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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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Need of Water Prudent India

India is facing one of its major and most serious water crisis. After two consecutive years of weak monsoons, 330 million people — a quarter of the country's population — are affected by a severe drought. With nearly 50 per cent of India grappling with drought-like conditions, the situation has been particularly grim this year in western and southern states that received below average rainfall. The country that pumps more groundwater than any other has reached a water supply and food safety reckoning that threatens to upend political and economic stability, and long-term public health. Hand in hand with the groundwater depletion and contamination, is a food supply "toxic time bomb" of global implications. When irrigation wells go dry, farmers turn to untreated wastewater that is laced with industrial chemicals and human sewage.

According to the Composite Water Management Index (CWMI) report released by the Niti Aayog in 2018, 21 major cities (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to reach zero groundwater levels by 2020, affecting access for 100 million people. However, 12 per cent of India's population is already living the 'Day Zero' scenario, thanks to excessive groundwater pumping, an inefficient and wasteful water management system and years of deficient rains. The CWMI report also states that by 2030, the country's water demand is projected to be twice the available supply, implying severe water scarcity for hundreds of millions of people and an eventual six per cent loss in the country's GDP.

The Union government recently formed a new *Jal Shakti* (water) ministry, which aims at tackling water issues with a holistic and integrated perspective on the subject. The ministry has announced an ambitious plan to provide piped water connections to every household in India by 2024. The ministry has set a tough target at a time when hundreds of millions don't have access to clean water. Aiming at laying huge pipeline networks for water supply means that yet again, we are giving more preference to infrastructure. Also, the moot questions are: what will happen if there is no water to supply? What will happen to all the wastewater that gets generated?

This indicates that there is a clear disconnect between water, society and economy. Currently, we are interested in laying large networks, constructing huge storage dams, fetching water from 150 kilometres and above, which involves a huge carbon footprint. We are valuing land more than water, neglecting our local water bodies, which have either gone dry or encroached. Also, in many Indian cities, water is not properly distributed. Some areas of mega cities like Delhi and Mumbai are privileged to get more that than the standard municipal water norm of 150 litres per capita per day (lpcd) while other areas get 40-50 lpcd. Aggravating the problem is that the water being supplied currently is of drinking water standards which are not only alarming but a crime towards the next generation.

The World Health Organization (WHO) states that an individual requires around 25 litres of water daily for meeting his/her basic hygiene and food needs. The rest is used for non-potable purposes like mopping and cleaning. This indicates that for most of the non-potable uses, a quality lower than drinking water is required. Thus, for economic efficiency and environmental sustainability, water must be treated and supplied according to usage. To top this, are issues of leakage losses, water pricing and metering of water. Lack of proper maintenance of existing infrastructure causes further losses of almost 40 per cent of piped water in urban areas.

Water is at the top of the development agenda of the new government, as emphasised by the prime minister at Niti Aayog's governing council meeting last week. Encouraging the participating chief ministers to give top priority to the subject of water in all its different avatars, especially conservation, the prime minister emphasised that the first concrete step taken by the central government towards a holistic and integrated perspective on water has been the constitution of the new Jal

Shakti Mantralaya. This bold institutional step has integrated the erstwhile Ministry of Water Resources, River Development and Ganga Rejuvenation with the former Ministry of Drinking Water and Sanitation, and has led to the formation of a single new ministry focused on water with a capital W. This is a major step towards the consolidation of the management of water resources with delivery of drinking water and sanitation — a much-needed step in the direction of ensuring India's water security — as well as a thrust towards the goal of providing safe and adequate piped water supply for all households.

Looking at the current situation, there is a need for a paradigm shift. We urgently require a transition from this 'supply-and-supply-more water' provision to measures which lead towards improving water use efficiency, reducing leakages, recharging/restoring local water bodies as well as applying for higher tariffs and ownership by various stakeholders.

A recovery-based closed loop system is the need of the hour. It is time to go back and start using our traditional practice of rainwater harvesting — catching water where it falls. Presently, India captures only eight per cent of its annual rainfall, among the lowest in the world. Another aspect is the treatment and reuse of wastewater. About 80 per cent of the water that reaches households, leaves as waste and pollutes our water bodies and environment. There is a huge potential in reusing and recycling this treated wastewater at least for non-potable purposes, which is cost effective.

All this leads to the fact that we need to promote a decentralised approach, with a key focus on water conservation, source sustainability, storage and reuse wherever possible. It is important to understand that managing the water situation is not the job of only engineers but all stakeholders including hydrogeologists, economists, planners and most importantly, communities themselves.

Emphasis on behavioural change is not getting enough attention because it is nuanced and complex. But locals/citizens/communities have a huge part to play. We can contribute by keeping in check our own usage and actions.

Goutam Mukherjee

Dr. Goutam Mukherjee
Hony. Editor, JILTA

From the desk of General Secretary

69th Foundation Day Celebration

Above was organized at the Auditorium of Seminar Hall, Science City, JBS Haldane Avenue, Kolkata – 700 046 on Wednesday the 14th August, 2019 at 03.00 PM onwards.

The programme commenced with the introductory speech from Mr. Susanta Mallick, General Secretary, ILTA followed by requesting the following dignitaries to please take their seats on the dais –

1. Mr. Prasanna Kumar Maduri, Campus Manager, Stahl India Private Limited, Kanpur
2. Mr. Tapan Nandi, President, ILPA Infrastructure Development Foundation, Chairman, ILPA Leather Goods Park, Ex-President, ILPA & Ex-Regional Chairman, CLE
3. Mr. Arnab Jha, President, ILTA

Due to preoccupied assignments, Prof. Amitava Bandyopadhyay, Dept. of Chemical Engineering, University of Calcutta who delivered the prestigious B. M. Das Memorial Lecture arrived in the programme little late.

However, Mr. Maduri and Mr. Nandi greeted with a bouquet by Mr. Arnab Jha.

The portrait of late Prof. B. M. Das was then paid homage with a Rose stick by the following :-

1. Mr. Arnab Jha, President, ILTA
2. Mr. Prasanna Maduri, Speaker
3. Mr. Tapan Nandi, President, IIDF, Chairman, ILGP
4. Mr. Kanak Kumar Mitra, President, Alumni Association, GCELT, Kolkata
5. Prof. (Dr.) Sanjoy Chakraborty, Officer – in – Charge, GCELT, Kolkata
6. Mr. Aniruddha De, CFTC, Budge Budge
7. Mr. Shankar Dawn, Ex-President, ILPA
8. Mr. B. C. Jana, CLRI, Kolkata
9. Sk. Gholam Md. (Ladla) on behalf of Industry
10. Mr. Sanjoy Dasgupta, a Senior Member of ILTA

Mr. Mallick then announced the names of the award winners and requested them to come to the dais to receive their awards.

a) **Mr. P. Aravindh** – Winner of B. M. Das Memorial Medal for securing 1st Class 1st Position in B.Tech, Leather Technology examination of Anna University in 2019 received the award from Mr. Arnab Jha.

b) **Ms. S. R. Abhinayaa** – Winner of B. M. Das Memorial Medal for securing 1st Class 1st Position in M.Tech, Leather Technology examination of Anna University in 2019 received the award from Mr. Tapan Nandi.

c) **Mr. M. Dinesh Kumar** – Winner of B. M. Das Memorial Medal for securing 1st Class 1st Position in M.Tech, Footwear Science & Engineering examination of Anna University in 2019 received the award from Mr. Prasanna Maduri.

d) **Mr. Rupendra Paul** – Winner of both B. M. Das Memorial Medal & J. M. Dey Memorial Medal for securing 1st Class 1st Position in B. Tech, Leather Technology Examination of Moulana Abul Kalam Azad University of Technology, West Bengal in 2019, received the awards from Prof. (Dr.) Sanjoy Chakraborty and Mr. Shankar Dawn respectively.

e) This year there was no candidate and winner of B. M. Das Memorial Medal for securing 1st Class 1st Position in M. Tech, Leather Technology Examination of Moulana Abul Kalam Azad University of Technology, West Bengal in 2018.

f) **Dr. Dibyendu Bikas Datta** – Winner of J. Sinha Roy Memorial Award for his article titled **"Occupational Health, Safety & Ergonomic issues in Artisan Sector"** published in February, 2018 issue of JILTA

adjudged the Best of all articles published in JILTA in calendar year 2018 by a committee consisting of Prof. (Dr.) Sanjoy Chakraborty, Principal, GCELT and Dr. Dipankar Chaudhuri, Scientist & Head, RCED, CLRI, Kolkata, received the Certificate and the Award from Mr. Arnab Jha

G.S. then requested Mr. Prasanna Kumar Maduri to deliver his lecture titled **"Innovative, Sustainable Solutions : Leather Process, Biodegradability – Stahl"**. A memento and a certificate of honour was handed over to Mr. Maduri by Mr. Arnab Jha.

Prof. Amitava Bandyopadhyay was greeted with a bouquet by Prof. (Dr.) Sanjoy Chakraborty. Prof. Chakraborty introduced Prof. Bandyopadhyay to the gathering and requested him to deliver the prestigious B. M. Das Memorial Lecture titled **"Environmental Issues related to Tanning Industry"**. A memento and a certificate of honour were handed over to Prof. Amitava Bandyopadhyay by Mr. Susanta Mallick.

Mr. Mallick then offered Vote of Thanks by expressing gratitude to Mr. Prasanna Kumar Maduri and Prof. Amitava Bandyopadhyay for delivering their useful lectures. Gratitude was also expressed to Mr. Tapan Nandi, Mr. Shankar Dawn, Members, Guests and Students for their kind presence. Science City authorities were thanked for extending necessary help and co-operation.

Mr. Mallick then invited all present to have a Tea Break followed by the Cultural Programme.

There were about 200 participants in the event.

The eminent Folk Singer Mr. Pranes Som and his orchestra presented a nice musical evening to the audience. Mr. Prabir Dasgupta, a senior member of the association acted as the anchor of this programme and the singer was greeted by Mr. Shiladitya Debchoudhury, Jt. Secretary, ILTA.

The cultural event was concluded followed by dinner.

Felicitation to Mr. Mrinal Kanti Chakraborty in Foundation Day Celebration Programme

Mr. Mrinal Kanti Chakraborty is a Life Member of our Association.

Mr. Chakraborty, from 1970's to 2015, was actively involved in all activities of our Association.

He is well known to all members, academic institutes, people of the industry & several departments of the Govt. of West Bengal.

Since the days our Association could not pay salaries to it's staffs in time, Mr. Chakraborty worked with dedication for achieving the current position of our Association.

He was one of the pillar behind earning through LEXPOs and making our own 6 storied building.

Mr. Chakraborty is the person who convinced Mr. Buddhadeb Bhattacharjee, then Minister of Information & Culture, Govt. of West Bengal to give us the land for our own office building at highly subsidized cost at a prime place.

In short he is a man of dedication and worked for this Association till he was fit.

61st Annual General Meeting

Above is scheduled to be held at 03.00 PM on Saturday the 19th October, 2019 at the Auditorium of Indian Science Congress Association, 14, Dr. Biresh Guha Street, Kolkata – 700 017. Notice of the AGM with further details will be posted in due course.

LEXPO Siliguri – XXVI

The next LEXPO at Siliguri will be the 26th in series. We have already applied to the competent authority for allocation of Kanchanjungha Krirangan adjacent ground from around the middle of December, 2019 for organizing the event.

BEREAVEMENT

With profound grief and a heavy heart we announce the sad demise of Bani Prasad Garai, an active life member of our Association on 22nd July, 2019.

May his soul rest in peace and May God give strength to the members of the bereaved family to bear the irreparable loss.

You are requested to :-

a) Kindly inform us your '**E-Mail ID**', '**Mobile No**', '**Land Line No**', through E-Mail ID : admin@iltaonleather.org or over Telephone Nos. : 24413429 / 3459. This will help us to communicate you directly without help of any outsiders like Postal Department / Courier etc.

b) Kindly mention your **Membership No. (If any)** against your each and every communication, so that we can locate you easily in our record.

(Susanta Mallick)
General Secretary

Executive Committee Members meet every Thursday at 18-30 hrs. at ILTA Office.
Members willing to participate are most welcome.

Bani Prosad Gorai

(5th July' 1937 – 22nd July' 2019)

Late Bani Prosad Gorai passed out the Advanced Certificate Course in Footwear Technology, Govt. of West Bengal and taken Managerial Training in Advanced Footwear Technology, Factory Management & Organizational Managment from CFTC Madras, Govt. of India in the year 1962.

He served as a Quality Marking Inspector of Footwear under Director of Industries, Govt. of Bihar in the year 1963-1964. Then he joined as Manager TCPC for leather industry, Govt. of West Bengal in the year 1966.

He took retirement from service in the year 1995.

He was an Ex-Examinar, Boot & Shoe Department, College of Leather Technology, Govt. of West Bengal, Ex-Paper setter & examiner, West Bengal State Council of Technical Education (Boot & Shoe) and also Ex-Guest Lecturer in the SISI, Govt. of India, Kolkata.

Mr. Gorai was a man of enthusiasm and dedication in all respect of his achivements in life. He was a Senior Life Member of ILTA, who participated in all the activities of ILTA, especially LEXPO, on which he had a special love.

May his soul rest in peace and may God give strength to the members of the bereaved family to bear the irreparable loss.

=====X=====

WEAK vs STRONG MOLECULAR INTERACTIONS

Dr. Buddhadeb Chattopadhyay

Former Principa, Govt. College of Engineering & Leather Technology, Kolkata
& Principal, MCKV Institute of Engineering, Liluah, Howrah, W. B.

There was a silent historical change in Engineering Education. The All India Council for Technical Education has proposed a set of model curricula all over the AICTE approved courses. Biology has been for the first time introduced in most of the Engineering courses. It was required simply. Because the basic science on which the engineering is nourished remain unseen, like the roots of the plant. But when the plant grows, spreads its branches, leaves and fruit in air, the part that we enjoy much; the role of the root cannot be overthrown. Application of science for purposeful use to humanity is the concern of all Engineering branches.

Until 2018, basic science in engineering was dominated by the physical sciences, keeping the marvels of biological science at bay. Nevertheless, it has to clearly understand that many marvels of engineering products or devices came up by studying biological system or species since the history of development of engineering. For instances compare between eye and camera, biomechanics and hominid robot. Way back in 16th century, Leonardo da Vinci, the greatest multifarious genius, studied the flying of the birds and mimicked to develop *ornithropter*, a flying machine ("*Orni*" in Latin means bird). Even today Aviation word was derived from Latin *Avifauna* (the Bird).

Take for instance designing the functional sports shoes, without gait analysis and knowing the force distribution in foot could not have been possible to support the sports man/woman. This era is of Artificial Intelligence, Internet of things, where understanding neuro circuit is important. It is no more likely the chips, RAMS or cache memory that will rule the globe in future. Not to mention that the progress of Biomedical Engineering, Environmental Engineering, Genetic Engineering and Biotechnology cannot be made without solid understanding of Biological science.

In this article, we shall focus on some bewildering questions that often appears as mystery to the Engineering students, which we have to enquire. Some of them are like, how proteins do so dedicatedly their variety of functions? Who makes the secondary structure and unique folding patterns like alpha helices, beta structure, ribbons etc.? Does the antibody have memory to identify specific antigen amongst the host of others? Are the enzymes programmed macro molecules? How the information regarding protein formation is conserved in DNA and passed on from mother cell to daughter cells? Is it the same like data transfer in Information Technology or Computer Science and Technology? How does computer coding differ from genetic coding? Why am I like my dad or mom? How enzyme substrate is so uniquely specific, so that even an optical isomer of the same building block would be refused to be bound? Why some molecules inside the cell stays closer to some other molecule – is it due to intimacy or programme? What is the role of water inside the cell, a deficiency or excess amount of which often invite a disaster? Why reactions require drastic conditions *in vitro* (in glass wares) to happen; while on the other hand, the same *in vivo* (in life) happen at normal physiological temperature (37^0 C.) appreciably.

These are the things that happens in the 'Cellular Amphitheatre', when one group of actors after acting disappears from the stage, replaced by the another set of actors in the next Act. These are not the bizarre questions of idle minds, on the contrary, much valid questions that requires enquiry at the micro level first.

The beauty of organic chemistry is despite its vast spread, the laws are limited and often intuitions play a big role in understanding. In this paper, we shall try to examine in as simple manner as possible. A kind of a so-called popular lecture, you

Corresponding author E-mail : cbuddhadeb@gmail.com

may like to call it for the kick start to pursue Biology for Engineers in right spirit.

Most of the above specificity questions can be answered by a simple one liner. *"Molecules will do; as they do must."* It is important to review their unique bonding nature first, before we go to the macro molecules for which we are interested, like Proteins or DNA, RNA etc. There is not a single protein rather there are millions in numbers. We can say Protein is their family name. Similarly, nucleic acids are the family name there could be billions of different members of nucleic acids.

In order to look into the insight of understanding, the gateway is important and the gateway is the nature of **Chemical bonding**. A chemical bond is a Coulombic attractive force that binds the atoms together. An aggregate of the finite size of these bonded atoms are called molecules. It has to be remembered this finite aggregate doesn't mean a mere collection of the atoms, but they are bound together by a force of attraction. It is like a car and its spare parts. If, we dismantle a car into its parts, we shall get gear, steering, wheels, engine so on and so forth. A mere physical collection of all of them is never called a car. But, when we fix them in right place some remains very close, some at a fair distance, we get a car. When a car moves on the road, we never say look the steering + wheels + gear + engine….. are moving. The individual identity of the spare parts is lost in crisis! Assembled together, they get a new identity – the car. One atom of oxygen and two atoms of hydrogen bound together to form one molecule of water. The individual identity (read property) of both the hydrogen and oxygen molecules are sacrificed and they are merged with a new property of water. Take for instance hydrogen acts as a fuel for fire; oxygen supports the fire; but water is an excellent fire extinguisher!

Originally, it was thought that only covalent bonds form the molecules and all the attributes of the covalent bond(s) is the root cause of the property of the molecules. Now, weaker attractive forces are also considerable for holding the macro molecules together. For example, three alpha helices are hold together in a definite pattern to form a triple helix in collagen, the hide and skin protein and they do not fall apart in physiological condition because they are bound together both intermolecularly (between the molecules) and intramolecularly (within the same molecule) by weak bonds (read forces). What decides antibody to form complex with antigen? What decides an enzyme to bind together with a substrate? It is the weak bonds always. On the contrary, what would happen if, they were bound by strong covalent bond instead? The simple answer would be that would be a catastrophe. No life would ever exist in the earth. Forget about biodiversity!

It is a marvel of nature to allow weak interactions happen, because they are appropriate and just. Therefore, in the world of molecules there is no psychological superiority or inferiority complexes. Strong interactions are important to do their jobs, which the weak interaction could not do; similarly, weak interaction can do such jobs, which strong interaction could not do. In the world of chemistry, the weak interactions are also called **chemical bonds**, precisely **weak bonds**. When they stand alone, they are not good enough contributors, but when they are many, together they offer a great amount of bonding strength. Something like, *"united we win; divided we fall"*.

Chemical bonds are characterized by several means. The first one, is by their **bond strength**, which is measured in terms of kilo calorie per mole. This means, how much kilo calories are needed in order to break the particular bond in question. This is again a misnomer, for it seeks bond rupture, but not bond formation.

The last line of the above para invokes a question, why do the atoms form a bond? The simplest answer is – in order to be more stable. Atom A and atom B will react to form a molecule AB, if (if, and only if), the AB is more stable than both A and B together. In terms of chemical equation, we can write this explanation as: A + B = AB + Energy. Therefore, the reverse reaction is: AB + Energy = A + B. This energy follows the first law of thermodynamics, which precisely states that energy in a system can neither be created, nor be destroyed. Therefore, it is quite okay to postulate stabilization energy for bond formation by the bond breaking energy. Because the quantity of both are the same and it is easier to experimentally determine the bond breaking energy than bonding energy (bond forming energy).

Coming to the second property of the bond is the **bond length**. Bond strength and bond length varies inversely. Higher the strength is, closer the molecules are. This is also true in the sociological and political world. The human (say a couple) stays closer together, when they are bonded strongly. It is the strength that decides the mean path length between them! For example,

when two hydrogen atoms are bound together by strong covalent bond, they form a molecule (H:H) and are 0.74 angstrom apart, whereas the same two atoms when bound by weak van der wales bond instead; they are 1.2 angstrom apart.

The third important characteristic is the maximum number of covalent bond that an atom can form. This is called **valency** for strong bonds. Oxygen can form two covalent bonds, so its valency is two. Hydrogen can form one only, hence it is monovalent atom. Hydrogen will never make more than one covalent bond; similarly, oxygen will never make more than two covalent bonds.

The fourth characteristic is the **bond angle**. It arises when one atom forms more than one bond. The angle between two specific bonds is approximately the same. For example, carbon can form four covalent bonds, orienting tetrahedrally take for instance, in methane. Hence the bond angle is 109^0.

The fifth characteristic is the **freedom of rotation** around the bond axis. Single covalent bond always allows free (not quite, it has also a small activation energy) rotation about the bonding axis; while this rotation is disallowed when there is a double bond or a triple bond in the organic molecules. Even a partial double bond character hinders free rotation. Say, the free rotation in the peptide (- NHCO-) linkages of a polypeptide chain is greatly hindered due to its partial double bond character, which in turn allows the unique folding of protein, enzyme (enzymes are also proteins but globular proteins). Peptide bonds are quite rigid for the reason that the carbonyl and imino group must lie in the same plane in order to make delocalization of the pi electron happen, to make a partial double bond. Neither C = O, nor N = C have the length of a double bond, as compared to that of their analogous molecules. They are somewhat different. But interestingly, the length of both C = O and N = C in peptide linkage is just the numerical average of C – O and C = O; likewise, simple average of N = C and N – C. That's why the name partial double bond character (with bond order 1.5).

The quantum mechanics tells us the about sixth characteristic. The higher the **bond order**, higher is the bond strength and shorter is the bond length. We shall not go in details about it at this point. This is arising out of "molecular orbital theory". Suffice it to say that, the bond order of a single bond, double bond and triple bond of organic molecules are one, two and three respectively.

The nature of the force for bond making – both weak and strong remained a mystery for the Chemists for the long time until in 1920s, when quantum mechanics was discovered. Then various empirical laws on how the bonds are formed were put on theoretical back grounds. It was realized that the chemical bonds – both weak and strong, are formed because of the Coulombic interaction arising out of the electron clouds of the valance shell. Quantum mechanics showed that the covalent bonds are formed because of the sharing of electrons of the participating atoms and it is these forces that eventually cause the weak bonds to happen.

It has to be remembered that every bond is a result of bond-making and bond-breaking forces. When equilibrium is reached in a closed system, the rate of bond breaking equals the rate of bond making. This means simply that the number of bond making per unit time would exactly equal to the number of bond breaking per unit time. Recalling the equation A + B = AB + Energy and also AB + Energy = AB the proportion of the bonded atoms would be found from the equation of the equilibrium as $[AB] / \{[A] [B]\} = k_{eq}$, where, k_{eq} is the equilibrium constant at a particular temperature and the concentrations of all the reagents and the products are their concentrations at equilibrium in terms of moles per liter. It would be better to say at this point that the strong bond is characterized by a very large amount of Energy in the above equations; whilst the weaker bonds are in that way by a small amount of Energy. Whether we start with only free A and B or AB or a combination of free A and free B with also AB, at equilibrium, the proportion of the concentrations of A and B to that of AB will be obtained by the above formula. It also predicts that at equilibrium the concentrations of the reagents and the products would reach to the concentrations as stated in the equation in terms of the equilibrium constant. It matters only whether the equilibrium is shifted towards the reagent or the product; towards left or right. Therefore, we can come to a reasonable conclusion that at equilibrium point of a chemical reaction, the presence of all the reagents and the products molecules (however insignificant in amount it might be) is *sin qua non.* This means that if, we reduce Cr (VI) to Cr (III), it is not possible to convert all the Cr (VI) molecules to Cr (III). Since in that case, the equilibrium constant would be infinite and that's clearly is the absurdity.

There is always a change in the form of energy as the proportion of bonded atoms move towards **equilibrium concentration**.

Biologically, the most convenient way to express the energy change in terms of the physical chemists' concept of **Free energy** or more precisely, Gibbs free energy, denoted by a symbol G, in the honour of Josiah Gibbs, the inventor. We shall avoid the detailed discussion on free energy except to say that the *free energy is the energy that has the ability to do the work*.

The second law of thermodynamics tells us that a decrease of free energy *always occurs for a spontaneous reaction, when the system itself does the work on the surrounding* (exergonic). When equilibrium is reached, there is no further change in free energy. This means one of the necessary and sufficient condition for equilibrium point is that Ä*G must equal zero*. Thus, the equilibrium state for a collection of atoms in a closed state is the state of least amount of free energy. In other words, it signifies the state of highest stability. This now explains our previous postulation that the atom A and atom B will react to form a molecule AB in order to reach to a least energy state or an increased stable state. Water on the top of a mountain peak doesn't require installation of pumps in order to flow down to the least altitude of zero mean sea levels. The energy is released as it descends down the mountain. The entire driving urge is to attain stability. The system itself does the work on the surroundings here. The reverse flow would require a huge number of pumps of very high power in HP to drive the water from river back to the mountain at the expense of the same amount of energy as per the first law of thermodynamics. In this case, the surroundings have to do the work on the system. Therefore, the rule of thumb is, ÄG negative is irreversible. Exergonic work is not reversible. When ÄG is positive, that is, when it is endergonic, it is a difficult reaction (non-spontaneous), because we need to put extra work on them. The backward reaction in this case is favorable than the forward reaction or in other words the equilibrium is shifted towards the left.

The free energy lost as the reaction approaches gradually towards equilibrium is either transformed into heat or increase the **entropy**. We shall not exercise rigor here to define entropy except we shall say that the *entropy is the amount of disorder, the degree of freedom or freedom of the movement*. In other ways, the number of ways with equivalent energy, the collection of molecules or atoms can be permuted.

The Nature has one aim it seems, to create chaos, disorder. Explode a bomb inside a building; the second law of thermodynamics will take care of the rest! We need no bulldogger further. So, increase in randomness is energetically favorable. To maintain order in a system we need to spend energy. This is true in public life also. The moment teacher comes in the class, he spends energy and the students maintain both long-range and short-range orders. This is order simply breaks away quite scientifically, when the provision of energy input is withdrawn. In this case, the teacher finishes the class and goes back to his cabin. Greater the disorder, greater is the amount of entropy and entropy increase is energetically favorable. The existence of entropy means many spontaneous chemical reactions (reactions that are exergonic) need not proceed with the liberation of heat (exothermic). For example, when common salt goes into solution it goes in spontaneously with the absorption of heat (endothermic) and not with the evolution of heat. Even then, the solution process is spontaneous since, the sodium cation and chloride anion from common salt gets dissociated and randomly distributed in the water-salt solution. The large amount of increase of entropy in this case out weighs the small amount of heat loss. The second law of thermodynamics tells us that ÄG = ÄH – T ÄS, where, ÄH is the change in enthalpy and T the absolute temperature (which is obviously always positive) and ÄS, the change in entropy. This equation says that ÄH negative and ÄS positive pushes the chemical reaction towards spontaneity, since ÄG becomes negative in both the cases.

Clearly, the stronger the bond is; greater is the change in free energy (ÄG) that accompanies its formation. Therefore, greater is the proportion of atoms that must be in the bonded form. This common sense idea can lead to a intuitive formula ÄG = – RT ln k_{eq}, where R is the Universal Gas constant, or conversely $k_{eq} = e^{(-ÄG/RT)}$. Insertion of appropriate values of R (1.987 cal/deg.mol) and T as 298 (at normal temperature 25 deg C.), tells us that ÄG value as less as 2.0 kilo calorie per mole can drive a bond forming reaction at normal temperature to virtual competition, if, all the reagents are used in molar concentration (1.0 mole per liter each).

ÄG values accompanying a covalent bond from the atoms such as hydrogen or oxygen, are very large in value and negative in sign, usually – 50 to – 110 kcal/mol. The above equation also tells us quite accurately that the corresponding equilibrium constant of the bonding reaction will also be very large, and thus the concentration of unbound hydrogen or oxygen atoms

in such reactions would be very insignificant. Take for instance, for a ÄG value of – 100 kcal/mol, only one out of 10^{40} atoms will remain in the unbound form at room temperature, when equilibrium point is reached. In other word the equilibrium point is, when there is no further net bond formation or when the reaction reaches a terminal point. On the contrary, the main type of weak bonds important in the biological system is the Van der Wales bonds, hydrophobic bonds, hydrogen bonds, ionic bonds, induced ionic bonds etc. We shall discuss later that sometimes it is difficult to distinguish the hydrogen bond from the ionic bond.

The enzymatic catalysis is very specific. The enzyme only recognizes the substrate for which they are destined to. How do they specifically identify them amongst the host of other molecules, some of which may be its isomers? Well, they don't have an inbuilt programme. They can recognize only because of their capacities to form **weak bonds**. It would be a purely messy affair; had they been attached to the substrate with strong bonds instead.

Now, being mostly a kind of a globular proteins, enzymes themselves are folded uniquely. It is the craving for lowering the **surface free energy** in cellular aqueous medium that drive them to fold. Now for a given volume a sphere/globule has a least surface area (that's the reason why rain drops or soap bubbles are spherical) and thereby least surface free energy. Again, to make their folded manner stable, a large number of weak interactions are needed. This is offered by the building blocks of proteins, the alpha amino acids. Either through intramolecular hydrogen bonding or by ionic interaction arising from the side chains of ionized acid and basic groups or by hydrophobic interactions arising from nonpolar amino acid residues in the polypeptide chains these typical and unique folds happen.

The hydrophobic moiety of the polypeptide chains feels shy (uncomfortable) with water and, therefore, they wish to avoid the contact of water. This means that they will try to find a more comfortable environment to stick together. That means that they will try to bury themselves in the innermost space of the globules.

Why is that? Take for instance, a lone water molecule can form four hydrogen bonds with four neighboring water molecules. At room temperature, it is liquid. So, at room temperature each one can form 3.4 hydrogen bonds. That does not mean 0.4 of a bond. It means out of every 10 water molecules on an average 34 other water molecules are bound by hydrogen bonds. Considering for ease as 4 hydrogen bonds per every water molecule; this association will release a bonding energy of about 16.0 kcal/mol.

So, we are picturing about water-water interaction. We shall now figure out non-polar molecule viz. benzene in water system. Benzene being flat and planner has a different 3-D geometry than water, which is tetrahedral. Benzene has permanent dipole moment zero, while water has a great permanent dipole moment. Therefore, benzene can interact with water through Van der Wales bonds only, which is extremely weak and can release energy to the extent of 1.0 kcal/mol, that is even when they almost touch together. The geometric differences between benzene and water molecules do not favour the touching situation for water and benzene interaction, since they cannot come closer enough. At the best we can fairly presume that 08 atoms of both water and benzene molecule can touch each other and loose and energy to the extent of 8 kcal/mol.

Now, because water-water interaction stabilizes the water benzene system more than that of benzene-water system, water will thrust benzene out from their cluster precisely to be more stable.

This thrust of water molecule to benzene in turn will push one benzene molecule to stay closer to other benzene molecules. Now since benzene is composed of altogether 12 atoms and it is flat and planner, enormous numbers of benzene flat planes can stack together touching hands-in-hands and loose easily 12.0 kcal/mol.

So, now we can estimate that water-benzene interaction will be stable by the extent of 16.0 kcal/mol. This in turn will favour benzene-benzene interactions loosing to the extent 12.0 kcal/mol. Means adding together they figures out to a total of 28.0 kcal/mol, whereas, by benzene-water interaction leads to a loss of 8.0 kcal/mol. The question is now like, upon investment of some money, one bank is going to offer you 8.0% rate of interest, while another (not a Ponzi firm) is offering 28.0% interest rate. It is now left to you to decide, which one shall you prefer.

Now possibly, you can understand why the nonpolar moiety of the polypeptide chain feels shy of water environment of the cell

and what drives them towards remaining inside the fold. It is always these nonpolar amino acids in the protein molecules that initiate the protein folding. Now, when such a giant molecule of protein folds to occupy the smaller area, it is quite natural that there would be some cavities, kinks, holes like thing in the shape of the folded protein. The substrate for which the enzyme is unique, just the complimentary to the curves of those cavities, kinks or folds, like positive and negative of a celluloid film, male female part of socket and plug or male female ports of computer data cable, charger and laptop/mobile pair.

This complementarity of enzyme and substrate in turn allows them to be just the right fit like **a lock and its key fit**, like a square peg in a square hole and a round peg in a round, where enzymes act as a lock and the substrate as its key. The unique is that for enzymes, there is almost no duplicate key. The precise fit is extremely important not only for enzyme-substrate complex formation; but for antigen-antibody complex formation too. Since the force of such kinds of interactions varies with the inverse sixth power of the distance between the enzyme substrate or antigen antibody pairs; the closest proximity only ensures such kind of stabilization effect.

Enzymes do not bind indiscriminately with all the molecules. They have noticeable affinity to bind with their specific substrate to form enzyme-substrate complexes at the transitional state of the reaction. Because enzymes can catalyze both directions of a chemical reaction, they must have some specific affinities for both sets of reacting molecules; either in the left or the righthand sides of the chemical equation. It is possible to calculate the equilibrium constant for binding of an enzyme with one of its substrates, which consequently tells us about the ÄG upon binding. For ÄG values between 5.0 and 10.0 kcal/mol, several strong bonds are simultaneously associated and are the basis of the enzyme substrate complex formation. Also, worth noting the fact that ÄG of binding is never exceptionally high. Thus, enzyme substrate complex can be both made and broken apart rapidly upon thermal movement. This explains why enzymes can function quickly, sometimes as often as 10^6 times per second. If, enzymes could bind with their substrates or the products with more powerful bonds, the rate of the chemical reaction would have been much slower.

Now it is obvious that if, some means we can alter the protein folding we shall lose its property. There are many ways that proteins serve us, for example, as connecting tissues, organs, bones and teeth, nutrition, defense so on and so forth. All of their varied specific functions are broadly due to their unique folding pattern. Again, the sequence of amino acids in forming the proteins contributes a lot to decide how best should it fold and what is the function that a protein is expected to perform. This again opens a new exciting probability, if, we can alter the amino acid sequence, then we can get a newer kind of protein folding which can attribute to newer properties in a biological system. Yes, **Recombinant DNA Technology** has a lot of promise now a day in almost every field of anthropogenic activities.

Who decides that amino acid sequence in a protein? Again, it is the master; called DNA that conserves all the information what should be the sequence of amino acids in a native protein. We are gifted from our parent cells. Since DNA replication is semi conservative, either we are like our dad or mom and never an average.

Weak bonds mediate most protein – DNA and Protein – Protein interactions. Interaction with protein – DNA or protein – protein lies at the heart of the cell biology. This not only detects the varied functions like respond to signals, expressing genes, replications, repairing, recombine DNA and so on. These interactions – which clearly play an important role in how those cellular processes are responded and regulated, all are due to weak chemical bonds of the sort. Despite the low affinity of the bond, affinity in these interactions, the specificity as well, results from the combined effects of many kinds of such weak bonds between the two interacting macro molecules.

In the world of molecules, therefore, there are no reasons of complacency or satisfaction, neither any despair nor despondence upon the relative strengths. They are just optimal and the best fit for the jobs that they are destined to perform. Strong bonds are necessary and can perform such other tasks, which a weak bond couldn't perform and vice versa. Putting question at the molecular levels make the things simpler and worth for understanding and appreciating better.

Leather is a fascinating product that needs regular care to reach and maintain its optimum condition. General use causes cracking, delamination and discoloration, all of which can be prevented by proper cleaning and protection. Stahl's range of Shoe & Leather Aftercare products brings out the best of your leather items and makes them more durable at the same time.

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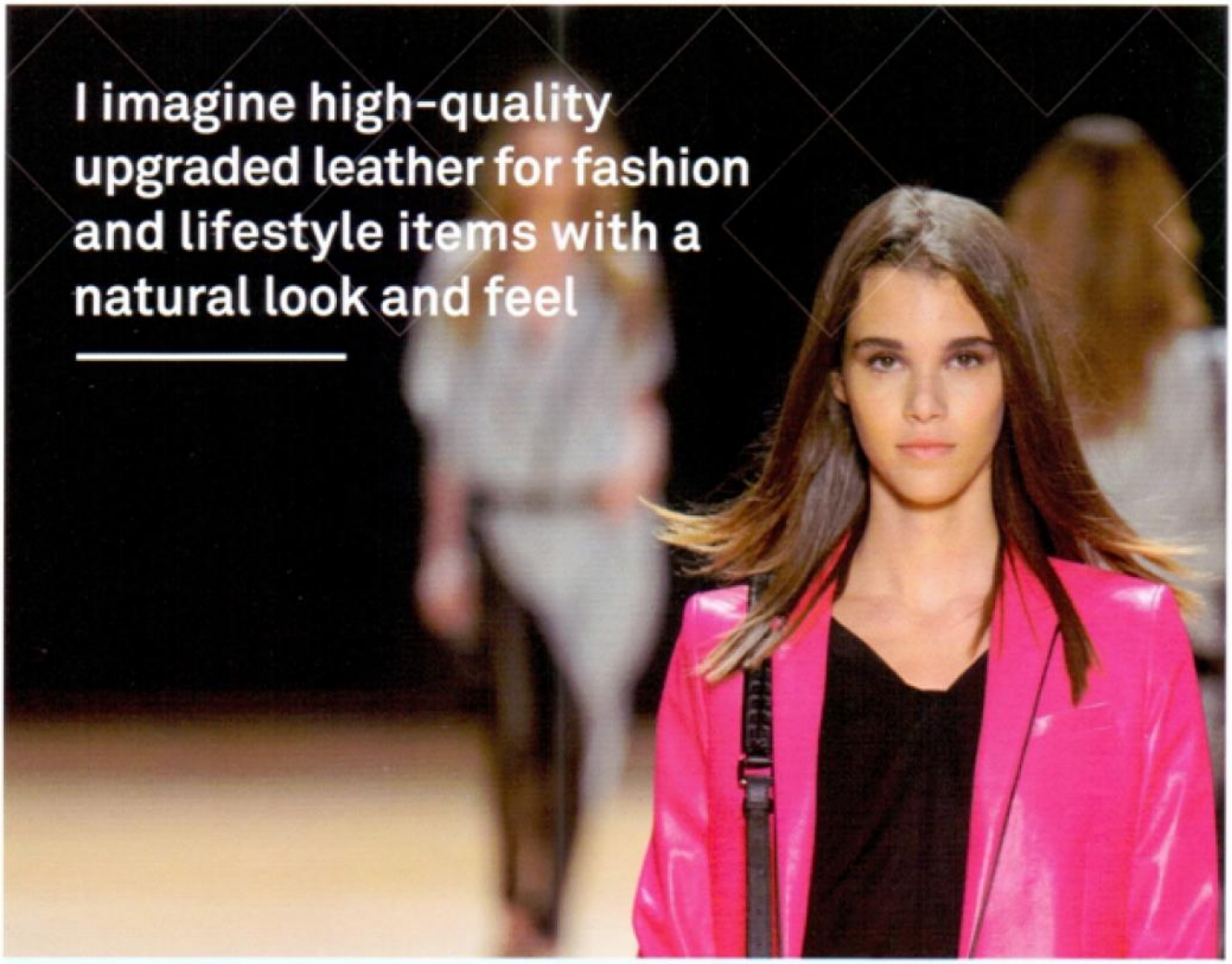

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RECYCLING HELPS TANNERIES WEATHER THE WATER CRISIS

'Due to Zero Liquid Discharge norms and recycling, water use is down by 80 per cent'

Despite severe drought conditions in Tamil Nadu's North Arcot district, it is business as usual for the leather industry — which consumes enormous quantities of water — in clusters such as Ambur, Vaniyambadi and Ranipet. This is because the sector's water consumption has dropped by nearly 80 per cent thanks to the adoption of Zero Liquid Discharge (ZLD). The leather industry should be thanking the Madras High Court for this transformation.

In 2007, the Court stopped the industry from letting out untreated effluents containing toxic chemicals and acids into the Palar river, farms and waste land. Despite the high cost, tanneries adopted ZLD. They established the membrane-based (reverse osmosis) effluent treatment, process to recycle water for use in the production process.

Five years ago, a large unit used to consume nearly 2,00,000 litres of water a day, but today it uses just 20,000 litres. Similarly, a small unit consuming around 20,000 litres a day now uses just 2,000, said Israr Ahmed, Managing Director, Farida Group, a leather manufacturer in Ambur.

Hundreds of water tankers that used to criss-cross the Ambur cluster, which has over 100 tanneries, have disappeared. Due to strong environment norms adhered to by the industry and efforts of the Tamil Nadu Pollution Control Board (TNPCB) for pushing ZLD, the leather industry is today in a better position to handle the water crisis. Otherwise, it would have been a disaster, Ahmed told *BusinessLine*.

Moving to ZLD was quite expensive with the industry spending nearly Rs. 1,500 crore and the government half that amount in the form of subsidy. However, the problem is that ZLD plant's life is five years and needs continuous reinvestment, said Ahmed, who is also Regional Chairman (South) for Council for Leather Exports.

It is a similar situation at the Ranipet cluster. "We never faced any problem thanks to ZLD," said AR Manikandan, Technical Manager at Bharat Enterprises, one of the first leather manufacturing units in Ranipet. However, the city is facing a huge water problem, he added.

At Pallavaram in suburban Chennai, which has over 100 tanneries, the units are reeling under severe water shortage. However, since the global demand for leather products is down, the units have restricted production and this in turn has led to reduced water consumption, said Mohamed Najeeb, Partner, Noor & Sons.

All functional tanneries are members of the Pallavaram Tanners Industrial Effluent Treatment Company, which is treating the effluents through Common Effluent Treatment Plant, he said.

An official of the Central Leather Research Institute said ZLD has helped in water conservation. However, the high cost and salt content in the recycled water is a challenge.

(Source - Dept. of Chemical Engg, J.U)

PAVING THE WAY FOR EXPORTS

Merchandise exports grew 3.93 percent year-on-year to $29.99 billion in May. Imports were 7.76 percent higher at $45.35 billion during the month. While this moderate exports growth is a reflection of extremely modest growth in global trade, what is more concerning is the swelling crude import bill and increasing gold imports. Also, though some important sectors performed well during the month, but all is not well with our exports as the latest official figures show.

A look at the detailed data shows that some key sectors such as engineering goods, iron ore and leather products did well in May, but overall 13 out of 30 major product groups, including gems and jewellery, were in negative territory. Also, exports growth, though helped by some hand-holding by the government, is still at a sub-optimal level and MSME sectors are still facing a lot of problems such as liquidity crunch and volatility in currencies.

Meanwhile, according to a news report, the government has drawn up a strategy to benefit from the ongoing tariff war between the US and China. The report adds that the Commerce Ministry has identified 203 products where exports could be increased to the US, replacing Chinese goods, and 151 items where exports to China could rise. This is a timely step. There is no doubt that protectionism is a bane for world trade, and to mitigate its effect on our exports, we need to find a smart way out.

But constraints are there on the domestic front as well and they need to be addressed urgently. An exporters' association has recently raised concern about a number of issues such as inadequate access and high cost of credit, lack of marketing support, poor export related infrastructure, etc. There are many other issues. The Budget is ahead, and it offers an opportunity to the Centre to bring in some comprehensive measures to help the sector.

(Source : SME Times – 01/07/2019)

HC UPHOLDS JAIL TERM OF INDUSTRY OWNER FOR CAUSING WATER POLLUTION

The Delhi High Court has upheld a one-and-a-half-year jail term awarded to the owner of a textile printing industry for causing water pollution. The court rejected the contention of the convict that water samples were not lifted from his unit and it was not a water discharging unit. Justice Sunil Gaur said there was no illegality or infirmity in the trial court's verdict holding the man guilty for the offence and awarding him the jail term and dismissed his appeal.

".... On scrutiny of the impugned judgment and the evidence on record, I find that non-lifting of samples of water for analysis is not fatal to the case of the respondent (DPCC) as it is evident from the inspection report of February 21, 2000 that no effluent treatment plant was installed by petitioner to treat the effluent," the judge said. The high court added that since the convict was engaged in textile printing without obtaining the mandatory consent under the Water (Prevention and Control of Pollution) Act, the reliance placed upon a Supreme Court verdict was of no avail as in the said case, the mandatory consent was obtained.

According to the case details, the convict was running a textile printing unit in a village here in south Delhi and during an inspection by the officials of the Delhi Pollution Control Committee (DPCC) and the sub-divisional magistrate (SDM) of the area, it was found that the screens used for printing were being washed there.

It was also found by the DPCC team that the untreated trade effluent was discharged and the convict was doing these acts without the consent of the authorities concerned. It was noted in the trial court judgment that the convict was discharging the trade effluent directly or indirectly, thereby permitting the polluting matter to enter a stream or sewer or the land, without installing an effluent treatment plant (ETP).

(Source : PTI)

SHOEMAKER PAYS FINE FOR PAK SANDALS

A famous Pakistan shoemaker who made sandals from snakeskin for Prime Minister Imran Khan as an Id gift ,which was confiscated for violating the Wildlife Act, got the chappals back after paying a hefty fine of Rs 50,000.

Official from the Wildlife Department in Khyber Pathtunkhwa Shinwari in Peshwar and confis cated two pairs of traditional Peshwari sandals made from snakeskin.

Such sandals are famously known as "Kaptaan special chappals" and it was made as an Id gift for Khan by the shoemaker .He claimed that the material had been sent from the US to his shop to craft two pairs.

(Source : The Telegraph - Kolkata)

INDIA SHOWS INTEREST IN KENYA'S LEATHER INDUSTRY; ASSURES MEGA INVESTMENT IN NEAR FUTURE

Showing interest in Kenya's leather industry, the Council of Leather Exports (India) has assured of mega investments in the near future.

During the three-day visit to Kenya with a 14-member business delegation from India to meet government and private sector players for possible partnerships and investment opportunities Chairman of the Council, Aqeel Ahmed said Indian investors continue to see Kenya as a regional hub.

"Investment opportunities that we have in this country are amazing. We believe we could do huge investments in the coming year, that is why we are here," Ahmed told Journalists at the event.

According to Kenya's industrialization Principal Secretary, PS Betty Maina, the leather sect- or in the country contributes 0.3 per cent to the gross domestic product and the partnership with India will be looking at improving the sector's output.

Speaking at a forum to discuss the investment and trade opportunities between Kenya and India, Maina said principal secretaries will soon have a workshop to come up with policies on the revitalization of manufacturing with leather and footwear being some of the priority areas.

(Source : KNN India – 29/07/2019)

SHUT SINCE DEC 2018, MSMEs FROM LEATHER INDUSTRIES & TANNERIES IN UP STILL UNCLEAR ABOUT THEIR FUTURE

More than 400 tanneries in Kanpur and a number of leather industries are still waiting for state authorities' permission to start their units again in the region which were closed back in December 2018 due to Kumbh Mela.

Closed since December 2018 before the start of Kumbh Mela, tannery units in Kanpur have not received any kind of directions from the authorities to reopen these industries, Taj Alam, President, Uttar Pradesh Leather Industries Association (UPLIA) told KNN India.

Rubbishing media claims on directives being issued for the reopening of tanneries, Alam claimed "Industries have neither received any direction nor any indication from the responsible authorities to address this issue."

Khan said, "CPCB gave notices prior to the Kumbh Mela, to shut down from 15 December 2018 to 15 March 2019. Even after the order, they closed one month ago. According to their norms, it went for four consecutive months rather than 3 scheduled months. This drive was not initiated through any means of written notice or information".

Adding to the issue, the President added, "A press conference was held regarding it and within six months industries were directed to stop the operation of industries. After mid-march, they had to open but it did not happen and industrialists are still suffering. Any updates have not come yet from the government or the UPPCB. Moreover, not any possibility has been provided to reopen the leather and tanneries in Kanpur and Unnao districts. Other than the permanent employees, industrialists are bearing a heavy loss in their revenues. Employments to the people are some of the bulky results of the ignorance of responsible body".

The combined value of Kanpur leather goods manufacturers, leather industry, including tanneries is nearby Rs 12,000 crore. In Kanpur and Unnao districts around millions are directly or indirectly employed through this. Total export from the cluster is worth Rs 6,000 crore which is exported to the Gulf, Europe, China and Iran.

(Source : KNN India – 31/07/2019)

LEATHER SECTOR FEARS SUPPLY CRUNCH WITH EXPORT DUTY CUT

The Union Budget's proposal for a sharp export duty cut on raw leather and hide ,from 60 to 40 percent ,has the leather industry worried.

There is another proposal for removing the 15 percent export duty on Eastern India tanned leather. The Council for Leather Export (CLE) is to meet on Tuesday, to lobby with the government against the proposal.

At present the share of these items is not big in the leather export basket but this is now expected to rise. And, both leather goods makers and tanneries are apprehensive of their in out cost going up.

Currently, the share of raw hide and leather skin in India's net leather and leather goods export, which was $5.3 billion (Rs 36,500 crore) in 2018-19, is almost negligible.

(Source : The Business Standard – 09/07/2019)

CHENNAI INDUSTRIES TO NOW USE TREATED SEWAGE WATER

In ten more days, Chennai will become the first Indian city to recycle sewage and supply it for industrial purposes. A new treatment plant is being built in Kodungaiyur, which is likely to be completed by the first week of August.

This plant will supply recycled sewage water to industries, thereby ensuring that fresh drinking water is reserved for residential use. The move, Metro Water Board officials say, will help city tide over water crisis.

Another treatment plant, under construction in Koyambedu, is likely to become operational in September. Together, these two plants can treat 90 million litres of sewage per day using the reverse osmosis technique.

How is this done?

Usually, after secondary treatment, sewage water is released into city's rivers. Now, it will be sent to these new plants for a third level of treatment. This will make the water fit enough for industrial usage. For the last 10 years, every day, 40 million litres of freshwater is supplied to industries in Manali, Minjur and Ennore in North Chennai, apart from Oragadam and Sriperumbudur in the outskirts. The water comes from Chembarambakkam reservoir and Minjur desalination plant. (New Indian Express)


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HOW DO A TANNER PERCEIVES THE DEATH

Dr. Goutam Mukherjee, Associate Professor,

Govt. College of Engineering & Leather Technology, Kolkata

There are about 50 trillion of cells, constantly dividing and also disappearing in human body. There are at least 70% of water containing large number of various ions who have definite functions to perform. The numerous chemical reactions always proceed on with a specific rate constant at 37 degree Celsius temperature and one atmospheric pressure. All these reactions follow the laws of Chemistry.

Constantly within these tiny cells the new molecules are formed at the expense of the reagent molecules. When the energy of activation of some chemical reactions are high; enzymes step in to lower the activation barrier to speed up the reaction rate reasonable enough. Sometimes some reactions use the so called "energy currency" the ATP, to make the reaction happen. These reactions are well disciplined and follows a specific sequence, which we call the metabolic cycles or biosynthesis pathways. For example, carbohydrate synthesis, metabolic pathways of glucose, metabolism of fatty acids, cholesterol and lipoprotein synthesis, lipid synthesis, amino acid metabolism, citric acid cycles etc. These not only are happening constantly, but are effectively monitored. Take for instance, if, glucose metabolism goes beyond monitoring or control, we have diabetic problems, when the control system requires external intervention.

Leaving these asides there are various transport mechanisms in both the directions; from intra cellular space to outer cellular space and vice versa. Take for example, the unique colloidal connective tissue, the blood, contains carrier hemoglobin that binds oxygen and release them to all the cells from head to feet, every where within given time and rate.

Coming to the fact that each cell contains DNA. Some of the human genomes are as long as 2.5 meters. These are opened at the 'ori' site and a host of enzymes like, DNA helicase, SSB protein, DNA polymerase I, II and III, topoisomerase, DNA ligase etc. are the weapons that are used by DNA for faithful replication, monitoring, control with astonishing speed, control and accuracy in each of the 50 trillion cells. What a speed! 1,000 nucleoside per second and with average 1 error in per 100,000,000 nucleosides!

Take for instance RNA polymerase with very high accuracy detaches non coding sequences from coding sequences, called slicing and transcribes at the rate of 80 nucleosides per second very effectively in each cells. Consequent three nucleosides from 5' direction, constitute one genetic code.

Ribosomes, amino acid t-RNA synthetase and host other molecules reads the genetic codes and aligns the correct amino acid one after another to synthesize polypeptide chains with a predetermined amino acid sequences, whose information are conserved in DNA. These information are Passed on to m-RNA by the process called transcription and then these are used to produce native polypeptide chains to from proteins, stimulating hormones etc. of various kinds in various cells. The rate of this translation is about 40 amino acids per second.

So, there are miracles that are happening in every second within our bodies without our active interference or conscious control, whether working or sleeping. Sometimes one, sometimes more than one polypeptide chains are combined to form a supramolecular super structure. The kind of folds that a protein should make is not also left to the proteins itself. It is also guided by the amino acid sequence or to say ultimately the DNA. It is these unique folding that decides how the protein is expected to perform – as enzyme, or as nutrition, defense, connective tissues etc.

Take for example the tropocollagen, which is the basic protein that makes the skin, teeth, tendon, cartilage, bone etc. are triple helix in the folded manner. They form 5 x 5 pentameric matrices in such a way that one row is staggered by one quarter of the

length from the next row; very much like the rows of bricks to construct the wall. Then we need some strong binding to make the wall strong. Several covalent bonds act as cement in these constructions.

Very exciting things happen. Enzyme lysyl oxidase and hydroxy lysyl oxidase, oxidizes some of the lysines of the tropocollagen to allysine and hydroxy lysine to hydroxy allysine. They are actually semi-aldehydes. These aldehydes undergo several reactions like Schiff base condensation, Aldol condensation to bind one tropocollagen molecule to another by head-to-head or head-to-tail or tail-to-tail joining within the same row along with the same, in between the columns of the pentameric matrices. They then mature and forming adhesion of several such forms make the organs as stated above. Native collagen is white in colour. Colour of the skin develops afterwards. A 1.0 mm dia. native collagen is 10 times more strong (tensile strength) than a 1.0 mm dia. steel.

Leaving these asides, several impulses of ions of metals triggers neuro signals by which we receive any kind of sensations.

In order to sustain life, there is a grand design of the Nature that all these trillions of chemical reactions never reach equilibrium. A chemical reaction does not proceed further upon attaining equilibrium. Reaching any chemical reaction in life to equilibrium is not a sustainable solution for life-show to go on. But as per the laws of chemistry the reaction must tend to reach equilibrium. What is the equilibrium point of life then? Death is the only equilibrium of life by any means. At that point and beyond, there is no exchange of either energy or mass from those cells from and to the surroundings. The cell is a thermodynamically open system at constant pressure. Therefore, all the complex molecules need no binding to remain in folding pattern and of course, they then do; what they should do must. Increase entropy to lower the Gibb's Free Energy, gain freedom of movements. Collagen triple helix or proteins will start breaking down to polypeptides then oligopeptides, then di or tri peptides, indole, amino acids and finally to Nitrogen oxides, carbon dioxide, water and the mineral oxides and get randomly distributed; whether you do cremation in crematorium or not. We call them aerobic purification or anaerobic decay; as the case may be.

Hence it is indeed a joyful maximum degree of freedom of those 50 trillions of molecules because they have no binding, no more tasks to perform, no more discipline always to maintain, no more transformation from one structure to another.

Since all chemical reactions *in vivo* must tend to reach this destined equilibrium point; every second in life, we are approaching to death. This is the scientific truth that I as a tanner do believe.

Workshop on Occupational Health and Safety Interventions – A Report

Under the ambit of ongoing initiatives of Solidaridad Asia to promote pollution prevention in Calcutta Leather Complex, a workshop on Occupational Health and Safety (OHS) interventions was organized in four Tanneries of Calcutta Leather Complex on 7th and 8thAugust, 2019 in close coordination with Calcutta Leather Complex Tanners Association (CLCTA).

The name of four tanneries where OHS activities executed are depicted as follows:

1. Sheerma Tanning Industries
2. Prime Industries
3. Nafis Tanning Industries
4. Trident Leather

Figure 1: Dr. Mittal demonstrating ergonomic practices

The Occupational Health and Safety experts, Dr Ashish Mittal and Mr Rajasekaran, conducted the camps and sharedtheir valuable inputs on relevant subject matter. Dr Ashish Mittal holds a vast experience of 25 years of working in the OHS domain, especially in the Micro Small and Medium industries. Mr Rajasekaran is a well-known trainer and consultant with an experience of more than 40 years on a wide range of management systems, including Occupational Health and Safety Assessment Series (OHSAS-18001).

The OHS camps received an encouraging support and significant participation from the tannery management and workers. Health check-ups of around 120 workers from the 4 selected tanneries were conducted.Dr. Mittal presented theOHS best practices to the participants and the dire need to adopt them. Also,he demonstrated the proper ergonomic practices to be adopted in the tanneries to prevent common health issues such aschest pain, shoulder pain, back pain, eyesight problem, etc. Lastly, Dr. Mittal introduced topics of hygiene practices and its implications on the health of the tannery personnels.

Figure 2: Mr. Rajasekaran inspecting shop floor of the tannery

Mr. Rajasekaran visited shop floors of the respective tanneries and provided valuable insightsfor efficient management. The improvisation of shop floor will not only minimize the risk of injuries but also have a positive impact of productivity enhancement of the workers. He emphasised the significance of adhering to the safety rules of the tanneries in abating the OHS issues in the tanneries. It was a participatory training programme and Mr. Rajasekaran addressed the large number of queries raised by the workers and Tannery staff.

Both experts highlighted the importance of First Aid Facility and proper usage of Personal Protective Equipments (PPEs) at shop floor. They mentioned that atleast two personnels from each tannery must be trained on First Aid facility while workers should understand the importance of using PPEs at the shop floor.

The tannery owners appreciated the initiative and ensured proper implementation of the inputs given by the experts.

Lastly, Mr PradiptaKonar, Program Manager- Solidaridad Asia thanked Calcutta Leather Complex Tanners Association for their unwavering support and ensured to continue such camps and activities in future as well, with the ultimate objective of making Calcutta Leather Complex more competitive on Occupational Health & Safety and a conducive environment for growth. He also informed that Solidaridad has already initiated working on waste management practices to minimize the water usage and reduce effluent water and, secondly to utilise solid waste generated by the tanneries into value added products.

Figure 3: Health check-up of a female tannery worker

Solidaridad 50 YEARS

SOLIDARIDAD 1969-2019

In the past 50 years, the work of Solidaridad has closely followed the socio-economic developments in the field of international cooperation. And more often than once, the organization has also stood at the cradle of innovation in promoting and fostering sustainable economic development.

Anno 2019, Solidaridad operates worldwide and has a full ambition to continue its work as a solution-oriented civil society organization accelerating global sustainable and inclusive development. And as we look forward, we strive to consider the lessons learnt from our 50 year-long experience as well as the essential factors needed to ensure that our society keeps moving forth in its transition towards a sustainable economy.

PROMOTING SOCIAL JUSTICE

Our journey began in 1969, at a time when social protests worldwide were starting to tear down the old, traditional socio-economic and political structures.

Solidaridad was established by Catholic bishops in the Netherlands through an Advent campaign to provide development aid to Latin America. This resulted in the commitment of Dutch Catholic parishes to development cooperation. Solidaridad was thus a child of its time, born at a time when the world was undergoing substantial political and socio-economic changes.

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LEATHERS FINISHED FOR THE SHOEMAKER OF THE '70s*

Geo Donath

The theme of this symposium is the radical change that has taken place, is in process of taking place, and is very likely to continue to take place, both in shoe manufacturing techniques and in leather. The key note, as in so many other conversations where leather and shoes are discussed, is the problem of leather facing up to synthetic competition and the threat such competition poses, not only to the leather trade, but also to the shoe industry as we know it today.

I think that the leather industry has come a long way over the past 20 or 30 years. It is beginning to realise that it is not simply offering a unique material which the shoe manufacturer has to purchase in order to make shoes, but it is on the verge of becoming a service industry providing a delivery service, a fashion service and even a component service to its customers. The quality of leather produced has gone up dramatically over these past 30 years and I will lighten these serious proceedings by illustrating this point by means of a true story :

I am privileged to be permitted to pay regular visits to a very large tannery in Germany. On the occasion of one of these visits two old timers were reminiscing over lunch about the quality of prewar calf leathers. The somewhat younger head of the German concern interposed stating that in his plant such reminiscences can be substantiated, and immediately intructed his shoe factory to produce the quality sample of the 1938 French Calf production together with the quality sample of 1968 French calf in a similar weight. Within half an hour the leathers were brought in and very much to the dismay of the two old timers concerned, the 1938 quality sample was indescribably poor in relation to the leathpr produced 30 years later. In all fairness, not only the finish of the 1968 vintage was greatly improved, but the leather itself was superior, better tanned, the flanks were fuller, the veins werc less pronounced etc. So much for the good old days.

Before considering details of particular finishes, my own pet love, which are either already available to the tanner, or about to be made available, it is perhaps of interst to look in a crystal ball to try and see what kiod of shoe factories there are likely to be in existence at the end of the decade.

** This lecture was given at a SATRA Symposium. The author is associated with Stahl Chemicals (GB) Ltd.*

My own guess is that these are likely to fall into five distinct parallel categories :

1. The high class shoe factory cutting leather.
2. The somewhat less traditional shoe factory cutting poromerics.
3. The even less traditional shoe manufacturer cutting cheap substitutes other than poromerics, ie vinyls, cloth, etc.
4. The manufacturer producing shoes of plastic materials by injection moulding or other fully mechanised means.
5. The shoe manufacturer producing full shoes of poromeric material by either injection moulding as we know it today, or some modification of the same method.

Of the five categories, the first four are, of course, in existence today. The relative importance of these categories in terms of pairage produced is likely to vary inevitably to the detriment of conventional leather shoes. The reason for this is not a lack of demand for this type of footwear, but the availability of a limited quantity of raw material only. The real danger from that quarter to the leather industry lies in the possible utilisation of hide collagen for some other purpose which could conceivably make it more valuable than it is for leather manufacture. At this time, I am not aware of the existence of such process ; although edible proteins can be made of collagen, recent market trends do not suggest that such materials will attract sufficient demand to make it worthwhile to divert hides from leather manufacture.

The fifth kind of shoe factory mentioned is, of course, not yet in existence. It is quite possible that it will never come into existence. The prerequisite for having such a plant is the availability of a poromeric type of material which can be used to injection mould or similarly form an entire shoe retaining the properties of this material. As far as I am aware two large American companies have carried out feasibility studies and opinions are evenly divided ; one of them feels that it is a starter and is worthwhile pursuing, whilst the other one is of the opinion that the difficulties to be encountered are greater than eventual benefits obtainable.

The reasons for investigating such a long shot are reasonably clear. It has to be recognised that poromerircs are probably facing a harder time than leather. Whilst I would not entirely write them off myself, a great many people would, and their performance over the past three years in America where their share of the market starting with the year ended June 30th 1963 has declined from 5.4 per cent to 4.3 per cent to 3.5 per cent seems to justify the the pessimistic, from the poromeric point of view. In view of the fact that the United States shoe production was declining at the same time, the material can be safely said to have lived up to the worst expectations of its producers. The picture

in this country is probably slightly different, but we have little reason to doubt that the United States pattern is likely to be followed over here too.

I believe that we can go a long way towards explaining the reasson for this decline by the lack of advantage offered by these materials overall to the shoe manufactures ; the saving at the best of times not much more than marginal, which may be effected when putting a poromeric through a shoe factory in place of leather is more than counteracted by the higher price poromerices cost even a number of years after their introduction. This price, incidentally, is unlikely to come down substantially due to the high initial costs of raw material, On the other hand, if a material offering the same physical properties which poromerics claim to have can be used in injection moulding entire shoes, then I believe a very dangerous rival to all four conventional or more conventional types of shoe manufacture will arrive offering the possibility of making very large runs of shoes in the given design at an extremely economical price.

The tanner's interest is in the first kind of shoe factory mentioned ; this is going to be the only where leather is likely to be used and it is for the prosperity and survival of this type of shoe factory that producers of leather and their associates have both to strive and, on occasion, pray. The question then is what imporatance will these developments have from the point of view of leathers to be finished for the 70's and what will the first group of shoe factories, the leather consumers, like, and, most important of all, what kind of leather will they want.

I think it is safe to assume that the selling price to the consumer of leather shoes is not likely to decrease ; in all probability, it will go up and my own guess would be that it will go up at a rate in excess of what has taken place over the last ten years. This will place leather shoes where they belong in the aristocracy of the shoe family, more particularly in the vanguard of fashion. Leather shoes are likely to become something of a luxury, but in a world whose prosperity is increasing in leaps and bounds, such luxuries will be within easy Leach of an ever increasing proportion of the population. In the same context, it is likely that runs of a particular style of footwear through a shoe factory using leather, will be shorter than through the other factories. This means that shoe plants using leather will be, in point of fact are, more flexible to the demands of the ever-changing world of fashion than those plants which use materials other than leather.

Thus, it is my feeling that the first and foremost duty of shoe factories *cutting leather is, and will* continue to be, to produce shoes which have a visual appeal, which are stylish and which are fully up-to-date with the latest dictates of the fashion moguls. With leather, we do not have to worry about the greatest bug-bear of the synthetics, namely the comfort factor. We have a material which is naturally and automatically comfortable and pleasant to wear. In this connection, it is interesting to note that the failure of poromerics and other

substitutes does not lie in their inability to sell the first pair of shoes to the consumer, but in obtaining repeat sales. People in the seventies want new things, want change, are searching for novelties. Poromerics are in themselves are novelty and the shoes that have been produced from them are certainly not unpleasing to the eye so they did get their first sale, and if you compare their advertising budget with that of the entire leather trade, it would indeed be a poor testimony to the advertising industry if they had not, but I personally know of no-one who has consciously bought a second pair of poromeric or other substitute shoes. I believe this failure to obtain repeat business is due primarily to lack of comfort, and in the second place, to lack of variation, lack of flexibility in offering the multiplicity of styles, the ringing of changes in a way shoe manufacturers using leather have been able to do and are very likely to be able to continue to do.

The third aspect, and it is here perhaps that leather users and leather manufactures have more to worry about is on the question of physical meaning properties. The resistance of the various substitutes to the adversities to which shoes are subjected have been extremely well documented by their very efficient advertising campaign. I am not convinced that the difference is as great as the poromeric industry would lead us to believe it is. Probably when the two classes of products are subjected to laboratory tests, the difference at first sight appears to be quite substantial, but when the two ranges are compared in wear trials, which is after all the real test, and wearers are questioned as to the necessity to clean or otherwise look after leather and poromeric or other substitute shoes, the difference becomes very mush smaller, even when we leave the newly developed "easy care" leathers out of consideration. The reason, of course, is not entirely due to the quality of the upper materials used in the shoe, but quite often to the actual construction ; cleaning is necessary around the edges of the sole, in welts and various other places where dirt can accumulate and from where it shnuld be removed but usually is not and is simply coated with shoe polish to make it blend in with the rest of the shoe. The result, however, is much the same ; the shoe for practical purposes need cleaning, and it is of little importance why it needs cleaning.

There is another aspect of physical properties which is sometimes left out of consideration by the tanners and which has been continuously and constantly under-played by manufacturers of poromeric materials—namely, the actual suitability of poromerices for making shoes in the shoe factory. This is an area which tanners have for some reason or other failed to exploit although it holds out the promise of very great advantage to them. Leather, for the present day shoe factory, is an ideal material to work with. Poromerics are not. It is possible that the shoe factories in the seventies specialising in the use of poromerics and other substitutes will install machinery which will be more suitable for using these materials ; indeed, I am told this process is already started.

There is another snag inasmuch as whilst leathers produced by the various manufacturers are, by and large, similar in their properties as to their suitability to shoemaking, and it is not particularly difficult for a shoe factory cutting leather to change from that produced by one tanner to that produced by the other (and this particular aspect is economically well exploited by the shoe manufacturers) the differences between the various classes of the poromerics and other synthetic materials is very much greater and it is conceivable that a shoe factory which sets itself up on one poromeric will not be able to substitute another without major changes in process and machinery.

There is, however, a very important lesson to be learnt by the tanning industry from the poromerics in this very field of shoemaking—a lesson which applies to the techniques of selling. Leather has been traditionally sold by leather salesmen who usually had a good knowledge of how leather was made, were excellent salesmen, outstanding businessmen, but, with the greatest respect, in the majority had very little or no knowledge of shoe manufacturing techniques, and were, and I am afraid to a large extent still are, unable to advise shoe factories on difficulties encountered in using leathers produced by their principals. This may have been all right as long as leather was virtually the only shoemaking material available and as the leathers produced by the various production units from the point of view of suitability to make shoes were, by and large, similar, but as soon as materials other than leather became available, the situation, in my view, changed.

The earliest manufacture of poromerics immediately recognised this aspect, probably prompted by the fact that his material was not ideally suited for shoemaking. At the same time, the natural attitude of chemical manufacturer to industrial selling is a technical service one and no self-respecting chemical manufacturer would dream of selling anything without providing the highest grade of technical service to his customer. The manufacturers of poromerics have made certain that they had people available who could go into a shoe factory and help the shoe manufacturer put their material through the factory, reducing his manufacturing problems and troubles with a material which is less suitable to the making of shoes than the leather to which the shoe manufacturer has been used to. I am convinced that without this type of service, the record of leather substitutes would have been even more dismal than it actually is. The lesson, which I cannot over emphasise, for the leather industry, is that this type of selling works. As units both on the leather manufacturing and on the shoe manufacturing side are becoming bigger it can be exploited economically and, unless I am very much mistaken, the shoe manufacturer is ready for it also from the leather trade.

It would be unfair not to mention that this particular aspect of selling leather is becoming recognised by tanners as part of the necessity of providing service to their customers and as a result an almost new breed of leather

salesmen well versed in shoe factory practices is appearing together with delivery dates quoted and kept which would have made us blink in disbelief only a few years ago.

I apologise if I appear to have spent far too much time in generalities and on painting a background to what I am really supposed to be talking about, namely finishes. I see the contribntion the leather finish industry can make to the continued well-being of its customers, and by customers I mean not only people who finish leather but who eventually use this leather, is in providing fashionable finishes and providing finishes which stand up to the demands which are likely to be made on leather through the next ten years and longer.

Taking the fashion aspect first, finishing has already become possibly the most important phase of operations in a tannery. This, in itself, is a major change ; until not so very long ago, finishers were but a small appendix on the technical staff of tanners, required only to give a light polish to the leathers after the wet processes had been completed in all their mystery and the leather for better or worse was ready for finishing. Today the finisher is not only required to protect the leather from the possibility of subsequent soiling and give it a little bit of extra brilliance, but is called upon to take the same piece of crust leather and produce an almost infinite variety of effects on it using whatever methods and whatever chemicals he can make available for the purpose. The change has been a very beneficial one for the industry and has contributed to the flexibility of providing the fashion service shoe manufacturers demand. It is very much quicker to produce a different effect on the same crust than to produce the same type of effect from the wet.

Fashion is a state of mind and a state of awareness. It is also a question of coordination with other pieces of apparel and accessories worn not only by ladies but also by gentlemen. This is one field where the leather industry has adapted itself exceedingly well. Tanners are making excellent use of fashion advisers and seem to be very quick in picking the right trends. Fashion seems to be one area where the collaboration of leather manufacturers and their suppliers has served and is serving the shoe manufacturers to very good advantage.

My own company uses the service of three separate fashion experts in three separate parts of the world and it may be interesting to read out the lines which have prompted us to develop rub-off Florentique finishes : "Poor is beautiful, rubbed is beautiful, the shoe just before scuffing is beautiful, but scuffed is already on the wrong side of the tracks".

Bearing in mind that fashion is necessarily subject to the fastest changes let us examine what is available and what is likely to become available in this particular segment ?

The two types of leather which immediately spring to mind are the "wet look" or patent types of leather which have enjoyed unprecedented popularity over the past couple of years, and the rub-off or Florentique type of leathers which

are just coming into their own. I think we are all quite familiar with the patent type of leathers and it would suffice to say that this is a direct and almost exclusive contribution of the chemical industry to the leather trade. Some people present might argue that the contribution is not entirely beneficial, but I think when the balance is struck, the benefits are likely to outweigh the disadvantages.

From the chemical manufacturer's point of view, production of these patent leathers with urethanes, as we do it today, is a shining example of research and utilisation of modern materials. We are all aware of the mysteries of japanning as our grandfathers have used it. Little by little the various coats used in the japanning process have been substituted by urethane coats whose manufacture could be properly controlled and where, at least, we have had a choice of reproducing results from day to day and week to week. Without explaining details of the process, suffice it to say that had these urethane products not been available when the present boom in demand for shiny leathers has come about, the industry, both the leather and the shoe industry, could certainly not have taken advantage of this boom.

In the field of new fashions, the last year has seen an extremely interesting and promising exercise in co-operation between the shoe industry, the leather industry, and the leather finish industry. I am referring to rub-off or Florentiqe finishes. As you know, the technique consists in applying a coloured lacquer top coat to the leather in a contrasting shade to the base coats which is then partially and selectively rubbed off after the shoe has been formed on a last in a pattern which follows the contours of the shoe. The result is extremely pleasing in appearance, having at least some of the character of old, well-polished pure aniline shoe.

I understand there is a certain amount of resistance among shoe manufacturers to doing the actual rubbing off in their shoe rooms. I feel that this resistance is some-what misplaced. Using a good pigmented rub-off or Florentique top coat together with the appropriate polishing wax on a conventional polishing wheel, a reasenably skilled opeator should have no trouble in producing a very pleasing effect on a pair of shoes in actually less time than it takes to clean and refinish in hot shoe rooms. After such polishing, it should certainly not be necessary to shoe room as good rub-off or Florentique finishes are quite resistant enough top coatings for ordinary wear in the shoe. It does not follow that because you can rub it off on a wheel with a cutting wax, it will rub off very easily in wear. The finish may "move" when you clean the shoe but this is the case with true aniline leathers in any case which get their character through such movement when the shoes are polished and waxed.

The demand from shoe manufacturers has been for a rub-off effect to be produced in the tannery to give the same effect in the shoe without their having

to do any rubbing off of their own. This is, strictly speaking, impossible as whilst the effect may be produced in a number of different ways, it can certainly not be produced to show up in the parts of the shoe which ought to show the particular character of rubbing off. It is possible to produce such an effect in the tannery, not necessarily by rubbing off in the tannery, which is a laborious process ; and although several machines have been produced to try and give this effect, none appears mally to be successful, but by a "wash-off" technique where the top finish normally to be rubbed off is removed in the tannery by washing-off. The leather is then top coated in the normal manner, can be made into shoes and can be shoe roomed normally, much to the delight of a large part of the shoe fraternity. I must emphasise that the effect so produced is a random one and will show up as a random effect in the shoe. It can be quite attractive, but, in my own view, it is not the same as the rub-off where the effect is shown in the exact right places on the shoe.

A further fashion effect, which is already with us but which is likly to be further exploited over the next few years, is that of rotogravure printing. Several machines have been developed for the purpose and very pleasing effects can be produced either by top coating a contrasting colour print on the leather, or printing the leather on the base coat or even in the middle coat. The disadvantage of this method is that each different print will require a new roller in the rotogravure priniting machine, and as these rollers are at least as expensive as embossing plates, in many cases considerably more expensive, it may be that the range of prints to be produced will severely curtailed by the necessity to amortise cost of these rollers in a reasonable period of time.

In this connection it is possible to transfer coat leather from a transfer paper which may have a texture on it. Tnis would enable the printing of leather without having to amortise the printing rollers and simply pay for the paper which is used to produce that particular square foot of leather. A further alternative to this method is to laminate a vinyl or even urethane sheet to leather with some sort of pattern borne on tse sheet. This is a technique already used on a number of patent leathers. There is also a certain amount of imitation reptile leather currently being produced by this method. Unfortunately, this type of lamination has not always met with a great deal of success in leather manufacture as problems appear to be created by the quality of adhesive which can be employed, by the quality of sheets available, and by the actual technique to putting the sheet on the leather, even when the natual unevenness of the leather surface is disregarded as a difficulty.

I have absolutely no doubt that the list of gimmicks and other novelties produced on leather by leather finishing will con tinue to grow nearly to infinity. This is only limited by man's ingenuity which must be recognised as being unlimited. At the same time, we are experiencing a very healthey trend in renewed and increasing demand for full grain leathery leathers, leather-like

effects, and even a demand for the imperfections of leathsr which are the hall marks of its naturality, I firmly feel that the future of the leather industry lies in producing these characteristically leather-like shoe materials with a finish which will withstand whatever demands can possibly be made on it, and thus a luxury material can be created, and will be created, which is not only luxurious but utilitarian also.

The second field of considerable contribution of leather finishes to the development of the shoe and leather industry in the 70's appears to be finishes designed to give wear resistance to improve the physical properties of leather. The two main fields seem to be those of waterproof leather and that of easy care finishes.

On the problem of waterproof leathers, I am able to say that we, on the leather finish side, are in a position to produce an acceptable finish for any waterproof leather which has, so far, been produced. In the case of the recently developed and recently publicised Briggs waterproofed leathers, we can use a reasonably conventional acrylic type of resin finish provided the emulsions and pigments are sufficiently modified to be waterpoof themselves not to impair the waterproof properties of the leather. This does exclude a number of products currently on the market, but it is certainly possible to produce a finish which can be applied by present day techniques in the tannery to give even an improvement to the leather already waterproofed. Such process is currently commercially running in more than one tannery, both in this country and abroad.

There are various other waterproofing materials available and, in some instances, it is essential to use either wholly solvent type finishes or a solvent base coat which will permit adhesion of subsequent finish to leather.

I am afraid the one thing we cannot do is to provide a finish which will maintain seams waterproof.

With all the disadvantages attributed to "wet look and/or patent-type leathers, in some instances rightly and in others, I am happy to say, quite wrongly, the one supreme advantage these leathers have in addition to being high gloss is that they are truly easy clean. The polyurethane coating applied to tne leather is outstandingly dirt resistant and is truly wipe and wear. In point of fact, you cannot polish it even if you try and the shoes really and truly only need cleaning in the crevices where dirt has been deposited. Thus, we have an "easy", wipe and wear finish available.

The next step as far as the leather finish industry was concerned quite obviously was to translate this particular physical property into the conventional leather look. This is probably not the place to go into tbe full details and all the intricacies of polyurethane coatings ; suffice it to say that is possible to impart the same physical properties as the "wet look" leathers finished in a conventional look. In fact with the development of the latest polyurethane lacquers based on

linear fully reacted thermoplastic polymers it is possible to use a con-curing system which does not require special stoving or drying in the tannery but can be applied, and, more particulary, can be tried in the conventional manner.

We, at Stahl, feel very strongly that this is the future trend in leather finishing and it is in this direction leather finishing ought to and is likely to develop during the 70's. My own advice to any tanner expanding or remodelling his finishing room would be, please make sure that you will have an installation where you will be able to apply solvent finishes of a relatively low flash point, as, in five years' time, I do very much believe that anybody who is unable to do this in his finishing room is likely to find that he can aim his product only at a very small proportion of the market.

In this connection, it is certainly no accident that most, if not all, poromerics currently on the market do contain a polyurethane layer which, in addition to a number of advantages specific for poromerics, does give lt resistance to scuffing and easy cleanability.

It may appear somewhat presumptious for me to say that the main problem with "easy clean" leathers is not so much in finding the correct finishes and perhaps even not so much in finding the correct method of application, a method of application which is practical and available in the tannery, although this last one is no mean problem, but to find a definition and a criterion as to what an "easy clean" leather really is and what it should be.

In this respect, unfortunately, laboratory physical tests as recommended by the various research associations, are not always as helpful as they could be. The BLMRA has recently conducted an investigation into the correlation of laboratory physical tests and wear trials. They have published these results in their monthly bulletin expressed in rank correlation coefficients for comparative purposes, a method which is not particularly clear to the layman unaccustomed statistical methods, but, in short, the interpretation of this rather complicated table is that practically none of the laboratory test methods has borne any resemblance to wear trials.

Of all the tests such as water vapour permeability, wet and dry adhesion, wet rub, flexometer tests, the only two which appear to have given a passable indication as to how the leather is going to behave in the shoe was dry rub resistance and scuff resistance testing. I feel very strongly that this question of reliable leather testing and the ability to predict behaviour of leathers in shoes, is an area in which our research associations could serve the industry very considerably by establishing realistic and practical standards which could be and acceptable guideline in making easy clean and other leathers also. In this connection, it may be that we can learn just a little bit from the Americans. It seems to me that although a great many of their testing methods are not strictly speaking universally accepted or anywhere near as scientifically worked

out as ours, or for that matter quite as faithfully reproducible, they are based on eventual usage characteristics and do fairly nerly predict how the leather is going to behave in the shoe factory on the one hand and in wear on the other.

What are then the properties we look for in easy clean leathers from a practical standpoint. I believe scuff resistance is of paramount importance. This as far as we are aware at the use of polyurethanes, and it is simply not sufficient to apply a urethane top coat to a conventional resin finished leather ; all that will happen, and this is evident from a number of "wet look" leathers, is that the top coat can be easily kicked off the shoe and scuffing results which is just as bad or worse as with conventional finishes. It is essential in order to achieve scuff resistance to use a urethane base coat or a urethane finish all the way through on the leather.

The second aim that we aepear to have in giving "easy clean" finishes, namely that of wipeability or coming up reasonably bright after just beipg wiped over with a damp cloth, can be achieved by using a urethane top coat only with acrylic base coats and this will have a reasonable life in the shoe. I am not certafn if it will be permanent. I think that if you have a leather which has been finished with conventional acrylic cr nitrile rubber resins and then has been topped with urethane, it will be resistant to wiping for a considerable period of time ; the actual length of time obviously depending on the thinkness of polyurethane applied, As the shoe is worn it appears very likely to me that in certain spots the urethane will be worn through and the underneath layers exposed which will then show up dull and uninteresting looking and the more we wipe them the worse they will look. Thus, once again I feel that in order to achieve a really wipeable and practically washable leather finish, it is essential to use once again an all-urethane coating.

Whilst still on the subject of urethanes frem a technical manufacturing point of view, it is perhaps not superfluous to emphasise that whilst in order to produce a potent type of urethane leathtr it is essential, at the present stage of develepment, to use two component urethanes which require curing, these are susceptible to dust during that cure poriod and thus their manufacture in addition to loquiring flameproof equipment does neccssarily call for specialised application, specialialised ovens and so on. It seems that with the latest break-through in fully reacted linear type urethane coatings, such specialised equipment, apart from flameproof equipment, is not going to be required to make easy care leathers which means that once the shoe industry does decide that it is ready to pay the relatively small premium which producing such a leather will require, the i dustry could swing into production of easy care leathers generally very quickly.

What are then the advantages of using a polyurethane top finish on leather? 1 must apologise if the list I am about to give will sound like a panaccea of all ills which have been bedevilling the shoe and leather industry. I feel, however,

that all the points I am about to make have been well-founded and borne out by the unique behaviour of surface coatings made on a polyuaethane basis.

1. Improved break and non-wrinkling.
2. Non-cracking.
3. Non-grazing.
4. Scuff and scratch resistant finish.
5. Completely washable finishes.
6. Completely washable finishes.
7. Finishes which will resist shoe factory damage.
8. Viriability of aesthetic properties both in appearance and in feel.
9. Light fastness, bleed resistance and crock. ie both wet and dry rub resistance.
10. Almost infinite flexibility.

In point of fact, the leather industry is, of course, not alone in recognising these unique properties of polyurethanes ; they have become a by-word in every-day life. Indeed, the poromerics industry, the leather substitute industry, would ideally like to find a cheaper, more convenient main core or substrate on whfch it can apply a thin layer of polyuretaane to give the properties it seeks to achieve.

The leather industry has the advantage, the built-in advantage, of having a substrate which is ideal in practically all respects both for the making and for the wearing of shoes and all we really have to do is apply this near ideal polyure-thane film to this unique substrate,

The methods by which this can be achieved are numerous. In a tannery, normally, people will think in terms of applying polyurethane by means of spray or use of a curtain coater. But polyurethane films are being applied to other substrates including flexible substrates by transfer coating for example, which could give a new dimension to leather finishing. In this method the finish to be applied to the substrate is first put on a transfer paper which can be either smooth or textured and then it is transferred from this paper onto the leather substrate and anchored to the leather by means of a polyurethane adhesive.

Thus, as far as the future is concerned from the point of view of wearing and shoe manufacturing properties, we are principally offering polyurethane finished leather. As a second string to our bow. in this particular field, we can offer vinyl finishes. These have enjoyed very widespread use in the upholstery field for some time now. particularly in the United States. Whilst they certainly do represent an improvement over what have become conventional finishes, their properties are certainly second to the urethanes. This is particulariy true in the field of scuff and abrasion resistance. Vinyl finishes are, however, cheaper than urethanes and the price differential is likely to persist,

It is probably a healty sign that the industry, excepting car upholstery leather makers, is by and large ignoring this cheaper alternative in favour of a

superior albeit more expensive. one. Possibly the relatively minor importance of the cost of finish as a proportion of the final selling price of leather may have a bearing on this point of view. At the same time, it is interesting to note that the poromerics industry is hard at work in trying to develop a vinyl based substrate or backing for its urethane top coats primarily in a quest to try and make the product cheaper. The one thing the shoe factory will not be able to do with any "easy care" finish and particularly not with. polyurethane finishes is to dress the shoes in the conventional fashion. I am afraid most shoe manufacturers are quite happy to pay lip service to avoid or all shoe rooming. They claim that washing off and putting back on or only putting on a finish on the leather is a nuisance. At the same time, we as leather finish manufacturers get at least as many complaints about leather that is too fast to wet rub and will not accept a top dressing or will not come off easily enough when washed in the shoe room as we get about leather that is not fast enough and where the colour is coming off too easily.

The answer is that damage is done to the shoes through the shoe factory and this needs to be repaired in the shoe room. It is possibly the easiest way to re-finish all the shoes rather than just pick out the ones which have some damage. It may well be that if we can provide a leather which is resistant to such damage shoe rooming will simply wither away. On the other hand as far as I am aware, most poromerics are shoe roomed and as I firmly believe that leathers finished with modern finishes are over shoe roomed there seems to be scope in selling the idea of reducing shoe rooming and still producing a shoe with the high sheen the customer seems to expect when he opens a box containing a new pair of shoes. I would not like to speculate the amount of pressure on the unfortunate leather salesman who is trying to take his customer into accepting a bright leather which he will not have to shoe room and then have to face his principal who would like to make a dull leather which hides most of the faults.

It may be appropriate to close by a short anecdote again which is not only true but also very recent. One of the vice presidents of the large American food company controlling my organisation has heard a great deal about the dying leather trade, and finding himself in Paris decided to visit the Semaine du Cuir. He came to our stand manged to squeeze into a corner where he was given a drink and then decided to look around for himself at the Exhibition. The man is a sceptical, hard boiled, mid-Western business man. The Paris Fair this year was probably not the best we have ever seen, still this man spent six hours wandering around the show, clean forgot about his luncheon engagement and returned to the stand in the late afternoon shaking his head, his only comment being : "If this is a dying industry, show me a live one."

We are, as an industry, contray to all reports very much alive and kicking. If we can keep on innovating in every direction, leading the field in new developments, adding new ideas, new processes, new leathers and new shoes during the next 10 years as we have done in the last, then I have absoluetely no worry and very much look forward to coming here again in 10 years' time to contemplate leather for the 80's.

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Indian Leather Lechnologsits' Association

(Since - 1950)

INDIAN LEATHER PRODUCTS ASSOCIATION

The Indian Leather Products Association (ILPA), established in 1987, is a premiere representative body of manufacturer-exporters of superior quality leather and leather products with head office in Kolkata and a regional office in Chennai.

IMPORTANT ACTIVITIES OF ILPA :

- Brings together manufacturer & merchant exporters on a common platform.
- Stimulates growth & development of the industry as a whole.
- Promotes export of leather & leather products.
- Develops & maintains symbiotic liaison with international trade bodies & Chambers of Commerce.
- Organises trade delegations to international fairs & seminars.
- Organises various Seminars/workshops both the benefit of its members and industry.
- Promotes International Fairs and RBSMs like IILF Kolkata, ILPA Buyer Seller Summit.
- Organises the ILPA SHOW : Leather on the Ramp , one of the most prestigious and sought after Fashion event in Eastern India.
- Closely involved in setting up the Calcutta Leather Complex(CLC).
- Runs and manages the Freya Design Studio : a CLE award winning Design Studio both for leather goods and footwear.
- Runs and manages the ILPA INFRASTRUCTURE DEVELOPMENT FOUNDATION (IIDF) – a state of the art Common Facility Centre.
- Imparts Skill Development Training through ILPA Technical School.

Common Facility Center

Design Studio

CAD CAM Center

ILPA Technical School

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GDP GROWTH SLIPS TO FIVE YEAR'S LOWEST ON SLOWDOWN IN INVESTMENT, MANUFACTURING

India's economic growth fell to 5.8 per cent in the January-March period of 2018-19, the lowest in 20 quarters, due to a sharp slowdown in investment and manufacturing growth as well as a contraction in agricultural production. This pulled down the gross domestic product (GDP) expansion to 6.8 per cent in FY19, the slowest in the first stint of the Modi government. The economy's revival will be a key challenge for the new finance minister, Nirmala Sitharaman.

Economic growth in FY19 was much below the government's own projections of 7.2 per cent in the first advance estimates and 7 per cent in the second one. Economists expect the Reserve Bank of India's (RBI's) Monetary Policy Committee to cut the policy rate in the upcoming meeting to revive investments.

The March quarter growth made India fall behind China as the fastest-growing large economy after a year-and-half, as the neighbouring nation grew by 6.4 per cent in the quarter. On an annual basis though, India continued to remain the fastest-growing large economy. This point was emphasised by Finance Secretary Subhash Chandra Garg.

Garg attributed the slowdown in GDP to the crisis in non-banking financial companies (NBFCs). "The slowdown in the fourth-quarter GDP was due to temporary factors like stress in the NBFC sector, which affected consumption finance. The first quarter of the current fiscal year (2019-20) would also witness relatively slow growth but from the second quarter onwards, it will pick up," Garg said.

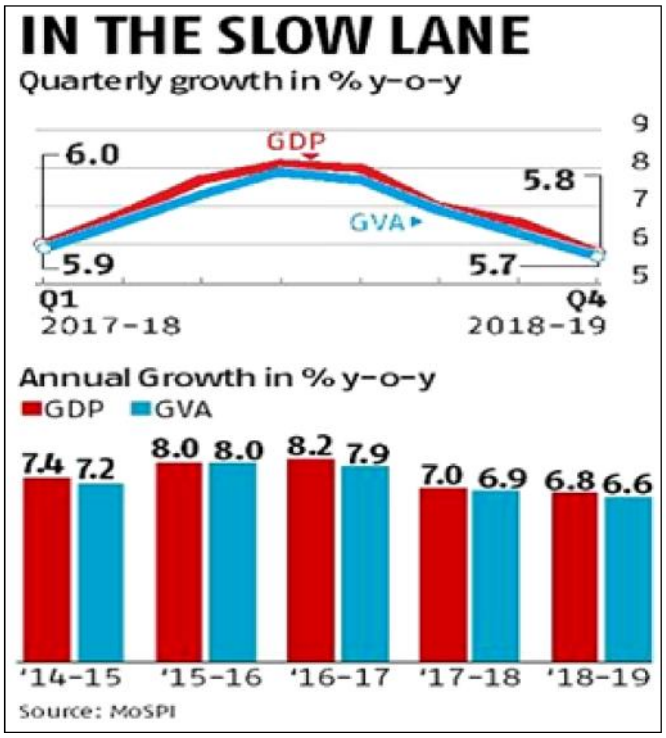
However, financial services and related sectors grew by 9.5 per cent in the fourth quarter of FY19, the highest pace in at least eight quarters. Growth in the gross fixed capital formation (GFCF), which denotes investments, declined to 3.4 per cent, the lowest in several quarters. With private investment already low, the government's curtailment of capital spend in the fourth quarter to meet the fiscal deficit target could be blamed for the sharp fall in the GFCF growth, which was over 10 per cent in the previous three quarters. The government's revenues saw a shortfall of over Rs 1.6 trillion, according to the data released by the Controller General of Accounts on Friday.

With the fiscal deficit targeted at 3.4 per cent of GDP for 2019-20 in the interim Budget, it would be crucial to see if Sitharaman will go by this number or change it to perk up the economy. "We believe that the government should target a structural deficit as an alternative to targeting the fiscal deficit, like most advanced economies and several emerging market economies. This serves as an automatic counter-cyclical stabiliser unlike the current target that has been set from the outset as a fixed percentage of GDP," SBI group Chief Economic Advisor Soumya Kanti Ghosh said.

Private final consumption expenditure growth fell to 7.2 per cent in the fourth quarter from 8 per cent in the third and 9.7 per cent in the second. The growth stood at a meager 7.3 per cent in the first quarter. Manufacturing activity suffered a slowdown, with growth falling to 3.1 per cent in Q4 compared to 6.4 per cent in the third quarter, 6.9 per cent in the second quarter and 12.1 per cent in Q1.

"Low growth in manufacturing calls for direct intervention by the government. The economic activities are likely to pick up as the government is likely to undertake measures to boost growth," Madan Sabnavis, chief economist at CARE Ratings, said.

However, lower consumption and investment may continue to constrain the overall economic growth, which is expected to see only gradual pick-up in the coming year. "We project the country's GDP to grow by 7.2 per cent in 2019-20. There is a 50 per cent chance that the RBI will go in for a rate cut by 25 bps in its June policy to give an impetus to the lagging growth," he said.



The government's final consumption expenditure showed a stellar growth of 11.5 per cent, which could be on account of revenue spending to meet routine expenses like salaries.

Agriculture and allied activities saw a 0.1 per cent contraction in Q4, compared to 2.8 per cent in the previous quarter. The meteorological department predicted on Friday that the monsoon would be normal this year. However, some regions such as north-west and north-east would receive less than normal rains, according to the official weather forecaster.

Acreage for the rabi crop was lower than last year, which has impinged on the agricultural performance. "We expect consumption impulses to remain muted in the upcoming print, and recovery in the same will depend on the monsoons and the efficacy of the income schemes for the rural population," said B Prasanna, group head – global markets – sales, trading and research, ICICI Bank.

D K Joshi, chief economist at CRISIL, said he expected the economic growth to lift in fiscal 2020, particularly from the second half over a weak base, as normal monsoons, softer interest rates and budgetary measures kick in to support consumption. "These factors should help growth cross 7 per cent in fiscal 2020," he said.

(Business Standard – 15/08/2019)

UNEMPLOYMENT CLIMBS TO 3-YEAR HIGH : STRESSED COMPANIES SPIKE UBRAN EMPLOYEMENT

Amid stress in the major economic sectors and slowdown in consumption, demand and investment in the economy, rising unemployment has added to the worry. Unemployment in India has shot up to a 3-year high of 8.3 per cent, as on August 20. With the urban unemployment rate close to the 10 per cent mark, job seekers in the urban areas are suffering more than those in the rural areas, according to CMIE unemployment database. With the urban unemployment rate close to the 10 per cent mark, job seekers in the urban areas are suffering more than those in the rural areas.

Jobs in Tripura, Haryana and Himachal Pradesh has faced the worst hit, with the unemployment rate climbing as high as 23.3 per cent in Tripura in July.

"Unemployment rate has significantly surged in the rural and urban India, with the steep rise in joblessness in urban areas in the last few weeks. The worsening job scenario is likely a reflection of stress in the corporate sector, largely in the automotive industry," Mahesh Vyas, MD & CEO, CMIE, told Financial Express Online.

Textiles, tea, automotive and a few other industries are facing a severe slowdown. Reports suggest that around 3.5 lakh jobs have been cut in auto and related industries in the current financial year so far. There has been as an estimate that the job cuts in the sector may reach up to 10 lakh down the line.

Depleting rural demand has also affected the sales of the corporates in the urban areas. One recent example has been

India's largest biscuit maker "Parle," which has indicated towards a possibility of laying off up to 10,000 employees due to poor sales amid falling demand in the rural heartland.

Other industries like textiles and tea are also struggling to survive. Exports of cotton yarn halved in June, as compared to the same month last year. The tea industry, accountable for providing jobs to over 10 lakh people, is also suffering heavy losses due to the spike in production cost and low selling price. These factors have affected the profitability of these industries, eventually becoming a reason for the job cuts.

(Financial Express – 21/08/2019)

TWO AND HALF YEARS DEMONITIZATION : CASH RULES, DIGITAL PAYMENTS GROW, CREDIT CARDS DRAG

Cash in India has grown fast since demonetization, but digital payments have grown faster. However, it's the use of credit cards and debit cards which has failed to keep up the pace with the changing times, going by the latest RBI data. "Cash usage declines as the country becomes richer," says the latest RBI report. However, the cash in circulation surged to Rs 21.16 lakh crore in June 2019, which is over 24 per cent more than the cash present in the system just before demonetization in October 2016.

Notably, one of the objectives of the demonetization was to decrease the usage of cash and to boost digital payments in the economy. Since demonetization, digital payments have grown by about 34 per cent, however, the growth in usage of debit and credit cards at POS terminals has declined in the post-demonetisation period, says the RBI report.

The central bank says that the wider adoption of digital payments depends on many factors like robust payments system infrastructure, reduced cost of e-payments, the introduction of new and innovative schemes to attract consumers, push to greater financial literacy, bank accounts and strong consumer demand for e-payments because of convenience, safety and add-on benefits.

Cash tends to be used relatively more by older generations and availability of digital infrastructure can reduce the cash usage. As far as infrastructure is concerned, the roadblock here is that India has only 0.003 POS terminal for every citizen, which is the lowest among other advances and emerging market economies, shows the latest data by RBI. Apart from the POS terminals, the number of credit or debit cards per individual in India is also at the lowest among different advanced and emerging economies. The country has only 0.7 card for every individual.

In the number of cards, cashless payments and value of cashless payments per inhabitant, India lags behind the AEs and other EMEs. At the same time, the value of the currency in circulation as a percentage of GDP remained high as compared to other economies.

(Source : https://newzz.in – 23/08/2019)

THE WOBBLY ECONOMY : PATIENCE IS FINALLY WEARING THIN

Narendra Modi led BJP government must stop quibbling over the nature of the crisis, and act with speed. Patience is finally wearing thin. The resigned shrug with which Indian industry once responded to the flow of dismal high-frequency data from various sectors of the economy has started to give way to muffled expressions of disquiet over the Narendra Modi government's fumbling efforts to put together a strategy to deal with a snowballing crisis. What many find especially galling is that

the government chooses to remain in denial about the seriousness of the crisis, and continues to hush talk of gloom and doom by harping on its distant dream of creating a $5 trillion economy in five years. In early August, the Reserve Bank of India's monetary policy committee cut its growth projection for the year to 6.9 per cent from its earlier forecast of 7 per cent. In 2018-19, real GDP growth had plunged to 5.8 per cent in the last quarter (January-March), dragging the full year growth down to 6.8 per cent — the lowest in five years. It is clear that things are not expected to improve by much this year.

The deepest pain is being felt in automobile, real estate and consumer goods segments while the farm and rural sectors continue to wallow in distress. Automobile sales sank to a 19-year low in July, tumbling 18.71 per cent to 18,25,148 units. Unsold inventories in the real estate sector have soared and fast-moving consumer goods companies have reported a decline in volume growth in the first quarter. Business confidence has started to drain because airlines, tourism and hotels are also starting to feel the heat as consumption demand evaporates. The automobile industry, which accounts for 25 per cent of the job-generating manufacturing sector, is battling a breakdown in its supply network as automakers cut back production, lay off contractual workers, and dealerships shut shop as credit supply dries up.

The government has tried to come up with patchwork solutions that do not adequately address the situation. The half-hearted effort stems from the fact that the authorities believe that the slowdown is the result of cyclical factors and that the crisis will blow over in the next two quarters. This has opened up a debate over whether this is really a cyclical problem or a deep-rooted structural crisis that can only be solved through radical reforms. Two factors that are playing out today point to a deep structural problem. Wage growth in the corporate sector has tumbled to single digits from high double-digit levels while rural wage growth has shrunk to less than 5 per cent in the last three years. Tax collections have remained weak, forcing the government cut back its own expenditure which has only aggravated the problem. Mr Modi and his government must stop quibbling over the nature of the crisis and act with speed.

(The Telegraph – 21/08/2019)

HIGHLIGHTS OF UNION BUDGET 2019 – 20

The Union Minister for Finance and Corporate Affairs Smt. Nirmala Sitharaman made her maiden Budget Speech today and presented the Union Budget 2019-20 before the Parliament. The key highlights of Union Budget 2019 are as follows:

10-POINT VISION FOR THE DECADE

- Building Team India with Jan Bhagidari: Minimum Government Maximum Governance
- Achieving green Mother Earth and Blue Skies through a pollution-free India
- Making Digital India reach every sector of the economy
- Launching Gaganyan, Chandrayaan, other Space and Satellite programmes
- Building physical and social infrastructure
- Water, water management, clean rivers
- Blue economy
- Self-sufficiency and export of food-grains, pulses, oilseeds, fruits and vegetables
- Achieving a healthy society via Ayushman Bharat, well-nourished women and children, the safety of citizens
- Emphasis on MSMEs, Start-ups, defence manufacturing, automobiles, electronics, fabs and batteries, and medical devices under Make in India.

MASSIVE PUSH TO ALL FORMS OF PHYSICAL CONNECTIVITY

- Pradhan Mantri Gram Sadak Yojana
- Industrial Corridors, Dedicated Freight Corridors
- Bhartamala and Sagarmala projects, Jal Marg Vikas and UDAN Schemes
- State road networks to be developed in the second phase of Bhartamala project
- Rs 50 lakh crore investments needed in Railway Infrastructure during 2018-2030.
- 657 kilometers of Metro Rail network has become operational across the country.
- Outlay of Rs 10,000 crore for three years approved for Phase-II of FAME Scheme.

MEASURES TO DEEPEN BOND MARKETS

- Stock exchanges to be enabled to allow AA rated bonds as collaterals

- User-friendliness of trading platforms for corporate bonds to be reviewed
- Electronic fundraising platform under the regulatory ambit of SEBI
- Listing social enterprises and voluntary organizations.
- To raise capital as equity, debt or as units like a mutual fund.
- KYC norms for Foreign Portfolio Investors to be made more investor-friendly
- Insurance intermediaries to get 100 pc FDI
- FPIs to be permitted to subscribe to listed debt securities issued by ReITs and InvITs.

DIRECT TAXES

- Tax rate reduced to 25 per cent for companies with annual turnover up to Rs 400 crore
- Surcharge increased on individuals having taxable income from Rs 2 crore to Rs 5 crore and Rs 5 crore and above.
- Direct tax revenue increased by over 78 pc in past five years to Rs 11.37 lakh crore
- Those who don't have PAN can file tax returns using Aadhaar
- Pre-filling of Income-tax Returns for faster, more accurate tax returns

AFFORDABLE HOUSING

- Additional deduction up to Rs 1.5 lakhs for interest paid on loans borrowed up to March 31, 2020 for purchase of house valued up to Rs 45 lakh
- Overall benefit of around Rs 7 lakh over loan period of 15 years.

OTHER DIRECT TAX MEASURES

- Simplification of tax laws to reduce genuine hardships of taxpayers
- Higher tax threshold for launching prosecution for non-filing of returns
- Appropriate class of persons exempted from the anti-abuse provisions of Section 50CA and Section 56 of the Income Tax Act.

RELIEF FOR START-UPS

- Capital gains exemptions from sale of residential house for investment in start-ups extended till FY21.
- 'Angel tax' issue resolved- start-ups and investors filing requisite declarations and providing information in their returns not to be subjected to any kind of scrutiny in respect of valuations of share premiums.
- Funds raised by start-ups to not require scrutiny from Income Tax Department
- E-verification mechanism for establishing the identity of the investor and source of funds
- Special administrative arrangements for pending assessments and grievance redressal
- No inquiry in such cases by the Assessing Officer without obtaining approval of the supervisory officer.
- No scrutiny of valuation of shares issued to Category-II Alternative Investment Funds.

INDIRECT TAXES

- Basic customs duty increased on cashew kernels, PVC, tiles, auto parts, marble slabs, optical fibre cable, CCTV camera, etc.
- Exemptions from custom duty on certain electronic items now manufactured in India withdrawn
- End use based exemptions on palm stearin, fatty oils withdrawn
- Exemptions to various kinds of papers withdrawn
- 5 per cent basic custom duty imposed on imported books
- Customs duty reduced on certain raw materials such as inputs for artificial kidney and disposable sterilised dialyser and fuels for nuclear power plants, etc.
- Capital goods required for manufacture of specified electronic goods

EXPORT DUTY RATIONALISED

- Increase in special additional excise duty and road and infrastructure cess each by rupee one per litre on petrol and diesel
- Custom duty on gold and other precious metals increased

EASE OF LIVING

- About 30 lakh workers joined the Pradhan Mantri Shram Yogi Maandhan Scheme that provides Rs 3,000 per month as pension on attaining the age of 60 to workers in unorganized and informal sectors.

- Approximately 35 crore LED bulbs distributed under UJALA Yojana leading to cost saving of Rs 18,341 crore annually.

BANKING AND FINANCIAL SECTOR

- NPAs of commercial banks reduced by over Rs 1 lakh crore over the last year
- Record recovery of over Rs 4 lakh crore effected over the last four years.
- Domestic credit growth increased to 13.8 per cent
- Rs 70,000 crore proposed to be provided to PSBs to boost credit
- Reforms to be undertaken to strengthen governance in PSBs

MEASURES RELATED TO CPSES

- Target of Rs 1, 05,000 crore of disinvestment receipts set for the FY 2019-20
- Government to reinitiate the process of strategic disinvestment of Air India
- Government to consider going to an appropriate level below 51 pc in PSUs where the government control is still to be retained, on case to case basis
- Present policy of retaining 51 pc government stake to be modified to retaining 51 pc stake inclusive of the stake of government controlled institutions

DIGITAL PAYMENTS

- TDS of 2 per cent on cash withdrawal exceeding Rs 1 crore in a year from a bank account
- Business establishments with annual turnover more than Rs 50 crore shall offer low cost digital modes of payment to their customers and no charges or Merchant Discount Rate shall be imposed on customers as well as merchants

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