CHEMICAL ENGINEERING ASSOCIATION

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NEWSLETTER

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CONTENTS

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THE PATH OF A CHEMICAL ENGINEER

SAUMYADEEP HALDER
(BATCH 2014)

It is seen that often one ponders……

How does it feel to be a good chemical engineer? What will come of the effort taken to become one? What will be unique about it? Would I be better off with it?

With the passage of time, as one approaches the final stage, one comes to realize the priceless acumen one has acquired over a few years, the knowledge that will be vital to tackle problem situations at the execution level in the industry.

A career in chemical engineering, most often, is a smooth and comfortable journey with an appreciable growth and experience. This can be mainly attributed to the several prominent specializations and sectors of chemical engineering.

Petroleum and Petro-chemical sectors of chemical engineering provide the most stable jobs with relatively high salaries. Pharmaceutical sector has also been a major contributor to the world market and its clear significance validates a chemical engineer's role in it. The Polymer and Textile Sectors have been very prominent players in marking out their value as a specialization. Food Sector has not fallen behind in depicting promise and growth in the recent times. There are several other fields where a chemical engineer can be considered more than just useful.

The effort put in becoming a talented chemical engineer is duly rewarded. Companies and Organizations mostly tend to reconcile with almost all needs and demands in order to acquire themselves a good chemical engineer; the prime reason being that, compromises cannot be made at all in terms of quality and ability when it comes to recruiting a chemical engineer, as he/she would be handling some of the most vital decisions and operations of the industry.

Among the several choices, the path of chemical engineering surely might seem like 'the road not taken' but for those who choose it and justify their choice, grass is green throughout the journey for them.

CHICKENS TO POWER THE FUTURE

AISHWARYA KUMAR
BATCH 2014

Yet another treasure from the unused waste biomass!...

Can you imagine the chickens grown on the farm being used to produce fuel???...Unbelievable..but true !.If we go by the stats, every year 11 billion pounds of poultry industry waste accumulates annually, because we have gigantic appetite for poultry products. They can't be stuffed into pillows. Mostly they are utilized as low-grade animal feed. Scientists in Nevada have created a new and environmentally friendly process for developing biodiesel fuel from 'chicken feather meal'. Professor Manoranjan Misra and his team members at the University of Nevada discovered that chicken feather meal consists of processed chicken feathers, blood, and innards.

Chicken feather meal is processed at high temperatures with steam. This feather meal is used as animal feed and also as fertilizer. Chicken feather meal has high percentage of protein and nitrogen. The researchers have paid attention to the 12% fat content of the chicken feather meal. They have arrived at the conclusion that feather meal has potential as an alternative, non-food feedstock for the production of biofuel. They have extracted fat from chicken feather meal using boiling water and processing it into biodiesel. Another advantage of extracting fat from feather meal is it provides both a higher-grade animal feed and a better nitrogen source for fertilizer applications.

Another research is going on regarding chicken feather meal. Chicken feather fibers are mostly composed of keratin, the same protein found in nails, scales, claws and beaks. When carefully heated for precise times to specific temperatures, the carbon-rich surfaces that result on the fibers attract hydrogen, somewhat like how activated charcoal filters can pull out impurities from liquids or gases. The heating process can also form hollow tubes between the fibers, strengthening their structure, and make them become more porous, boosting their surface area and thus their capacity to store gas. One can then pump gas into the fibers and store it at high pressure, and to release the gas, one just depressurizes it or raises the temperature.

The spongy, porous structures of these feathers can hold as much or perhaps more hydrogen than carbon nanotubes or metal hydrides. They would also prove far cheaper — using carbonized chicken feathers would only add about $200 to the price of a car.

Stats tell us that if we take into account the amount of feather meal generated by the poultry industry each year, researchers could produce 153 million gallons of biodiesel annually in the U.S. and 593 million gallons worldwide.

Experiments involving application of the pyrolysis process were carried out. During this process a very high heat without combustion in the absence of oxygen is applied. This yields fibers that are micro-porous, very thin and hollow inside like carbon nanotubes. They start forming at 350 degrees Centigrade, and above 500 C they collapse. The optimum temperature and pressure conditions are yet to be finalized.

Another step closer to a greener and cleaner earth!

7 CHEMICAL ENGINEERS WHO CHANGED THE WORLD

MONICA ROY
(BATCH 2014)

Chemical engineers are making a difference in the quality of life every day for everyone. We work in industries that touch everyone's lives. Whether that is health, food, or energy, we are involved in all aspects of society.

Over the years many chemical engineers have developed methods that vastly changed not only the material world, but the way we perceived it. They succeeded in creating solutions that the rest of the world could not conceive, or thought to be impossible. They overcame the odds and became great. In this article I am going to put 7 such 'forgotten heroes' in the limelight. These men have truly changed the world through their ingenuity and innovation.

Father of Chemical Engineering: George Edward Davis

Englishman George E. Davis (1850–1906) is generally credited with initiating the concept of chemical engineering. Davis identified broad features in common to all chemical factories and wrote the influential A Handbook of Chemical Engineering. He also published a famous lecture series of 12 lectures, given in 1888 at Manchester Technical School (which became University of Manchester Institute of Science and Technology (UMIST)). These lectures defined Chemical Engineering as a discipline and sparked Chemical Engineering degree programmes at several universities in the US.

Man of Steel: Henry Bessemer

If the industrial revolution was built on steel, then the father of the industrial revolution was Henry Bessemer. It was the Bessemer process that made steel available in industrial quantities at an affordable price. Bessemer was a prolific inventor. Despite no university education, he patented innovations in fields as diverse as pigment production and ship building.

During his experiments with steelmaking, he discovered that contact with hot air would turn pig iron into steel. He was lucky that the resulting reaction, which was extremely violent, did not permanently damage his workshop. Bessemer then channelled his efforts into developing a reactor vessel that could contain the violent reaction with some degree of reliability and safety. The result: the Bessemer Converter.

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Feed the World: Fritz Haber and Carl Bosch

The work of industrial chemist Fritz Haber and chemical engineer Carl Bosch formed the basis for modern fertilizers. The Haber-Bosch process, quite possibly the best-known chemical process in the world, captures nitrogen from the air and converts it to ammonia.

Haber developed a high-temperature high-pressure process to break the remarkably stable triple bonds of atmospheric nitrogen and made it available for ammonia production. Bosch, a chemical engineer at BASF, scaled up the process. Not only did Bosch find a cheaper way of producing hydrogen, but also a new catalyst and a reactor that would withstand both the high temperatures and high pressures of the reaction. All this was done at a time when high-pressure chemistry was still in its infancy and suitable equipment (reactor vessels, pipes, instrumentation etc.) was not readily available. Over 100 years later, their process is still in use everywhere around the world.

Penicillin Pioneers: Jasper Kane and John McKeen

Sometimes it's not the innovation itself that matters – it's making it available in quantity and at the right time. Scale-up, in other words.

Ensuring that there was sufficient penicillin to treat the hundreds of thousands of soldiers that took part in the D-Day landings during World War II was not the work of Alexander Fleming; it was chemical engineers who made that happen. While many worked on scaling up production of penicillin, it was Pfizer chemist Jasper Kane and chemical engineer John McKeen who arguably made the biggest contribution. The two cracked the problem of production via deep-tank fermentation.

PVC and Rubber: Waldo Semon

He wasn't a government leader, or someone who cured diseases, but Waldo Semon, had a profound effect on our lives that carries on to this very day. So many things we come in contact with—computer, credit card, wall covering, garden hose, food wrap, drainage pipe, plastic bottles—are made from vinyl, just one of several things this brilliant chemical engineer invented during his lifetime.

Semon also helped save our world when, just before World War II, he developed Ameripol, a form of synthetic rubber. He went on to play a vital role in creating Government Rubber-Styrene, a synthetic blend of rubber that was essential to the Allied war effort in World War II.

Source:
www.icheme.org

SUMMER IN CANADA

AKANKSHA GUPTA
(BATCH 2013)

I had an opportunity to undergo summer internship in INRS, Montreal, Canada under the MITACS Globalink 2012 programme. I worked on synthesizing Copper-Ruthenium nanoparticles using microwave reduction which is emerging as a potential area of research due to energy crisis in the world. The experience definitely helped me in broadening my perspectives, opened new vistas of knowledge and gave me some of the best memories to cherish lifelong.

I feel my internship has provided me an excellent platform to learn work ethics and experience the true blend of team work and research culture. After coming back to India I've made up my mind to pursue Masters in Nanotechnology in Canada, the thought of which seemed vague before the internship.

The workshops, symposiums and webinars organised during the stay helped all of us to interact with not only other participants from Brazil, Mexico but also with ministers and other officials of Canada. Receiving a hand-signed letter from the Prime minister of Canada welcoming us there still seems like a dream!!

Best part about Canada is its people, very welcoming, very eager to help. I would like to thank MITACS for giving me some of the best memories and friends for life. I really fell in love with Montreal during my stay!

Going to Canada was the best experience I have had so far, both in terms of education & research and fun! We visited Niagara Falls, Quebec city and Ottawa and it was an experience that cannot be explained in words!

I can say that Globalink internship has given me a clear picture of my goals and an insight of the possible ways to manifest them!

Thank you Globalink!!!

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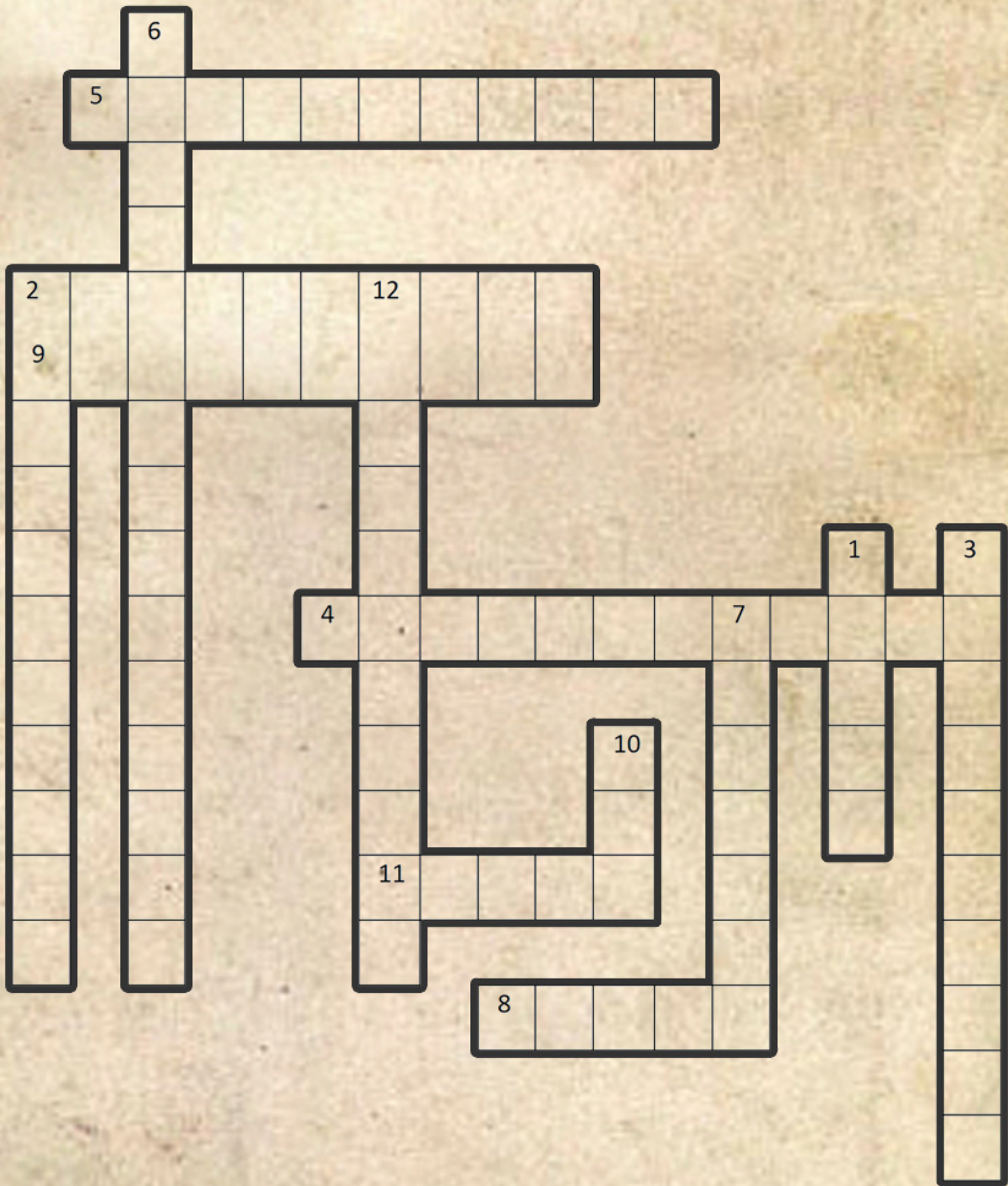
CROSSWORD

KATHAMBARI
BATCH 2014

NEERJA S
BATCH 2015



CLUES

ACROSS

2. Code name for the world's first fast neutron nuclear reactor

4. It involves heating oxide fuel with oxygen, sometimes with alternating oxidation and reduction, or alternating oxidation by ozone to uranium trioxide with decomposition by heating back to triuranium

5. Up gradation of heavy residual oils by thermally cracking them into lighter, more valuable reduced viscosity products.

8. Most significant gas desulfurizing process, recovering elemental sulfur from gaseous hydrogen sulfide.

11. The current standard method for the recovery of plutonium and Uranium by extraction

DOWN

1. It uses self-intersecting beams of ions from small particle accelerators to force the ions to fuse

3. A form of fusion power where neutrons carry no more than 1% of the total released energy

6. Use of microorganisms or biological agents to break down or remove oil
7. Common name for Liquified Petroleum gas (LPG)

9. Trade name for a chemical process used for removing hydrogen sulfide (H2S) from natural gas, synthesis gas and other gas streams in refineries and chemical plants

10. A nuclear fuel that contains more than one oxide of fissile material, usually consisting of plutonium blended with natural uranium, reprocessed uranium, or depleted uranium.

12. A shear-thinning property

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ANSWERS