice President

Vidushi Gupta

Cultural Coordinator

Acknowledgments by the Conveners

The society this year conducted a wide array of events, inter and intra college, academic and fun, and we are humbled by the fact that each of the events was deeply appreciated by students and teachers alike. We were overjoyed by the presence of Principal ma'am in most of our events and we sincerely thank her for never denying to any of our proposals, for listening to them patiently and affirming it with her warm smile. We also extend our thanks to the TIC of the department Keya Banerjee Ma'am, for her cooperation and support in the smooth functioning of the society. A special word of acknowledgement for **all the faculty members** of the department for their inputs, ideas, suggestions for improvement and for their unflinching support and motivational feedback that really pumped in enthusiasm in our spirits after each event.

We thank the teachers who, besides their many valuable insights, also helped us getting started with the society through interviewing the students and for the idea to keep up a proper stock register maintaining account records that could be passed on to the subsequent conveners. We thank those teachers who endeavoured hard to make the CFSL trip possible, whether it was by giving inputs time and again or by communicating with the Director, CFSL for the same. A big thank-you also to those who accompanied us on the CFSL and/or the Glassblowing visit. We also thank teachers in whose practical classes, we would so comfortably walk in to discuss our events and plans, and still be warmly greeted. Heartfelt thanks to the teachers who stayed beyond their class timings and supported our events by their gracious presence, also to those (internal & external teachers) who kindly judged various competitions. We express our gratitude to the teachers who would often openly appreciate the efforts the team used to put in every event. Last but not the least, we thank each and every one of all of our colleagues (senior and contemporaries) for everything they helped us with, without which the society wouldn't have run the way it did.

We also thank the editorial board members, for putting together a fine piece of work, for patiently rectifying innumerable times the magazine, fine-tuning the content, the photographs, and all of it whenever we asked them to do the same. Each one in the ed-board, is to be specially thanked for their efforts. The girls who took charge of each event as its student conveners, the girls who worked incessantly on the notice boards, and those who were on or behind the screens always are to be thanked. A big thanks to the student union members, each one of them personally, for not letting us down and for the constant back up support. You all are fabulous and we will miss you all, will miss those long hours of discussions and planning and wish you the best in your future endevaours. Every little memory with you is special and safe in our hearts.

We also thank our laboratory support staff for sharing the moments of joy with us, especially Manju Sati *ji* who accompanied us for the trip, Satish *ji* who spoke on Diwali festivities on behalf of all support staff; Avinash, Soumya, Satyapal & Nadeem for helping us out with several arrangements.

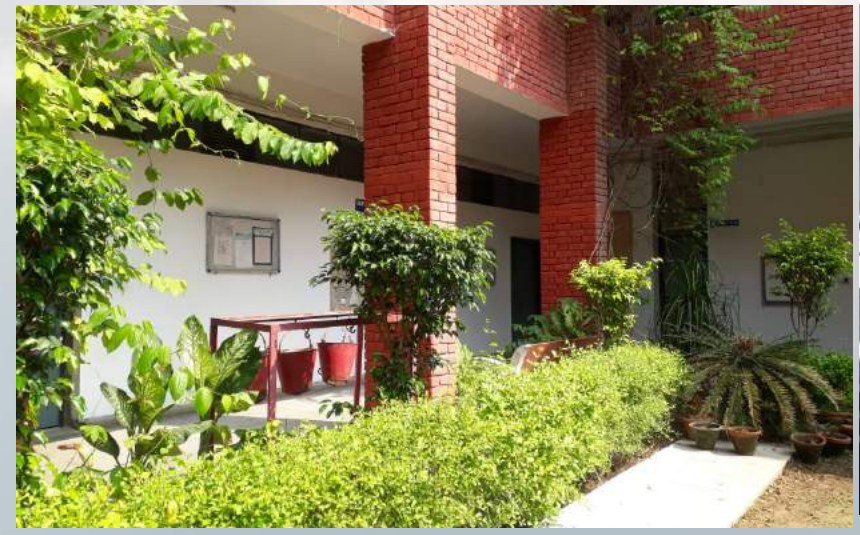
Hoping that we haven't missed anyone, and thanking them as well if we did so.

Finally, we thank each other, for the wonderful fun we had working for the society. Moments became enjoyable, worries went going and tensions got distributed when the two of us worked together. It was a happy and positive journey of an year, and what we put forth today is a culmination of year round efforts from each one of us.

Thank-you all once again!

Dr. Tripti Kumari & Dr. Chingrishon Kathing
Conveners, Chemical Society 2019-2020

The Chemistry Department, Gargi College



Gargi College

Jot down your memoirs...