MANTHAN

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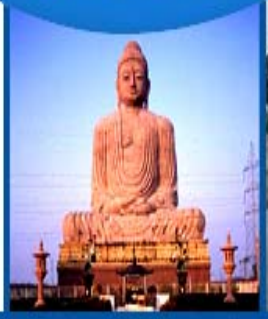

Manthan

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Manthan is a quarterly magazine published by BiharBrains, an international Forum of educated people of Bihar with the objectives of sharing ideas, knowledge and achievements which can be benefited to the scientific and non-scientific community.

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Message from Editor's Desk

*You are looking at the second issue of **'Manthan'** released by BiharBrains Scholastic Center (BBSC) Patna, an international forum of educated people of Bihar who lives in different parts of India and abroad (NRIs) and wish to take an active part in the development process of their country of origin.*
For details you are free to visit our website (www.biharbrains.org).
As you know, this magazine has been started with the objectives of making a pool of educated people who can readily share their knowledge, want to publish their papers/ articles which may be beneficial for the mass and can be applied in our daily life.
Based on the suggestions and comments by the members of the forum and regular feedback of online readers of the magazine, efforts have been taken in the direction of making this issue 'good looking and reader's friendly'. This issue of magazine has been divided into many sections so as readers can access articles from their own section of interest, and also they can get facility of free online access of the magazine.
The Science & Technology section is a major focused area of the magazine where our contributors have presented/ shared some of their experiences, ideas or have communicated about the development and research in some frontier areas of Biotechnology, Bionanotechnology Astrophysics, Chemistry, Computers, Ecology and Renewable Energy Sources etc.
In the development section, the developmental projects started by various trust and societies have been highlighted. Also, the perceptions of the certain individual on the issue of development as well as some important initiatives taken by the Government of India has made its place in the magazine.
In the news and breakthrough section, some articles also include the facts and figures of New Scientist, Scientific American, Hindu and other sources. We do feel that the collection of these breakthroughs will help the concerned researchers as well as budding scientists, who wish to gather information about the recent advancement in the said field.
*We are introducing one special section For NRIs**.** Here, NRIs can write their own experiences and impart knowledge about life and living of country where they live. We do expect, this may become most informative section for our readers and they can gain knowledge about the society, culture and their lifestyle.*
*As the number and quality of articles increased, we intend to build on this momentum, and to ensure that we publish only papers that describe meaningful advances. Ultimately, we strive to make **Manthan** an essential source for all peoples.*
We solicit your reactions/ comments/ suggestions in the mailbox and expect that with your help and support in future this magazine will grow into a viable/ versatile platform.

Bibhuti Bikramaditya, Chief Editor

Editorial Board

Science & Technology Section

Science & Technology Section

Ecological Science Awareness in India: Ancient to Present

Dr. Bijay Kumar Sharma, Patna, India

Ancient Indian Civilization is one of the oldest civilizations of the World. We get a glimpse of Ancient India through our Vedas and Purans particularly from Shri Mad Bhagwat Puran and Shri Vishnu Puran.

The Purans have mentioned the conflict between Sur and Asur. In more common parlance they are known as Rakshas and Devtas.

Devtas symbolize the civilized form of society based on agriculture and artisanship whereas Rakshas symbolize the tribal society based on hunting and forestry.

This is the reason why during Samundra Manthan, cattle breeding and domestication, horse breeding and horse riding, are embraced by Rakshas whereas Arawat elephant, fishing and forest related knowledge is accepted by Devtas.

What this implies is the following: the two societies, one agriculture based and the other forest based, were perpetually at war with each other. Devtas had more resources but Raksha were more resilient. Devtas society was based on private property and hence on exploitation and based on slave labour. But Rakshas society was based on equality and brotherhood. Therefore the Sur-Asur Sangram had turned into a war of attrition. The elders of the two Societies and Gurus of the two Societies clearly saw the futility of such a war and on their advice an armistice was signed and a joint programme of Samundra Manthan was launched.

What was Samundra Manthan?

Samundra Manthan was a programme where the two sides shared their respective knowledge and skills with one another.

Forest dewellers had the knowledge of archery, elephants and fishery and they taught them to the Devtas. Devtas had the knowledge of horse riding, dairy and cattle domestication. They gave this knowledge to Asuras. Thus the base of knowledge was expanded.

This temporary truce breaks down over the question of sharing the Amrit Kalash. The Amrit Kalash symbolizes the knowledge of Medicines & Health Care. It seems that Devtas had a vast storehouse of knowledge on life sciences and they were reluctant to share them with their Asuras counter part. This leads to the resumption of Sur-Asura Sangram.

We will not continue with the description of this pre-history. Our purpose is to see the contribution of Ancient India, Medieval India and Modern India in the field of ecology and biodiversity.

There is a specific mention of the golden era of KURU. He particularly paid attention to afforestation and irrigation.

Next biggest ecological project taken up in Puranic India was the project of Ganga.

As is well known that Raja Sagar was a very ambitious king and he led several campaigns of AswahmeghYaga. These Yagas caused heavy destruction of ecology and hence to loss of livelihood and pauperization. They led to personal losses to Raja Sagar also. Probably a large section of his own family was destroyed. The only surviving member of his own royal family was Dilip. He chalked out and initiated a giant project of bringing glaciers melted water to the plains. This project was completed by his son Bhagirath and this is how through conscious dynamic role of the descendents of Raja Sagar, the project of Ganga was completed. This was one of the biggest corrections brought about in Indian Ecology. The Indian Ecology had been badly devasted due to the greed and ambition of some kings in Ancient India.

In Medieval India we find Shershah and Akbar playing crucial roles in correcting the ecological imbalances particularly in the field of afforestation and road building.

In British India also Britishers, though were colonizers, were sticklers of rules and strictly applied their colonialist rules strictly and consistently. Any violation of rule could be taken up in the court of law and an Indian Citizen could go right up to Privy Council and get justice.

Any imbalances were immediately corrected. Even Lord Clive the first Director General of East India Company was made to pay through his nose for the wanton destruction he caused to Indian.

Under the Trust Act the funds allocated for Charity and Religion were strictly used for that purpose. All the monasteries and their properties were strictly accounted for.

No wonder we had 40% of total land under Forest cover. But let us see the track record of Independent India.

(1) ***India has total land area of 300 million hectares out of which 140 million hectares are arable land. This means rest is forest cover, mountains and deserts. So at least there should have been 40% forest cover but LANSAT imagery shows that we have only 11% and less forest cover.***

(2) *Quoted from 'The Hindu' Wednesday, October 5, 2005; Special Correspondent:**" 50 % forests lost: report"40species of plants and animals extinct** .New Delhi: The Final Technical Report of the National Biodiversity Strategy and Action Plan (NBSAP) has said that India has lost over half of its forest cover, 40% of its mangroves and a significant part of the wetlands in the past couple of centuries. The report " Securing India's Future: The Final Technical Report of the National Biodiversity Strategy and Action Plan" released here on Tuesday, was originally supposed to have been an official report of the Union Environment and Forests Ministry. It was made public as a citizen's report since the Ministry had failed to act on it for almost two years. Citing habitat destruction, hunting and over-exploitation as the immediate causes of biodiversity loss, the report said that behind these factors were unsustainable model of 'development breakdown of traditional management practices and institutions, centralization of decision making powers in the government, serious social and economic inequities, changes in moral and cultural values and lack of recognition of the full value of biodiversity in economic planning. The scenario has been worsened by globalization.*

(3) Evidence is growing that countries which abuse nature are getting poorer.
[THE HINDU, THURSDAY, OCTOBER 13, 2005]

'Countries that fell their old forests for quick bucks, that dynamite their reefs for fish, or that contaminate their waterways with farm and factory run-off may seem to be getting richer when in reality they are sliding into poverty because they are plundering their natural capital- a key pillar of medium and long-term wealth.'

(4) There is a huge accumulated surplus in the rural area as reflected in the household saving by World Bank Data. Bihar is topping in whole of India in rural as well as urban house hold saving still there is the largest out flux of migrant laborers from Bihar to other states of India. This clearly shows that because of lack of basic infrastructure such as road and power, there is a huge capital flight from Bihar to other states in general and particularly from the rural area to the urban area within Bihar.

(5) We have 540 Members of Parliament plus in the thirty Indian States and five Union Territories we have 300 members of legislative assembly and legislative council in each state on an average. The MP's have Rs 2 crores per annum and MLA's & MLC's have Rs 1 crore earmarked for their respective Land Area Development. Apart from this we have Jawahar Rozgar Yojna, Indira Awas Yojana and Food for Work program and many new ones are coming up with every new Government. If all these funds were utilized conscientiously and judiciously then there would be no dearth of employment. And also there would not have been lack of fund for Primary Capital Formation. Whatever rural assets, we had, have been wantonly or through sheer neglect destroyed over the years.

(6) Rs. 2000 cores are lying in the banks ear marked for afforestation. They have accumulated through a specific scheme where for every hectare of land deforested due to industrialization a corresponding sum has to be deposited in this afforestation fund and afforestation is to be carried out. In 2002 Supreme Court had observed that this fund remains unutilized or diverted. In 2006 Supreme Court has compelled the state governments to carry out some kind of afforestation programme.

Needless to say ' The focus of all planning and decision-making in India should be to achieve the twin objectives of ecological security and livelihood security, particularly of the most under-privileged sections of society.' Poverty can be banished only when nature enters economic calculations in the same way that buildings, machines and roads do. Where ecological damages have occurred there investments need to be done in ecological restoration.

References: Shri Mad Bhagwat Puran.

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Bionanotechnology: Advances and Future Perspectives

Dr. Mohammad Abul Farah, Seoul, South Korea

Bionanotechnology is an exciting multidisciplinary field that has enormous potential to develop new science and applications such as novel materials, devices, biosensors, drug delivery, etc. It is a rapidly growing integrative field that encompasses contributions from various disciplines, ranging from engineering and computational sciences to physics, chemistry and biology. Bionanotechnology is a subsidiary branch of nanotechnology, which is often described by the terms such as biomedical nanotechnology, nanobiotechnology, biomolecular nanotechnology and nanomedicine. Nanotechnology research may be defined as the creation, design, and manipulation of structures or particles with dimensions smaller than 500 nanometers (nm). Within this size range, the structures or particles have properties that can be tuned by changing the material's dimensions.

It is expected that nanotechnology will be developed at several levels: materials, devices and systems. Considering scientific knowledge and commercial applications, the nanomaterials level is the most advanced at present. However, in the last few years, new avenues and promises have been created for nanotechnology research because the biological and medical research communities have exploited the unique properties of nanomaterials for various applications for example contrast agents for cell and animal imaging and therapeutics for treating cancer. Some of the applications of nanomaterials to biology and medicine include drug and gene delivery, fluorescent biological labels, detection of proteins, bio-detection of pathogens, probing of DNA structure, tissue engineering, tumor destruction via hyperthermia, separation and purification of biological molecules and cells. The integration of nanomaterials with biology has led to the development of diagnostic devices, contrast agents, analytical tools, therapy, and drug delivery vehicles. Over the last 2 decades, a variety of nanoscale vehicles, including gelatin, ceramic, liposomes, and micelles, have been under development for therapeutic use. Recent improvements in engineering at the nanoscale level have lead to the development of a variety of new, novel nanoscale platforms such as quantum dots, nanoshells, gold nanoparticles, paramagnetic nanoparticles, carbon nanotubes, which currently are under development and investigation. These nanotools have been mainly used for imaging, drug delivery, photothermal ablation, drug targeting etc. Below are the few examples of current bionanotechnology research and progress.

Lipid-based vehicles

Liposomes, micelles, and polymersomes are nanoscale lipid-based vehicles. These lipid-based vehicles have been used primarily for increasing the solubility of hydrophobic chemotherapeutics and for limiting drug toxicity. Novel preparations of these compounds recently have been developed with the objective of overcoming some of those limitations. Liposomes coated with poly(ethylene) glycol (PEG), so-called stealth liposomes, have increased bioavailability significantly because of reduced, nonspecific reticuloendothelial system (RES) uptake. Liposomes constructed with novel lipid polymers have resulted in significantly increased membrane stability and bioavailability. Micelles and liposomes coated with tumor-specific antibodies have been used for tumor targeting. Liposomes that recently were synthesized with self hydrolysable lipids may allow for time-controlled release of drugs.

Quantum Dots (QDs)

QDs are defined as particles with physical dimensions smaller than the exciton Bohr radius; this gives rise to a unique phenomenon known as quantum confinement. Quantum confinement, which refers to the spatial confinement of charge carriers (ie, electrons and holes) within a material, embarks QDs with unique optical and electronic properties that are unavailable to semiconductors in bulk solids. Quantum dots are novel semiconductor nanocrystals composed of an inorganic elemental core (e.g., cadmium, mercury) with a surrounding metal shell and have an intrinsic fluorescence emission spectra wavelength between 400 nm and 2000 nm, depending on their size and composition. Quantum dots possess unique optical properties that not only allow them to be tunable to discreet narrow frequencies but also are an order of

magnitude more resistant to photobleaching than their organic fluorophore counterparts.

When QDs are used in biological research and applications, these optical properties will lead to improved detection sensitivity for analysis and to simplification in experimental and instrumental design. Because QDs have fluorescence properties, they have been rapidly adapted into many biological and medical research laboratories. For in vitro applications, QDs conjugated to antibodies and peptides are used for labeling receptors on fixed and live cells and tissues; QDs conjugated to oligonucleotides are used for genetic detection. For in vivo applications, QDs as contrast agents for cancer imaging has been successfully demonstrated.

Nanoshells

Nanoshells (approximately 10–300 nm in dimension) are composed of a dielectric core, usually silica, surrounded by a thin metal shell, typically gold. The optical properties of nanoshells are different from quantum dots. Nanoshells rely on the plasmonmediated conversion of electrical energy into light. Similar to quantum dots, nanoshells have the ability to be tunable optically and have mission/absorption properties that range from the UV to the infrared. Nanoshells are attractive because they offer in vitro and in vivo imaging and potential therapeutic properties similar to those of quantum dots without the potential for heavy metal toxicity. A potential limitation of nanoshells is their relatively large size compared with quantum dots. The ability of specifically engineered nanoshells to act as photoabsorbers with resultant heat generation has powerful potential therapeutic implications for the use of nanoshells in photothermal ablation.

Gold Nanoparticles

Gold nanoparticles are attractive because gold has been approved and used for treatment of human disease and they are relatively easy to synthesize. Gold nanostructures are used as contrast agents in electron microscopy or in vitro experimentation based on their ability to scatter visible light. Gold nanoparticles also have been used as a platform for novel experimental cancer therapy. It was demonstrated that systemically delivered gold nanoparticles (size, approximately 33 nm) conjugated to tumor necrosis factor (TNF) accumulated in tumors. Gold particles also have been used to enhance sensitivity to external beam radiation.58 Systemically administered gold nanoparticles (size, 1.9 nm) accumulated in a murine subcutaneous tumor model and greatly enhanced local X-ray therapy. Gold nanocages, a new type of gold nanoparticle, may be constructed to generate heat in response to NIR light and, thus, also may have a potential application in photothermal ablation. Gold nanoparticles are widely used in immunohistochemistry to identify protein-protein interaction.

Paramagnetic Nanoparticles

Functionalised magnetic nanoparticles have found many applications including cell separation and probing. Super paramagnetic iron oxide contrast agents consisting of 50-nm to 100-nm particles were developed and are attractive because they have much greater magnetic susceptibility than traditional magnetic resonance (MR) contrast agents, such as gadolinium. Ultra small, super paramagnetic iron oxide nanoparticles have been used clinically in humans to characterize lymph node status in patients with breast cancer, lung cancer, prostate cancer, endometrial cancer, and cervical cancer. It has been shown experimentally that gadolinium-containing nanoparticles coated with folate or PEG accumulates in tumors. Nanosized contrast agents are under development to improve the utility of MRI and computed tomography (CT) in imaging cancer. The ability to monitor apoptosis in vivo may represent a method for monitoring response to cancer therapy. Ligands that are specific for apoptosis (e.g., the C2 domain of synaptotagmin and annexin V) have been conjugated to iron oxide nanoparticles and, experimentally, have demonstrated an ability to bind apoptotic cells in vitro and in vivo.

Carbon Nanotubes

Carbon nanotubes are carbon cylinders composed of benzene rings, their use in biological applications is evolving. Carbon nanotubes have been used as gene therapy delivery vectors. Nanotubes can be made in different sizes and, at small sizes, have been shown to be internalized intracellularly through endocytosis. Recently, investigators have functionalized nanotubes for biologic applications by adsorbing different molecules and antigens to their surface so that they specifically may target tumor cells. Folic acid (FA) and fluorescent tag-conjugated, singlewalled carbon nanotubes (SWNTs), a type of nanotube has been created specifically to target HeLa cells, in vitro. These cells actively endocytosed these SWNTs and were identified through the fluorescent tag under confocal microscopy. Furthermore, SWNTs were engineered to absorb NIR light and subsequently were used for

photothermal ablation applications in vitro.83 SWNTs coupled to paramagnetic gadolinium particles are being developed for use as a high-performance MRI contrast agent.

Future perspective

Bionanotechnology offers an extraordinary, paradigm-changing opportunity to make significant advances in diagnosis and treatment of various diseases. Nanotechnology is also expected to accelerate fundamental biomedical research via the creation of novel state-of-the-art tools. This emerging field is exciting because of its possibilities. Areas of greatest clinical impact likely include novel, targeted drug-delivery vehicles, molecularly targeted contrast agents for cancer imaging, targeted thermal tumor ablation, and magnetic field targeting of tumors. Bionanotechnology also is progressing rapidly with regard to in vivo imaging and therapeutics. This progress very likely will have important implications for management of the cancer patient. Future advances in nanotechnology research and development likely will be associated with the further development of novel, high-impact approaches to cancer diagnosis and treatment.

As it stands now, it could be predicted that one day, researchers will incorporate multifunctionality into nanomaterials. With these multifunctional nanodevices, molecules and motors will guide nanomaterial movements, sensors for diagnosis, actuators (which are connected to the sensor) to release therapy, and a secondary sensor to monitor the disease as it is being treated. The foundation of nanotechnology is quickly being put into place, and some applications of nanotechnology in biology have surfaced, although these applications are nowhere near the complexity of the described multifunctional device. In conclusion, bionanotechnology is still in their infancy, but one day it would be capable of tracking life within the cells in real time, and of course without destroying them.

About the Author: *Mohammad Abul Farah attended Aligarh Muslim University in India where he received his M.Sc. and Ph.D. in Zoology with specialization in Genetics. He also served as Senior Research Fellow of Council of Scientific and Industrial Research, India. At present, he is working as a Research Scientist in Proteonik Inc., a biotechnology venture company based in Seoul, South Korea, on Diabetes research focusing on insulin signaling pathway.*

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Dye-Sensitized Solar Cell: Energy for the future

Dr. Sudhir Ranjan, Pittsburgh, USA

1.1 General description on solar cell technology

The top ten problems mankind will face during the next fifty years according to Nobel laureate Richard smalley of Rice University, Houston, USA are

1. Energy 2. Water 3. Food 4. Environment 5. Poverty 6.Terrorism 7.Disease 8. Education 9. Democracy 10. Population

The quality of human life *largely* depends on the availability of energy sources. The present annual worldwide energy consumption has already attained a level of over 400 exajoules and is expected to further augment steeply from the increase in world population and the rising demand of energy in the developing countries. So solving energy need would be the top priority.

Currently we derive energy mainly from coal, gas and oil, which are non-renewable energy sources. According to estimated sources the reserves of these fossil fuels will deplete during this century. There has been a worldwide scientific movement to develop a global society, which employs sustainable methods in all aspects of life. One of these methods is to use renewable energy. Sun, Wind and Water are the renewable energy sources. Fortunately, the supply of energy from the sun to the earth is gigantic; 3×10^{24} joules/year or about ten thousands times more than what mankind consumes currently. To tap into this huge energy reservoir of the sun remains, nevertheless, a major challenge for mankind.

A structure that converts directly sunlight (solar energy) into usable electric energy is called a solar cell. They are also referred as photovoltaic (PV) cells where PV stands for Photo (light) and Voltaic (electricity). They are useful because they are silent; have no moving parts; cause no environmental pollution in operation; never run out; can generate power *where it is needed*, without the need for electricity pylons and wires; work in cloudy weather and are good for low temperature climate. Use of solar cell may help in reduction or prevention of the use of fossil fuels (Oil, gas, wood, coal) and thereby further prevents emissions of CO2 (glasshouse effect), SO2, NOx (acid rain), etc. by conventional power stations.

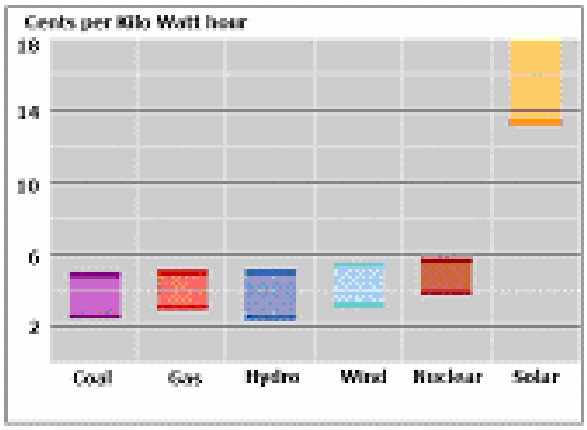

Figure 1: cost for power generation using coal gas wind, hydro, nuclear and solar energy .Courtesy: exxon mobile, USA (from web)

1.2 Background of Invention

The development of the solar cell technology begins with the 1839 research of French experimental physicist Antoine-Cesar Becquerel. He discovered (although he could not fully explain) the photovoltaic effect while experimenting with an electrolytic cell containing two metal electrodes. The Then “nineteen year old physicist” found that certain metals and solutions would produce small amounts of electric current when exposed to light. According to Encyclopedia Britannica the first genuine solar cell was built around 1883 by Charles Fritts, who used junctions formed by coating selenium (a semiconductor) with an extremely thin layer of gold. Fritts's devices were very inefficient, transforming less than 1 percent of the absorbed light into electrical energy, but that was a start. Solar cell efficiency finally saw substantial progress with the invention of the first silicon cell by Russell Ohl in 1941.The era of modern solar cell technology began since 1954, when three American researchers, G. L. Pearson, D. Shapin and C. Fuller (Bell Labs.) demonstrated first refined solar cell capable of a 6% energy conversion efficiency with direct sunlight. Western Electric brought PV technology in the market; early successful products included

PV-powered dollar bill changers and devices that decoded computer punch cards and tape. In 1958, first PV powered satellite Vangaurd-I was launched. First Gallium Arsenide (GaAs) solar cell produced. Since then there is no looking back in harnessing the vast solar energy for mankind. D. E. Carlson (1976) and Jerry Olson (1987) discovered cheap and efficient mode of converting sunlight into electricity by utilizing amorphous silicon and fabricating multi-junction, respectively with an efficiency of 20 and 34%. These modern solar cells are basically p-n junction photodiodes, made of basically silicon for most of the industrial purposes. Emergence of a new class of semiconductors (also known as highly mis-matched alloys, e.g. $Zn_{1-y}Mn_yO_xTe_{1.x}$) and the recent efforts made by scientists at Berkeley and at MIT using them has develop a new class of solar cell with power conversion efficiency of 56%. The method used to synthesize these semiconductors for solar cell purposes (Yu, K. M. et al. *Phys. Rev. Lett.* **2003**, *91*, 246403) is very tedious and is highly expensive.

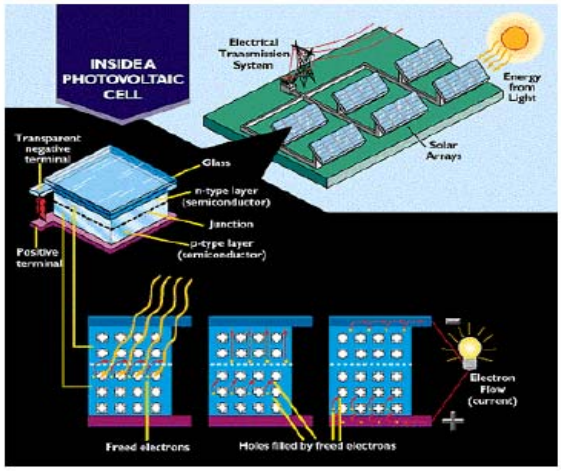

Figure 2: Schematic representation of silicon solar cell (from DOE web).

Solar energy devices remain far more costly except in limited applications. Existing solar photovoltaic technology is very energy-intensive, requiring manufacturing energy equal to about two years of the output of the solar device. These factors, coupled with the large land areas required to produce energy on a power-plant scale, make current solar technologies about five times more costlier than conventional electricity generation. Howsoever, advancement in solar cell technology has led to the development of grid-connect photovoltaic, Building Integrated Photovoltaic (BIPV),Concentrating Photovoltaic, Roof-integrated Photovoltaic, Roof-mounted Photovoltaic Standalone Photovoltaic systems, etc. for PV module preparation, a great source of solving energy.

2.1 Dye-Sensitized solar cell: General

Dye-sensitized solar cell (DSSC) has opened a new corridor, departing, in principle, from classical solid state junction devices and is now challenging traditional and dominant silicon based solar cell industry. DSSCs are photo electrochemical cells that use photo-sensitization of wide-band-gap mesoporous oxide semiconductors. These cells were invented by Michael Graetzel et al. in 1991 and are also known as Grätzel cells. [B.O. Regan and M. Grätzel. A low-cost high-efficiency solar cell based on dye-sensitized colloidal TiO_2 thin film, *Nature* **353**, 737-40 (1991)], Figure 3.

Solar power visionaries have long dreamed of solar panels that are cheap, efficient and able to withstand the relentless heat of the midsummer sun. Dye Sensitized Solar Cells uses cheaper starting materials than the traditional silicon solar cells to generate power at moderate efficiency of 12%. In conventional solar cells, a semi-conductor material - usually crystalline silicon - absorbs photons of light. The photons give electrons in the material an energy kick that makes them flow through the semiconductor to an electrode, where they can be connected to an electronic circuit and used to perform work. As the electrons race through the semiconductor, however, they risk running into “holes” left by other electrons. When that happens, electrons and holes can easily recombine, causing the electrons to shed their extra energy as heat.

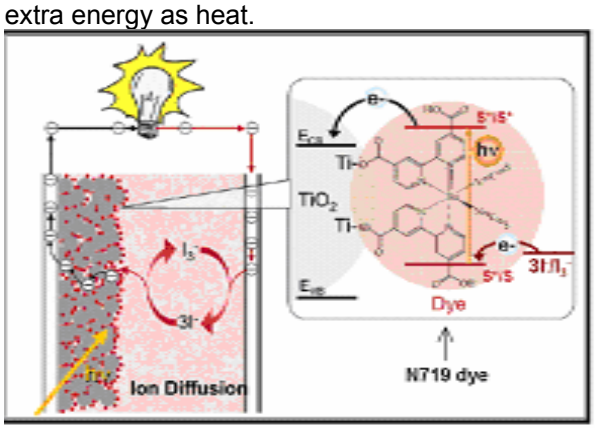

Figure 3: A schematic representation of non-crystalline Tio_2 dye sensitized solar cell. Taken from M.Gratzel chem lett 34, 8(2005)

To give the moving electrons the clearest path to the electrode, the semiconductors in the best conventional solar cells must be highly pure and defect free – thus expensive to produce.

Dye sensitized solar cells adopt a low cost solution to the problem of purity by separating the two jobs of collecting light and ferrying electrons. The overall power conversion efficiency of nearly 10-12% has been achieved by varying the film morphologies, incorporating hydrophobic tails into light sensitive substance, K-19
(Figure 4) and using solvent free electrolyte.

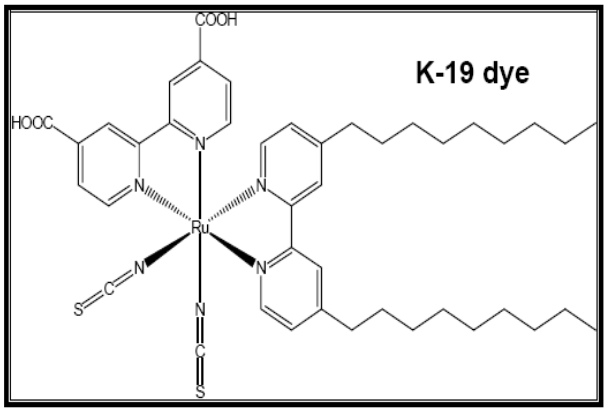

Figure 4: Chemical Structure of K-19 dye.

The critical stability test of 1000 hours at 80 ºC with this cell showed 6% of conversion efficiency losing only 4% of its performance. Unlike amorphous silicon, a recent stability test of 12,000 hours with this cell upon full-intensity light exposure showed no sign of photo degradation.

2.2 Dye-Sensitized solar cell: Components

DSSCs are extremely promising because they are made of low-cost materials and do not need elaborate apparatus to manufacture. Several scientific groups have given lots of attention and contribution on development of each component. Figure 3 is the schematic representation of DSSC having four major components. They are

1. Transparent ITO coated glass
2. Granular TiO_2 forming a nonporous structure.
3. A dye (N719), which is a light-sensitive substance spread on the TiO_2 surface.
4. A redox couple located in the space between the dye and the cathode.
5. A solvent for the redox couples (I^-/I_3^-) e.g. an organic solvent or Room Temp. Ionic Liquid. 6. Pt, cathode

The cells have been compared to photosynthesis because they use the redox reaction of the electrolyte. The energy conversion efficiency of the cells has not yet reached the level of silicon solar cells. The current energy conversion efficiency is about 12%, as was reported by Graetzel et al. It is said that the energy conversion efficiency can rise to 33% in theory.

2.3 Dye-Sensitized solar cell: Operation

Upon passing the solar light through an electrically transparent conductive glass electrode, photo excitation of dye molecules adsorbed onto the surface of sintered nanocrystalline TiO_2 takes place. The excited electron makes a jump from the dye to the conduction band in TiO_2. This jump occurs very rapidly; it takes only 10^{-15} seconds. In TiO_2, the electron percolates through the TiO_2 film, reaches the glass electrode, goes through external circuit, and reaches the counter electrode. At the same time dye regeneration takes place by receiving one electron from an iodide ion, in turn oxidizing the iodide to triodide. Iodide ion regenerates simultaneously upon receiving one electron from counter electrode, thereby completing the circuit.

2.4 Dye-sensitized solar cell-Electron transfer processes

The most important component of the DSSC is the photoactive electrode, the dye-sensitized nanocrystalline semiconductor film on a transparent conductive substrate, where the primary step of solar energy into electricity conversion takes place, i.e. electron injection from the photo-excited dye(K-19) to the semiconductor, a process that separates the electron and hole. For good photovoltaic performance of the DSSC it is important that absorption of the photon and the ensuing electron injection into the conduction band of the semiconductor (Processes 1 and 2 in Figure 5) occur several orders of magnitude faster than recombination of the injected electrons with the oxidized dye or the redox system (Processes 6 and 7 in Figure 5). Also, charge transfer between the oxidized dye and the electrolyte (Process 4 in Figure 5) should be much faster than recombination reactions to minimize wasteful

pathways in the DSSCs. In this section basic processes that occur in the photo induced interfacial electron transfer from the K-19 dye to the TiO_2 semiconductor in solution (no redox couple) are described. Although the processes in this specific case are for K-19-TiO_2 film, to some extent the processes can also be generalized to other sensitizer-semiconductor systems. Processes under illumination are:

$$\text{(A)} \quad \text{K-19-TiO}_2 \xrightarrow{h\nu} \text{K-19}^{**}\text{-TiO}_2 \xrightarrow{ET} \text{K-19}^{+}\text{-TiO}_2(e^-)$$

$$\text{(B)} \quad \text{K-19}^{**}\text{-TiO}_2 \xrightarrow{relax} \text{K-19}^{*}\text{-TiO}_2 \xrightarrow{ET} \text{K-19}^{+}\text{-TiO}_2(e^-)$$

$$\text{(C)} \quad \text{K-19}^{+}\text{-TiO}_2(e^-) \xrightarrow{BET} \text{K-19-TiO}_2$$

The K-19 dye captures a photon (hv),which initiates a long-lived charge separated state when an electron from the electronically excited state of the dye is injected into the conduction band of the semiconductor (Equations A and B). The two different electron transfer pathways indicate the possibility of electron injection from the fully relaxed excited state ($K\text{-}19^{*}$), as well as from non-thermalized, higher lying excited states ($K\text{-}19^{**}$). When an electron is injected, the dye cation ($K\text{-}19^{+}$) is formed together with an electron in the conduction band of the titanium dioxide ($TiO_2(e^-)$). Back-electron transfer (BET) from the conduction band/trap states of the semiconductor to the dye cation restores the original ground state of the dye (Equation C). The forward electron injection process (Equations A and B) occurs on femtosecond and picoseconds time scales while the BET occurs non-exponentially on the microsecond to millisecond time scale with only a negligible contribution from picoseconds/nanosecond components. The difference of several orders of magnitude between the time constants of electron injection and BET is one of the important properties which make the dye-TiO_2 system one of the most efficient light-to-energy converters available for DSSC.

A key issue in photo induced processes of dye-sensitized semiconductor films has been the mechanism of the ultra fast, sub-hundred femtosecond time scale electron injection, especially, whether it occurs from non-thermalized states prior to energy equilibration over all electronic, vibrational, and rotational degrees of freedom. Our research has provided evidence for non-thermalized electron transfer from dye to conduction band of the semiconductor.

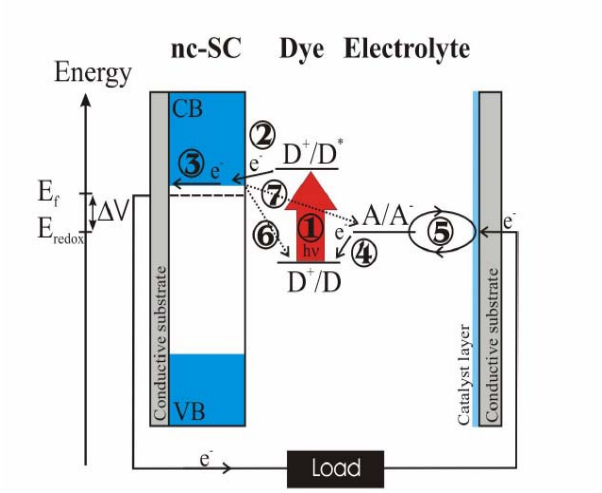

Figure 5: A scheme of the operation of the DSSC, solid arrows represent the primary and dashed arrows the wasting pathways in the solar cell. Following the excitation of the dye (process 1), electrons is injected into the conduction band of the non crystalline semiconductor [nc-sc] (process 2) where they can move through the network of nano particles (process -3). The oxidized dye molecule receives an electron from the mediator, a radox species in the electrolyte (process 4) and oxidized electrolyte species diffuse to the cathode where they are reduced by the electrons circulated through the external circuit (Process 5). The recombination of injected electrons is sown as the dashed arrows (process 6 and 7).

This is how dye-sensitized solar cell receives solar energy and gives electric current to an external circuit.

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Pin is Mightier than Pen

Chetan kashyap, London, UK

Say goodbye to signing your credit card slips!! As the pen makes way for the Pin in a new scheme, beating high street fraud is now a hi-tech challenge.

Shoppers who pay for their goods by card rather than cash can forget about signing on the dotted line in future. Instead, we will be asked to tap out a Pin number to authenticate the card.

Crime and Fraud in this sector grew by 15% last year, accounting for losses of £110m. Usually card details are taken from discarded receipts or copied down without the cardholder's knowledge. Cloning credit/debit cards has been a source of nightmare to the payment industry. Millions and millions of dollars are spent each year to combat fraudulent transactions and identity theft. More intelligent software/applications are been used to prevent this. But unfortunately, the growth in this area seems to be higher and higher.

Don't you feel scary when the waiter in the restaurant takes your card to swipe for payment - A potential fraudster can easily copy your details and clone within few minutes!!

These will all be gone with the new CHIP and Pin card.

A chip/microchip embedded on the credit/debit card holds the same personal data as a magnetic stripe - cardholder name, number, expiry date - but can lock it in more effectively, using sophisticated encryption. You need your PIN (issued by your bank) to pay for goods and services at shops or businesses. Sometimes you may not be able to sign a receipt to make your payment. If you do not know your PIN, you may be asked to pay using an alternative method.
How this works:

When you pay for goods and services, your card will be inserted into a special terminal. These terminals are different than ones used today.

After checking the amount, you will enter your four digits PIN into a keypad

The machine will check the PIN you entered against the PIN held on the chip in your card (just as your signature on a receipt is checked against the signature on your card today). For the transaction to complete there are two methods used these days (a) offline and (b) online. With the offline, the local terminal has the capacity to check/verify the entered PIN locally before the request for authorization is send. While with the second "online" method the PIN details are verified by your bank or the service provider involved within the transaction.

You will be given a receipt for your purchases. Although there are more additional costs involved to implement this technology by all involved i.e. merchants, acquirer, issuer, service provider, some points need to be remembered:

(a) The merchants have to invest for the new special terminals

(b) The acquirer switch has to process additional chip data

(c) Service provider has to change his switching mechanism to cater to the pin data;
Implement stronger encryption mechanism and keys.

(d) Issuer has to bear the costs for the micro-chip on card and also make necessary changes in the software.
Now let's see who will benefit from this and how:

(a) End-user (Cardholder):

- Prone to lesser fraud
- Sense of more security while using card.
- More secured Travel and Entertainment transactions

(b) Service Providers:

- Less headache on frauds
- Authority for more secured transactions
- Combat Card Crimes

We, in India are yet to get into this Chip/Pin Bandwagon. Most of United States, Europe and United Kingdom have made it mandatory to implement this system. You have to use PIN while shopping in these countries. Some of them accept signature on charge slips but most do not.

Many other countries around the world are also planning to implement the chip and PIN system.

So, the next time you get a Credit/Debit International Card from any bank in India, check if you have one CHIP/PIN card – else you may not be able to shop internationally!!

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Membrane Technology: An emerging area for the recovery of valuable metals from waste water / effluent

Dr. Manis Kumar Jha, Daejeon, South Korea

The huge amounts of effluent or wastewater are generated in electroplating and metal finishing industries containing toxic heavy metals viz. Zn, Cu, Ni, Cd and Cr. The acid mine water/ effluent is also another source of heavy metals in respect to valuable metal loss and pollution. The discharge of such effluents and rinse water in the sewage / river causes environmental pollution and affects the human health, living resources and ecological systems. The industrial effluents are usually treated to precipitate the toxic metals and the sludge so generated is dumped as land filled. Due to strict environmental regulations and conserve the natural resources, now it is necessary to develop a new techno-economical process for the recycling / treatment of these effluents.

In this connection membrane technology can play very important role. Membrane technology is comparatively new and emerging area in the field of separation science. The liquid membrane process is suitable to extract heavy metals from low metal containing solutions. In the present proposal liquid membranes will be used for the extraction of zinc and other associated metals such as Cr, Fe from the electroplating effluent and mine water. The process has tremendous potential, which can be explored for the recovery of valuable metals from pregnant and waste solutions. Different types of membranes viz. Bulk liquid membrane (BLM), Supported liquid membrane (SLM), Stagnant sandwich liquid membrane (SSwLM), Flat-sheet supported liquid membrane (FSSLM) are used for the recovery of metallic values from very dilute solutions.

The supported liquid membranes (SLM) has been used for the recovery of different metals viz. Cr(VI), Cu^{2+}, Ni etc. The different extractants such as tri-n-octylamine (TOA) in toluene, Aliquat 336, Cyanex 923 (phosphine oxide) are employed as carrier using microporous polypropylene membrane support, Celgard® 2500 and microporous support poly(propylene) as support in SLM. A comparative transport of chromium (VI) from acidic chloride solution to 0.1 M NaOH using BLM and SLM containing tri-n-octylamine (TOA) in toluene has been studied. The studied for the transport of Cr (VI) across SLM with Aliquat 336 as carrier has also indicated the high rate of Cr(VI) transport.

The emulsion liquid membranes (ELM) separation technique proposed by Li for the separation hydrocarbons has been recently regarded as more promising emerging technological alternatives for the recovery of valuable metals from the effluent containing low metal content. The process is continuous and fast, due to high interface area needs only a very small volume of extractant. The pore-free soluble membranes in three phase systems either O/W/O or W/O/W are called Emulsion liquid membranes. ELMs are prepared by first dispersing the internal phase in an immiscible liquid and dispersing this emulsion in a third phase (called the external phase). Normally, the internal and the external phases are miscible, but both are immiscible with the membrane phase separating them. The materials to be transported through it must dissolve in it on one side, diffuse across it in the dissolved form, and reversal of the dissolution process should take place on the other side. Many investigators have studied the practical operation of ELM recently, and the mechanisms that regulate the transport of metals through them. Attempts are being made to extract heavy metals viz Cu, Ni, Cd and Zn using Emulsion liquid membrane ELMs process. The removal of copper from a residual mine water and synthetic effluents has been studied using ELMs process.

The short-durability of membrane is the major problem in the liquid membrane technique. Attempts were made to increase the life time of the SLM, by providing support such as SSwLM, PPM, FSSLM, PIM for the recovery of metallic values from dilute solutions. A life time increase up to 100 hr. was obtained in case of SSwLM in compare to 15 hr for SLM. The membranes need regeneration by impregnating with the extractant after each completed life cycle. The poor durability of the SLM is due to the loss of liquid membrane phase (extractant and/or solvent) out of the pores of the support. The loss of extractant may be due to various reasons, such as pressure difference over the membrane, solubility of extractant and

membrane, solvent in adjacent feed and strip solution, wetting of support pores by aqueous phases, blockage of support pores by precipitation of the extractant or by water, the presence of an osmotic pressure gradient over the membrane or the emulsion formation of the liquid membrane phase in water induced by lateral shear forces. The major application of SLM may be for analytical purposes. In ELMs technology main problem is the stability of emulsion globule and its selectivity. The permeation process is affected by important variables such as concentrations of surfactant, extractant, internal strip phase, and effect of speed of agitation, aqueous feed phase pH, and the presence of impurities.

The membrane technology has good selectivity and the process can be easily handled. Some of the metal recovery processes are commercialized. The researchers are trying to remove the shortcomings in the membrane technology by new advancement in the process. The researchers are also trying to develop new type of durable membrane having different pore size and good selectivity.

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Geometry of the Universe

Bibhuti Bikramaditya, Daejeon, South Korea

Abstract: *Microscopically, We are in a revolutionary world of brains where new advances in the convergence of technologies and their digitization made people to be a part of one global family. But at the same time, macroscopically the universe in which we exist are uncertain, undefined, unshaped and may be propounded as some thing called "mysterious" because of the unknown facts, inadequate technologies, insufficient theories & their description. This article tries to put those facts and figures and advancement made in the recent past in the direction of the shaping of the universe.*

Introduction

Do we know where we are? What is our existence in the so-called Universe? What are the constituents of the Universe? Is our Universe finite in size? If so, what is "outside" the Universe? The answer to these questions involves a discussion of the intrinsic geometry of the Universe. Different scientists have made many speculations time to time.

Moreover, there are three possible shapes and types of the universe namely

1. Flat Universe (Euclidean or zero curvature),
2. Spherical or closed Universe (positive curvature) and
3. Hyperbolic or open Universe (negative curvature).

It is to be noted that this curvature is similar to space-time curvature due to stellar masses except that the entire mass of the Universe determines the curvature. So a high mass/high energy Universe has positive curvature, a low mass/low energy Universe has negative curvature. Fig 1 shows the shapes.

All three geometries are classes of what is called "Riemannian geometry", based on three possible states for parallel lines
Never meeting (flat or Euclidean)
Must cross (spherical)
Always divergent (hyperbolic)

It can be explained in terms of triangles where for a flat Universe the sum of angles of a triangle must be equal to 180 degrees, in a closed Universe the sum must be greater than 180, while in an open Universe the sum must be less than 180.

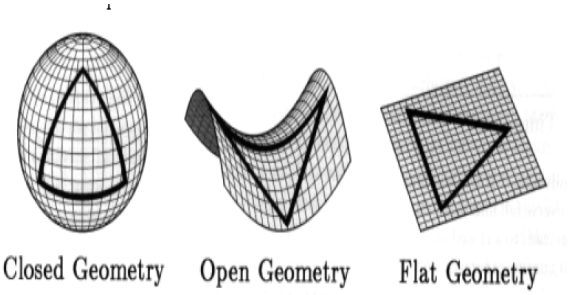


Figure1:

The usual assumption is that the universe is, like a plane, "simply connected," which means there is only one direct path for light to travel from a source to an observer. A simply connected Euclidean or hyperbolic universe would indeed be infinite. But the universe might instead be "multiply connected," like a torus, in this case there are many different such paths. An observer would see multiple images of each galaxy and could easily misinterpret them as distinct galaxies in this endless space, much as a visitor to a mirrored room has the illusion of seeing a huge crowd.

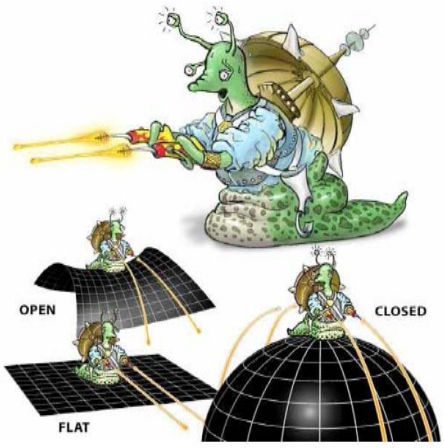
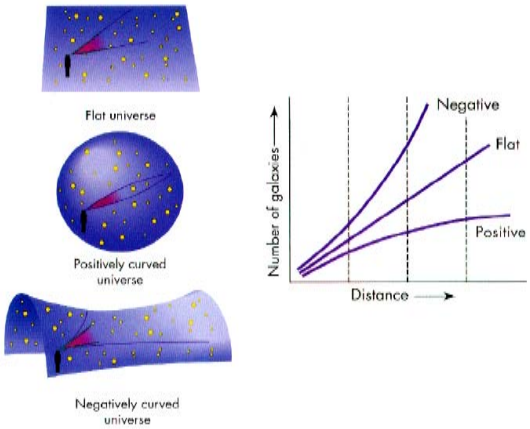


Figure 2:

One possible finite geometry is don space or more properly known as the Euclidean 2- torus. This is basically a flat square whose opposite

sides are connected. Anything crossing one edge reenters from the opposite edge (like a video game see 1 above).

Although this surface cannot exist within our three-dimensional space, a distorted version can be built by taping together top and bottom (see 2 above) and scrunching the resulting cylinder into a ring (see 3 below). For observers in the pictured red galaxy, space seems infinite because their line of sight never ends (below). Light from the yellow galaxy can reach them along several different paths, so they see more than one image of it. A Euclidean 3-torus is built from a cube rather than a square.



Mysterious fabric of the Universe

The possible shapes of the universe that has been given by astrophysics are described but they are unable to give clear picture for the same because of the insufficient technology and theories. For past 70 years when Einstein gave his famous theory of dark energy trying to give shape of the universe, later he denied his own idea/theory saying it as " great mistake", physicist were and are working on the real geometry of the universe. Physicists were in view that universe comprises of ordinary matter, which we are the part. The dark matter about which we have little knowledge, researches are going on. A real journey started in the year, 2000 by the Australian led team of international scientists who did a remarkable break through in the word of science. They claimed to have confirmed Einstein's dark energy theory, that came into limelight according to which the majority of the universe is made up of dark energy—an unknown quantity that fuels the constant expansion of the universe.

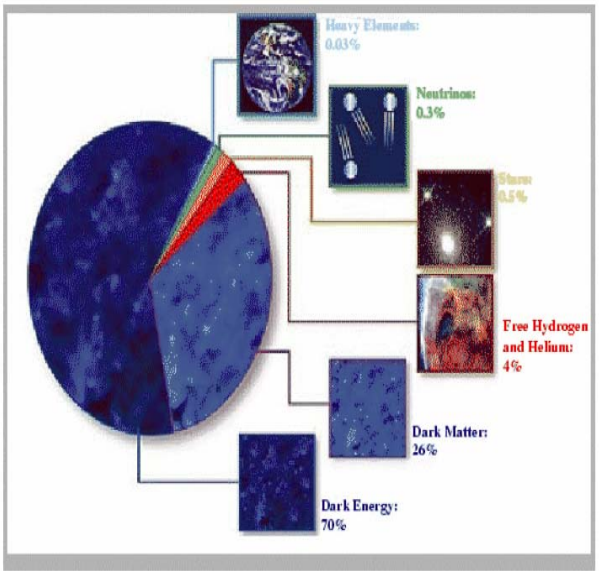


Figure 4:

Now Collese led team did laudable effort to reach on the conclusion that ordinary matter, dark matter and dark energy are the constituents of the universe which are in the ratio of 1:5:14 of which dark energy (70% of the universe) is the major part. Carlos Frenk, at Durham University, UK, was involved in the 2dF work and agrees: *"This new work provides a powerful confirmation that this quality exists in the Universe. Dark energy is unassessable now and that was not the case a year ago."*

A series of breakthroughs in the quest to identify the mysterious fabric of the Universe are now confirmed by many scientist It was topped a list of the 10 key scientific advances of 2003 by New Scientist).

In February 2003, the Wilkinson Microwave Anisotropy Probe (WMAP) satellite took the most detailed picture yet of the cosmic microwave background - an image of the infant cosmos when it was less than 400,000 years old.

In July 2003, astronomers from the Sloan Digital Sky Survey (SDSS), which aims to map out a million galaxies, published a research paper in which they superimposed their own galaxy-clustering data on WMAP's microwave data.

They claim the results prove that dark energy must exist. But on 12 December 2003, an international group of astronomers claimed analysis of data returned from the European Space Agency's (ESA) XMM-Newton satellite observatory casts doubt on the existence of dark

energy. Although there were several speculation among scientists and philosophers over the constituents of the universe and the evolution of the universe since ancient times and it was a cynosure of research also but this clarification about the shaping of the universe certainly created a flurry of hot debates among the physicists on the question of its validity.

First we would like to discuss the history of the gradual clarification (since ancient era to modern times) on the ordinary matter and its constituents.

Ordinary Matter:

The great Indian philosopher and the follower of the' Vaisheshik Darsahan, Maharshi Kanad '(much before Sankaracharya Period) argued that "Kshithij, Jal, Agni, Vayu, Aakash, Kal, Disha and Mon and Atma" are the constituent of matter in which first five are physical. These five physical components can be neither created nor destroyed. Empedocles (490-430 BC) demonstrated that there are four indivisible and unchangeable elements Fire, Air, Water, Earth eternally brought into union and parted form each other by two divine forces Love and Discord. Nothing new comes into being, the only changes that can be made, are Juxtaposition of elements to elements.

A sea of changes unearthed in the idea of ordinary matter took place in the 19th and 20th century. Now the primary constituent of matter i.e. atom, are already sub divided into fragments known as elementary particles. More than 37 fundamental particles have been found to exist within the atom (yet numbers are increasing as researches are going on).It is still known which one is the basic unit of the atom. It is to be noted that the physics of this elementary particle is as complex as that of the of the universe

Dark Matter:

Dark matters are the matter in which strong gravitational forces and its effects are present. Several stars, galaxies and black holes come under the purview of this. Let us discuss about its unambiguous facts. Black holes are said to be the graves of massive stars which on dying first explode, then collapsed to a point and disappear completely from our universe but before it disappears completely it leaves behind its imprints on the cosmic fabric of space and time in the form of what is called black hole—region of space from which neither matter nor light can escape. According to Stephen Hawkins super large holes are billion times more massive than Sun. The universe could be populated by trillions of "mini holes", each having the mass of the small mountains and with the tiny size of atomic nucleus. We can now imagine the complexities of the black holes. Yet we are not in a position to count the number of black holes exist in the world (some of them are given in table). Hubble Telescope only gives the direct evidence of the black holes.

Stellar Black Holes in the Milky Way

X-Ray Source Name	Mass of Companion	Mass of Black Hole
Cygnus X-1	24-42	11-21
V404 Cygni	~0.6	10-15
GS 2000+25	~0.7	6-14
H1705-250	0.3-0.6	6.4-6.9
GRO J1655-40	2.34	7.02
A 0620-00	0.2-0.7	5-10
GS1124-T68	0.5-0.8	4.2-6.5
GRO J042+32	~0.3	6-14
4U 1543-47	~2.5	2.7-7.5

Dark energy:

Big bang theory says that the creation or evolution of the universe was the random event occurred 12 billion years ago, just a second after big –bang (popularly known as Planck time), nascent universe was in the shape of the atom (whose radius was of the order of 10^{-12} cm) and the process of expansion began. It took 30, 0000 years to settle the universe when the shape and volume of the universe formed into the pattern. At present, it is said that there are 1, 70,000 galaxies in our universe, each having millions of starts. In "Mandakini" to which we are the part, have uncountable no .of stars. With the advent of time, new stars and its existents come into being. Number of stars and galaxies are set to increase because universe is still in the phase of expansion. A time will come when the expansion of the universe stops and continuous shrinking of the universe will start. According to Stephan Hawkins, after infinite time, universe will be collapsed to a naught.

This is "controversial approach" and needs a vast area of research. But as far as expansion of the universe is concerned, it is said to be due to dark energy. But what is dark energy, still needs to be resolved. Even collese led team and other

scientists could not give proper explanation. It is in itself area of research.

What is dark energy?

As yet, no scientist can give the answer to this fundamental question. We do not know what the nature of dark energy is, and unveiling this mystery will most probably reveal new physics and even might shake modern particle physics to its very foundations. Nevertheless, we have considerable astronomical knowledge about the properties of dark energy:

- Dark energy acts as a repulsive force, or anti-gravitation. It is responsible for the acceleration of the Universe today.
- Dark energy is probably related to a vacuum energy density.
- Dark energy is distributed homogeneously in the universe – it does not cluster like matter.

Source of Dark Energy:

There are two main ideas for the source of dark energy. It might percolate from empty space, as Einstein theorized, and is unchanging and of a fixed strength. The other holds that dark energy is associated with a changing energy field called "quintessence," something akin to a magnetic field. In that scenario, the field causes the current acceleration of the universe.

Another research team recently theorized that if the repulsion from dark energy gets stronger than Einstein's prediction, the universe could expand so incredibly that it would end in a Big Rip. All matter — galaxies, then stars, then planets, and everything right down to the atomic level — would be torn apart.

There are other methods for probing dark energy, but none are as developed as the supernova observations. So in the near term, progress toward understanding dark energy will rely heavily on more observations of exploded stars that are even farther away and deeper in time.

Note: These are Hubble images of the three of the most distant supernova. By tracking these exploding starts, astronomers can trace the expansion rate of the universe and determine how it is affected by dark energy.

Some MORE Researches in support of Dark Energy:

The new findings, which have been submitted to the Astrophysical Journal for publication, come from National Science Foundation-sponsored observations using a sensitive new receiver, called the Arc minute Cosmology Bolo meter Array Receiver, or ACBAR, mated to the Viper telescope. The investigators looked at subtle temperature differences in the microwave background, which equate with variations in the density of energy. From a physics point of view, energy and matter are equivalent.

Microwave radiation is absorbed by water vapor, so observations of the cosmic background are best made in areas with dry, thin air, such as Antarctica, or space. The results from ACBAR are similar to those reported in the summer by the Cosmic Background Imager, a set of radio antennas located high in Chile's Atacama Desert.

Berkeley's William Holzapfel, a Peter's native, said the MAP satellite is surveying the entire sky, while those using the South Pole telescope studied just a small chunk of sky in much greater detail. The two results should be complementary, much as a map of the United States would complement a street map of Pittsburgh. For years, cosmologists have talked about dark matter, arguing that the universe behaved in ways suggesting that it contained more mass than could be found in visible stars.

Though the ACBAR findings indeed suggest that dark matter is a major component of the universe, "I think the story is all about dark energy," Peterson a noted astrophysicist claimed. By combining data from WMAP, SDSS and other sources, four independent groups of researchers have reported evidence for a phenomenon known as the integrated Sachs-Wolfe effect. These groups have found that the gravitational repulsion of dark energy has slowed down the collapse of over dense regions of matter in the universe. After this, the case for the existence of dark energy has suddenly become a lot more convincing.

Chandra Telescope observation:

The new work by Allen and Fabian using Chandra, a powerful space telescope launched by

the space shuttle in July 1999 in the name of famous Indian astrophysicist Chandrasekhar, leaves little doubt the opposite is true. They believe the accelerating influence of "dark energy" began about 6 billion years ago**.** With the help of Chandra, the two astronomers studied 26 galactic clusters ranging in distance from one billion to 10 billion light years. Developed to examine high temperature matter that radiates X-ray energy, Chandra was able to observe the large gas clouds invisible to ordinary telescopes that surround the sprawling clusters.

The findings revealed an accelerating influence at work on the most distant galaxies. The Chandra observations confirm those made with two other spacecraft -- by NASA's Hubble Space Telescope in 1998 and another NASA spacecraft in 2003.

Concluding remarks

On the issue of validity of dark energy theory, it seems, physicists directly or indirectly accepted and trying to be of unanimous view but still could not define the dark energy yet which is said to be aroused from anti gravity, a missing force/energy from dark matter. According to Mr. T. E. Bardon who wrote in his article “Dark Matter or Dark Energy” and concluded that “Dark energy is a bench-testable, still-unaccounted entity in astrophysics and is definitely generating more gravitation in and around the observed and evidenced energetic masses than is accounted for in present theory. With the present dark matter theories stumbling, as pointed out by Musser, the fact that this dark energy is certifiably there, as is appreciable excess gravitation from it, should be closely examined. The long missing gravity could well be a problem resulting from the arbitrarily discarded and unaccounted "dark energy" rather than from the hypothetical missing "dark matter."

According to explanation given by astrophysicist, we can summarize that only 4-5% of the constituents of the universe are, to the some extent, known. New stars and galaxies can come and are coming into existence; rest 95% is still unknown. It would be a milestone for the physicists if the dark energy theory is accepted as a positive step. It is believed that the mere existence of dark energy may open a window to new and unpredictable physics. It may pave the path for deciding the geometry of the universe. Let us see what 21st century has stored in for us.

For the time being, I may conclude by saying **“Science is neither moral nor immoral but it’s revelatory”.**

About the Author*: The author is presently working as Senior R&D Engineer in StarVray Co., Ltd (www.starvray.com) at Daejeon, South Korea in the field of Bio-imaging based chip design and development. He is a member of Science for society, Bihar under NCSTC Network, Department of Science and Technology, Govt. of India. He is also the chairman and moderator of the organization called “BiharBrains” (www.biharbrains.org).*

More information about the author can be obtained from

www.bibhutibikramaditya.com

Biotechnology: Present and Future

Sateesh Kumar TVS, Seoul, South Korea

Introduction

Biotechnology is technology based on biology.

UN Convention on Biological Diversity defined Biotechnology as follows:

"Biotechnology means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use."

The structure of DNA was deciphered by James Watson, a geneticist, and Francis Crick, a physicist, thus marking the beginning of molecular biology in the 20th century. Their determination of the physical structure of the DNA molecule became the foundation for modern biotechnology, enabling scientists to develop new tools to improve the future of mankind.

The Human Genome Project is a major biotechnological endeavor, the aim of which is to make a detailed map of human DNA. The hereditary instructions inscribed in DNA guide the development of the human being from fertilized egg cell to death. In this project, which is estimated to take 15 years, chromosome maps are being developed in various laboratories worldwide through a coordinated effort guided by the National Institutes of Health. The genetic markers for over 4000 diseases caused by single mutant genes have been mapped.

To get an idea of the magnitude of this project, imagine a stack of 25,000 books. If each book is two centimeters thick, the stack would measure 50 meters, the height of a 15 story building. Consider locating a particular word within one of the books in the stack. For a molecular biologist this would be analogous to finding one gene in the human genome. Up to this point molecular biologists have mapped only a tiny fraction of the genome. The twenty three pairs of human chromosomes are estimated to contain between 50,000 and 100,000 genes, although it appears that only about five percent are ever transcribed.

Sub-fields of Biotechnology

* Red biotechnology is applied to medical processes. Some examples are the designing of organisms to produce antibiotics, and the engineering of genetic cures through genomic manipulation.

* White biotechnology, also known as grey biotechnology, is biotechnology applied to industrial processes. An example is the designing of an organism to produce a useful chemical. White biotechnology tends to consume less in resources than traditional processes used to produce industrial goods.
* Green biotechnology is biotechnology applied to agricultural processes. An example is the designing of transgenic plants to grow under specific environmental conditions or in the presence (or absence) of certain agricultural chemicals. One hope is that green biotechnology might produce more environmentally friendly solutions than traditional industrial agriculture. An example of this is the engineering of a plant to express a pesticide, thereby eliminating the need for external application of pesticides. An example of this would be Bt corn.

* The term blue biotechnology has also been used to describe the marine and aquatic applications of biotechnology, but its use is relatively rare

Bioinformatics

It is an interdisciplinary field which addresses biological problems using computational techniques. The field is also often referred to as computational biology. It plays a key role in various areas, such as functional genomics, structural genomics, and proteomics, and forms a key component in the biotechnology and pharmaceutical sector.

In1885, a scientist named Roux demonstrated embryonic chick cells could be kept alive outside an animal's body. For the next hundred years, advances in cell tissue culture have provided

fascinating glimpses into many different areas such as biological clocks and cancer therapy.

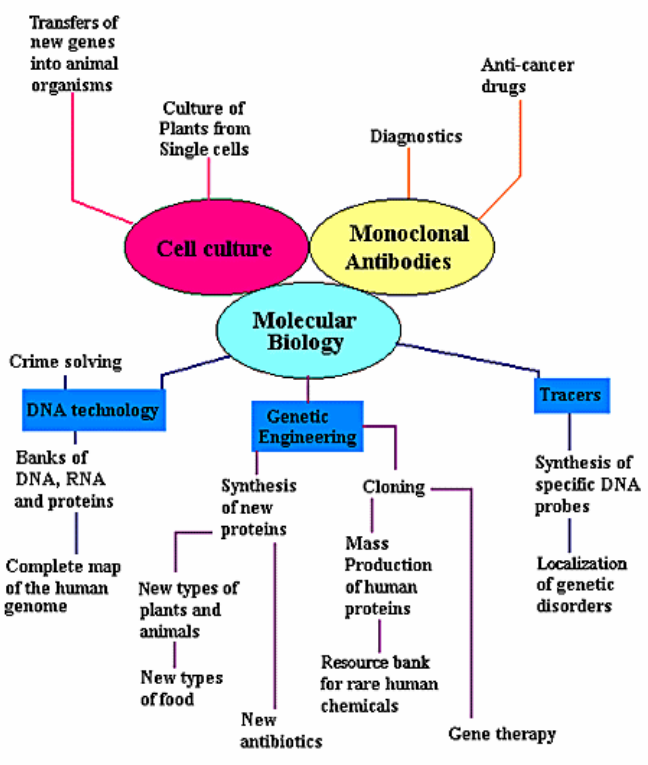


Figure 1. Areas of applied biotechnology

Monoclonal antibodies are new tools to detect and localize specific biological molecules. In principle, monoclonal antibodies can be made against any macromolecule and used to locate, purify or even potentially destroy a molecule as for example with anticancer drugs.

Molecular biology is useful in many fields. DNA technology is utilized in solving crimes. It also allows searchers to produce banks of DNA, RNA and proteins, while mapping the human genome. Tracers are used to synthesize specific DNA or RNA probes, essential to localizing sequences involved in genetic disorders.

With genetic engineering, new proteins are synthesized. They can be introduced into plants or animal genomes, producing a new type of disease resistant plants, capable of living in inhospitable environments (i.e. temperature and water extremes...). When introduced into bacteria, these proteins have also produced new antibiotics and useful drugs.

Techniques of cloning generate large quantities of pure human proteins, which are used to treat diseases like diabetes. In the future, a resource bank for rare human proteins or other molecules is a possibility. For instance, DNA sequences which are modified to correct a mutation, to increase the production of a specific protein or to produce a new type of protein can be stored. This technique will be probably playing a key role in gene therapy.

Recombinant DNA biotechnology has aroused public interest and concern and has influenced medicine, industry, agriculture and environmental problem solving in the twenty years since its inception. In medicine faster and more efficient diagnosis and treatment of diseases such as cystic fibrosis, cancer, sickle cell anemia, and diabetes are soon to be developed. Recombinant organisms will be used in industry to produce new vaccines, solvents, and chemicals of all kinds.

Biotechnology has applications in both plant and animal breeding. Scientists are developing disease and herbicide resistant crops, disease resistant animals, seedless fruits and rapidly growing chickens. Microbes are being engineered to digest compounds that are currently polluting our environment.

Some of the more exciting frontiers of biotechnology include protein based "biochips" which may replace silicon chips. It is believed that biochips would be faster and more energy efficient. Biochip implants in the body could deliver precise amounts of drugs to affect heart rate and hormone secretion or to control artificial limbs. Biosensors are monitors that use enzymes, monoclonal antibodies, or other proteins to test air and water quality, to detect hazardous substances, and to monitor blood components in vivo.

Gene therapy involves correction of defects in genetic material. In this process a normal gene is introduced to replace a malfunctioning one. "Gene therapy" will be the "expression" of the medical research branch of biotechnology. It may in time form the basis of its own industry or join the traditional pharmaceutical industry. New delivery systems, called liposomes, are being developed to get cytotoxic drugs to tumor sites with minimal damage to surrounding healthy tissues. New monoclonal antibodies will be isolated for use in

cancer treatment, diagnostic testing, bone marrow transplantation and other applications.

Conclusion

The biotechnology industry is about to reach a critical mass of maturity and convergence. Combined with the related convergence of biotechnology, nanotechnology, and information technology, unprecedented rates of progress and expansion will ensue—if public acceptance of biotech can be won.

In the long run, biotechnology will:

• Profoundly impact our perceptions of health, aging, personality, and the human soul
• Increase the carrying capacity of the planet
• Revolutionize manufacturing, materials science, and bioengineering—deeply impacting the nature and flow of information and materials through our economy

Ultimately, we could enter an era of self-directed evolution, with humanity creating entirely new molecules, biochemical pathways, tissues, organ systems, and life forms.

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Laboratory Acquired Infections: The Unique KI Test for Primary Containment Devices

Amit Singh, Singapore

Introduction

Laboratory-acquired infections (LAIs) are a matter of concern for the microbiological community of the world. There are reports of individuals, particularly laboratory investigators, succumbing to infection transmitted by an aerosol or splash from the material being handled (Kruse et al. 1991; Collins 1993). The strategies to eliminate such LAIs include the use of biological safety cabinets. There have been several attempts made by the manufacturers, legislative bodies, and national and international standards bodies to standardize containment testing strategies for open fronted containment systems. Operator protection tests should be an integral part of the routine servicing regime to ensure that the biological safety cabinets meet the required performance levels, and additionally to allow detection and rectification of poor containment, particularly those induced by the environmental factors.

In most of the parts of Europe and North America, Operator Protection Tests (OPTs) may only be required for initial certification but generally not follow installation, or routinely thereafter, e.g. post servicing. Moreover, the levels of containment required, unfortunately, are not fully comparable between countries, as the recommended testing methodologies and/or protocols vary (Anon. 1992; Richmond and McKinney 1995; Anon 1998). Manufacturers of contamination control equipment have the expense of testing by varying methods in different countries where standards apply. The most common type of open fronted containment system found in laboratories is the biological safety cabinets (BSC's). This paper describes the unique potassium iodide test conducted on biological safety cabinets in a tertiary hospital.

Purpose of study

Users sometime do not realize that the performance of the biosafety cabinets depends greatly on the nature of the installation as well as proper positioning of the cabinet in the laboratory. For example, the inflow air velocity from the laboratory into the cabinet is often of a very low magnitude (around 0.5m/s) and this can easily be disrupted by airflow turbulence in the room, for example, an air-conditioning outlet / diffuser. A safety cabinet may meet all performance criteria in the manufacturer's laboratory after production, as well as in the testing lab of the independent certification agency, but may fail to deliver adequate protection on-site when it is actually installed. A Study was undertaken in a tertiary hospital to determine the containment of the biological safety cabinets since it is important to understand that the testing conditions in the manufacturer's laboratory as well as the laboratory of the certification agency are ideal test conditions which sometimes do not correlate with real world conditions. Standard checks carried out on biological safety cabinets includes: Air flow velocity checks (inflow, down flow), airflow smoke pattern tests, noise level tests, vibration level measurement, light level measurement, UV intensity measurements, air cleanliness classification tests using a laser particle counter.

Methodology

The KI (potassium iodide) discus test is defined in the European Standard for microbiological safety cabinets, EN12469:2000 as a test method for validating the operator protection capabilities of the cabinet. The KI Discus test has been designed to enable operator protection factors to be measured for class I and Class II open-fronted biological safety cabinets. Unlike test methods employing a micro-biological aerosol challenge this technique enables cabinets to be evaluated without the risk of microbial contamination of either the biological safety cabinet or the laboratory.

A fine mist of potassium iodide droplets, produced by a spinning disc, is used as a challenge aerosol to measure the containment of the biological safety cabinet. Centripetal collectors

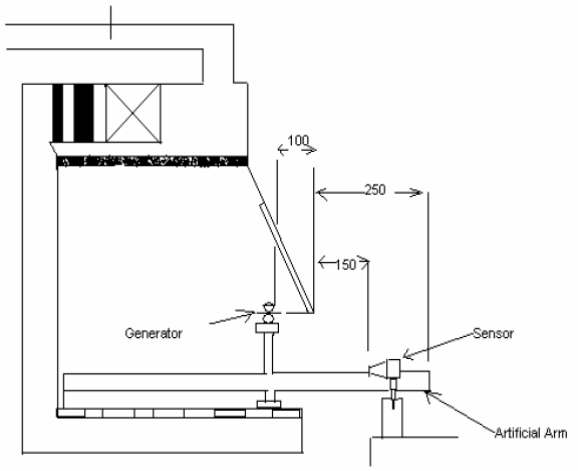
Sample the air and deposit the potassium iodide particles that are entrained in the sampled air on to filter membranes. At the end of the sampling period the filter membranes are placed in a solution of palladium chloride where upon the potassium iodide "develops" to form clearly visible and easily identified brown dots. Knowledge of the number of droplets in the challenge produced by the mist generator and of the number collected in the air samplers enables the aperture protection factor (Apf) for the cabinet to be evaluated. The aperture protection factor (Apf) is the ratio of how many particles can escape through the cabinet front aperture compared to how many particles are liberated if the experiment is performed on an open bench.

On pressing the button auto the suction blower in the lower part of the KI discus cabinet is started along with the spinning disc and the digital timer. After 15-16 seconds an indication appears on the control panel showing that the spinning disc has reached the correct running speed of 28,000 rpm. At this stage the peristaltic pump starts. The digital timer determines the quantity of fluid delivered to the spinning disc. Once the peristaltic pump is running, 20 ml of potassium iodide will be delivered from the reservoir bottle to the spinning disc. The digital timer indicates the time elapsed time from the start to completion of the delivery of 20 ml of potassium iodide. The digital timer was programmed to stop the pump after 20ml of KI is dispensed, which takes about 9 minutes. The blower is turned off 5-6 seconds later.

The filter membrane composed of cellulose nitrate, pore size 3 micron, diameter 25mm is removed from the samplers after 20 seconds so that the suction has completely stopped. The filter membrane is placed in a Petri dish containing the palladium chloride solution, with the surface that has been exposed to the air flow facing upwards. Within 10 seconds the membrane becomes saturated with palladium chloride and any potassium iodide particle if present becomes visible as brown dots. The filter membrane is then removed and immersed in distilled water for 3- 4 seconds before being placed on a clean water absorbing paper for examination.

Results and discussion

According to EN 12469:2000 Apf should be not less than 100,000 for each collector or there should not be more than 62 brown dots on the KI discus filter membrane after development in palladium chloride. The formula to calculate Apf:



The Unique Potassium Iodide Test
(All dimensions in mm)

$$A_{pf} = \frac{NxV}{10^4 xn}$$

N: number of particles liberated = 3.1 x 10^7 x M
M: volume of KI dispensed = 20 ml
V: sampling flow rate = 100 dm^3/min
n: the number of brown dots captured

Sample of 30 biological safety cabinets were subjected to the KI discus test. Sample of biological safety cabinets were from different manufacturers. It was found that only one BSC failed the test as it surpassed the 62 brown dots. The main reason for the failure of the cabinet was attributed to its weak inflow velocity which was measured as 0.36 m/s, the minimum inflow velocity defined by the standard EN 12469:2000 is 0.4 m/s. An understanding of poor cabinet containment is a valuable asset for reinforcing laboratory discipline and help combat the recognized hazards emanating from operator complacency (Rake 1978; Kruse et al. 1991).

There is a need of for continuous monitoring to ensure that the cabinets regularly return the desired level of operator protection (Clark et al. 1990; Osborne and Durkin 1991). The principle factors which contributes to the poor containment of biological safety cabinets are careless

technique and in adequate installation/testing to detect and overcome environmental factors that could compromise performance. Nevertheless, it is critical that BSC's repeatedly return high levels of operator protection as the handling of hazardous micro-organisms becomes more widespread; such work is often performed by relatively uninformed, though highly educated people, who may not have a thorough understanding of the mechanisms of the transmission of the infectious agents.

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DEVELOPMENT SECTION

DEVELOPMENT SECTION

Livelihood Initiative in Jharkhand

Praveen Ohal, Ranchi, India

Project Description

Jharkhand is one of the states in India with maximum population of tribal people. Most of the tribal population is living in the rural part of the state. The main source of income is agriculture and livestock management. Agriculture depends only on monsoon and there is no secondary crop practice. Generally all the tribes are engaged in pig keeping, goat keeping, dairy, poultry etc.

We request your involvement to support our initial implementation of Income Generating Activity; it is a comprehensive, research/training-based program that will help the rural community uplift their lives economically as well as financially and lead the way in community development. This is a unique project which teaches concepts and skills that empower young people to manage farm animals with high returns for a sustainable growth and development. The community will learn how to set and achieve realistic goals, recognize different steps and procedures in planning, organizing, implementing, and devise new guidelines according to experiences learned while training. We plan to provide a sustainable income generating opportunity to 40 poorest families (40 members of SHG – Self Help Group) from around 25 groups and 5 villages of Khunti Block of Ranchi District (Jharkhand).

Concept

- **People:** This project will involve a group of ten (10) poorest community SHG (Self Help Group) members and their families in first year and another group of twenty (20) in the second year. In short food security for more than 200 people.
- **Duration:** This is a total four years project, which includes two years intensive training and practical experience and two years of external support on care, management and running of milk co-operative system.

The Project:

- Ten (10) identified poorest SHG members would be given a Local Hybrid cow on finance.
- All the cows would be kept in the cattle shelter constructed by the organization to reduce the cost of Food, medicine and management. The cows would be insured from theft, killing, accidental or natural death. Organization will be responsible to take care of Food, Medicine, and marketing of the milk.
- Twice a day, morning and evening, one member of each family will come to the shelter; responsibility of these members would be cleaning, feeding and milking of their cows. Each one will have two registers, one for them and one for the organization, to maintain the daily milk yield. Supervisor and the community member both would maintain sign on each other's register. The supervisor will then transport the total milk to our selling point at Khunti main town.
- **Marketing:** The Ranchi dairy imports milk from other districts from more than up to 150 KM. The Ranchi dairy has large demand of the milk and selling milk to the dairy will not be a problem.
- **Recovery:** 50% of the milk yield will be taken as the refund of loan from each member. Minimum 10,000 Rupees would be collected in the first year and first calf will also be kept as a part of loan refund.
- **Revolving:** The next group of 20 members would be given cows by purchasing through the amount collected with little more funding and/or replacing the calf with additional money. In this way we will require 50% funds for the second group.
- **Investment:** The Third and fourth years project expenditure would be maintained by the loan amount to be recovered from the individual members of the second group against the cows.

Towards Sustainability

- Formation and functioning of Co-operative system will be started after six months of the project starting date.
- During the project period the community members would be trained on handling, care, management of their cows and running the milk co-operative system efficiently and effectively like functioning of the co-operatives, benefits and linkages with the Government programmes etc.

- In the third year the community members would manage the Milk Co-operative from their homes. The organization will continue providing assistance in Medicinal care and Marketing support with the loan amount collected from second group.
- After Three years of the project, for fourth year, organization will still be providing all the required assistance, but this time the community will have to pay for the services like, veterinary and medicinal support.
- This project will motivate number of families to join the co-operative and in future with the help of government programs we would try setting up a dairy unit for manufacturing milk products.
- This unique project can help the surrounding villages start similar activity and help in eradicating poverty.

GOAL:

With this project, we can help solve many issues like-

- ✓ The majority of rural communities are involved in cutting and selling of fuel wood, which is accelerating environmental degradation.
- ✓ Heavy reliance on land based activities and the limited access to irrigation facilities and reliance on rain fed single crop results in low productivity.
- ✓ This may enable children in the family to go to school, because they no longer have to work to help support the family.

We appreciate your consideration in this important project. We know this project will help us have a greater impact on the community at large.

Please do not hesitate to contact us at Cell. no. 94311 71929 or email us at hopeandanimal@gmail.com with any questions or comments.

We look forward to working with your organization.

About the Author: *Mr. Praveen Ohal is social worker, started his own NGO in the name of HOPE at Ranchi. He is also associated with NABUUR (www.nabuur.com) for the development of the village called khunti near Ranchi in India and to BiharBrains as City representative. He is also author of the Book entitled "Asia on Foot" that describes his own journey experience to travel into many Asian countries by foot. This book is also fund generating agency for his organization.*
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Meaning of bringing an NISc or IISER in Bihar

Dr. Rajkishore Prasad, Tokyo, Japan

The two acronyms NISc and IISER stand here for National Institute of Science and Indian Institute of Science for Education and Research, respectively, with modality that former became a history on paper within our political arena and later is present and a reality. Our whole nation is depleted of the Center of Excellence (COE) in science. Naturally, human resources with excellent scientific abilities are in minority but needed in majority to provide impetus to support up hill journey of our changing economy and society. Absence or any weakness in supporting scientific thrust will have adverse effect on the development of knowledge supported economy and society. The last NDA led central government came to realize this fact with serious plan to improve scientific caliber of the country. India needs scientists for which COEs are required to provide training of sciences to youngsters. But most of the young brains are reluctant to choose basic sciences as their career due to unsecured future. This matter of national concern was pointed by the former Hon'ble Minister for Human Resource Development, Professor Murli Manohar Joshi on the occasion of the golden Jubilee function of UGC. His observation was as under

"The undergraduate education in pure sciences is a matter of serious concern. We are going to face shortage of good researchers in a few years time particularly in our premier research institutes in the field of Atomic Energy, Space, Bio-technology, Energy, Oil exploration, Communication and so on. We will have to focus at 10+2 level and "catch those young" for integrated 5 years teaching programme with a possibility of exit after three years".

The NDA led government announced to open four National Institutes of Science across (**East:** At Bhubaneswar in the proximity of Utkal University, **West:** At Pune in the proximity of University of Pune, **North:** At Allahabad in the proximity of Allahbad University, **South:** At Chennai in the proximity of Anna University) the country. However, at none of these places, NISc came into existence and in between central government was changed. The present UPA led central government is silent over the issue of NISc, however, has announced to open similar institutes named as **IISER** at Kolkata, Pune, Kanpur and Chandigarh. It seems matter of NISc is gone. It is also not known if the IISER is modification or replacement of NISc but aims and objectives of both types of institutes are similar. Till today IISERs have been brought into functional existence at Kolkata and Pune and they have announced for admission in the first session starting from August, 2006. Establishment of IISER can be taken as a unique step to safeguard declining science education in the country. Some of the important and special features of IISER can be observed as under

IISER will be an autonomous institute under the Ministry of Human Resource Development (MHRD), Government of India. It will serve as research universities of the highest caliber and will provide teaching as well as research training of excellent quality in the basic science subjects.

IISER will offer 5-years integrated Masters and post-bachelors and post-Masters Ph.D. programs. Beside this doors for the integrated programs will be open for all those graduating in science from different universities. The integrated programme will be flexible and student may leave this course after four years also when they complete their master degree and are not willing to do doctoral programme. Also, a M.Sc. degree holder from outside can get entry into PhD programme of the IISER. There will be options and opportunities for the post-doctoral and research positions. Students will get scholarship on the basis of merit.

IISER will provide multidisciplinary science education and specialization. Traditional borders will be highly flexible. Thus curriculum of IISER will be multidisciplinary.

The academic programmes will be semester wise with options for specialization in multiple disciplines of basic sciences based on a flexible credit system.

Apart from classroom instructions, IISER will equip students with skills of other areas such as scientific inquiry, problem solving, communication skills, computational sciences, electronics and instrumentation, workshop and glass blowing practices. IISER will be an institute of international

standards and provide research opportunities in the frontier areas.

The full fledged IISER will accommodate more than 2,000 students in integrated master, doctoral and post doctoral programme, with about 200 excellent faculty members.

Obviously, this new initiative of central government to popularize and pave science education and research will produce excellent scientific manpower thought the country and lead to development of superlative infrastructure, industry and other related developments in the native state of institution.

One of the most important features of the course pattern of IISER is that it will be multi-disciplinary in nature. Multidisciplinary education in science will be helpful in developing flexible cognitive style and will train students for wide range of potential, for gaining excellence in multiple fields. It has been seen that the process of getting specialization becomes faster after adequate multidisciplinary training. This will develop specialization in students at higher levels of study or at work place. Such difference from traditional science education will increase possibility of student motivation and aptitude. It is like making Jack of all trades and master of many trades. Sometimes becoming jack of all trades is better than mastering one because it makes you master of integration, association, and conceptualization which bring distinctive specialization in future. If we see the list of polymaths e.g. *Leonardo da Vinci*, who was engineer, physician, painter, inventor, musician, astrologer, alchemist and architect, it is very easy for one to imbue that they were mastering many disciplines, capable in integrating knowledge of different trades and had shown unique convergence with diverging skills .

Fortunately, land of Bihar has also given many polymaths among which name of Chanakya is well known, but this land has been kept blanked with IISER, a setup with hope to produce *pundits of sciences*.

Bihar needs NISc or IISER

Bihar is a developing state and its development shares a great meaning with the developed India. Bihar shares about 8.9 % of the total Indian population, however, it lacks in centers for training human resources. In the name of central educational institute it has an NIT at Patna which is not only newly established but is modification of a pre-exiting state government runned engineering college. We may hope that NIT Patna will establish itself as a COE in the area of engineering in the coming years. However, for science subjects Bihar has nothing like national institutes except different departments of sciences with state runned universities. These departments are conspicuousness for lacking infrastructure, research funds, and skilled trainers. I do not like to blame existing faculties but mean to say that sharpness of a sword goes if it is put permanently in its case.

How existence of IISER in local can be beneficial can be imbued from course patterns offered by it. Its door will also be open for students graduating / mastering in science from other universities. I am sure that establishment of such institute will increase percentage of students from Bihar seeking higher education in science. As per India Science Report, less than 0.6% (not exactly mentioned and may be somewhere below this) students from Bihar migrate to other states for taking science education at higher level. This is so because there is imbalance in distribution of such institutes. Also, getting higher education outside is costlier and every aspirant cannot afford it despite his/her will to continue higher education in science. Such migration of student also leads to the development of infrastructure to states where they study. The absence of central institutes has made Bihar the least central fund fetching state for the technical education. From [2], it is amazing to know that while Central Government spends Rs. 100 per person in Delhi, it spends Rs. 59.5190 in Uttaranchal, Rs. 59.2818 in Arunachal Pradesh, Rs. 43.8686 in Assam, Rs.19.0718 in Himachal Pradesh, Rs. 15.8650 in West Bengal, Rs.14.1825 in Karnataka, Rs.10.0440 in Tamil Nadu, Rs.9.6488 in Maharashtra, Rs.9.6432 in Uttar Pradesh, Rs.9.1463 in Jharkhand, Rs.9.0617 in Andhra Pradesh, Rs.8.1865 in J&K, Rs.7.5542 in Punjab, Rs.4.81 in Haryana, Rs.4.46 in Kerala, Rs.4.17 in Chhattisgarh, Rs. 2.7 in Gujarat, Rs.2,29 in Orissa, Rs.1.46 in Rajsthan,Rs.1.05 in Bihar (Data 2005-2006) for the technical education. Such imbalance in distribution of Central funds for education cannot be described as good sign for the development and integrity of India. Unfortunately, such imbalances have been totally uncared while establishing new institutes like IISER. On the basis of this Bihar is one of the most suitable states for opening an IISER. As per India Science Report 2006, Bihar comes under BIMARU (Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh) group which has higher share of non-HRSTE

(Human Resources in Science and Technology by Education) workforce. This is due to lower level of education and less awareness among people for the technical education.

The opening of IISER or similar institutes in Bihar will also be beneficial for the local universities. Faculty and students of local universities will get chance to have interaction with scholars, researchers, for participation in quality improvement programs, to know ongoing researches in the frontier areas. This all will create a new will and zeal that will not only pave broken links of science education and research but also motivates students for pursuing higher studies in science and making it as their professional career. One can hope that IISER will play pivotal role in establishing strong relationship with the neighboring universities and other educational institutes to share faculty, research, development and infrastructure to achieve global level excellence in the field of science education and research.

Unfortunately, no serious steps have been taken so far to bring an IISER in Bihar. It will be not out of place to mention that like everything science education and establishment of institution for it is a politicized. Claiming with all our plus points will not bring IISER, if political leaders from the state do not take interest. Establishment of IISER will be a political decision, because many states are in the race for it with academic environment better than Bihar. However, denial to give IISER to Bihar on the basis of ill conditions of the existing educational system is a step to further widen regional imbalances and deliberately debarring Bihar to develop. I have been raising this issue from 2004. I become very hopeful about my demand when hon'ble president stressed need of IISER for Bihar while he was addressing joint session of our legislators in March, 2006. It's a new hope. Also when I talked, through BBC, a few months before with hon'ble union minister for S&T, he was also in favor of opening an IISER in Bihar. Appreciating my efforts, our BiharBrains (details can be seen at www.biharbrains.org), has formed recently a core-committee to make the demand emphatic and successful. I am also one of the members of the committee and it is in the process of making final report, however to make our attempts successful close cooperation of all intellectuals of Bihar is needed. One of the important steps in this direction happened when I met hon'ble union minister Sri Ram Vilash Paswan for the same in July 2006, in Tokyo. He promised to bring an IISER in Bihar. We hope our government and hon'ble ministers in the central government, MPs and all other higher authorities will show their serious concerns in bringing an IISER for Bihar.

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POSCO's Indian dream: Corporate Social Responsibility is the winning way

Jayanta Bhattacharya, Daejeon, South Korea

In many ways more than one, South Korean direct investment in India is symbolically connected to the liberalization of Indian economy that started in 1991.Within the year 1993, Korea emerged as the successful investor with its major behemoths like Hyundai, Daewoo, Samsung and LG corporations beginning to dot in the Indian corporate picture. Many foreign firms especially the ones from Japan and Europe were not at all interested in investment in India at that particular time. Some 13 years later , in India today, Hyundai is the second largest car seller and Samsung is the largest consumer electronics brand in a market which tantalizingly shows a double-digit growth in a world steeped at the fear of recession. Hyundai today also is the largest exporter of cars from India.

A relatively late entrant, Posco is the first foreign company allowed in the highly debated raw material sector of India. It's risk taking attitude as well the knowledge thus far gained about India and it market is poised for a great dividend in the years to come.

Posco-India, a wholly owned subsidiary of South Korean steel major Posco, celebrated its first Foundation day on August 25'2006. On that day it introduced a code of conduct for its employees and pledged to adhere to its global ethical practices. With the successful completion of one year, the company reaffirmed its commitment to its proposed 12 million Greenfield steel project in Orissa. Posco had set-up its Indian arm on August 25, 2005 what then was known as the largest single direct foreign investment in India. Concurrently, Posco-India Ltd, a part of the world's fifth-largest steel maker, may win the rights to a 600-million-tonne iron ore mining lease from the Indian government by October' 2006 which would also be a first of its kind in India for any foreign multinational company .The project will also give it access to the local supply of iron ore over the next 30 years. Orissa, located on India's east coast, has almost 50 billion tonnes of iron ore resources.

Securing the 600 million tonnes of iron ore would help POSCO counter tight worldwide supplies of the raw material. Remembering the experience in last one year on the project front, Soung-Sik Cho, chairman cum managing director, Posco-India Private Limited, said, "Posco-India, the most prestigious of all its projects outside Korea is emerging stronger with every passing day" (sic) at a press conference. The progress of the project is steady and we are thankful to the people here, the state government and the government of India for supporting the project."

As a part of its corporate citizenship plan POSCO with some 20 odd employees of Korean origin started a local language (Oriya) class for its employees .It has also instructed its Korean employees to learn to dress like the locals and to know the customs of greetings and worship. In a plan to shed its heavy and apparent foreign identity, it has taken a policy to look not too different from any Indian counterpart. It has instructed all its employees to respect the local sentiments and adopt a soft approach to their problems. It has lent its hand to the local community programmes like medical camp and sports etc. And by all signs, such overtures are paying off. Initial resistance is waning. The number of protests by the local people who are in the fear of losing their occupation and land is coming down and a testimony of bondage is emerging.

Recently, the CMD and one Indian staff on behalf of all employees of POSCO-India signed the pledge to abide by the Code of Conduct in all functions of the company. Subsequently all 86 employees underwent a self test on Code of

Conduct with focus on workplace conduct. The Code of Conduct reflects the company's uncompromising commitment to integrity and discipline with high standard of work ethics and transparency, a recent company release says so. Posco-India's Code of Conduct includes fundamental responsibilities of employees, stress on commitment to customers, business partners, competitors and investors; the company's commitment to employees. The rules of conduct detail out adoption of sound and fair work practices along with protection of confidential information. It also lays emphasis on avoiding conflicts of interest and creating a culture of mutual trust and respect. Further, the guiding principles laid down in the Code of Conduct details out the scope of benefits permissible in day to day dealings for employees. The Orissa government has sanctioned 1,135 acres of land for the plant. It has also appointed nodal officer, rehabilitation and resettlement officer and zonal officers to speed up the project work. In addition, the local Committee for Coastal Regulation Zone and Environmental Impact Assessment has decided to send recommendation to the Central Government for the construction of captive port. The recommendation for Posco-India's SEZ proposal has been sent for approval to Board of Approval of the Central government. Posco-India plans to kick off site preparation for steel plant and piling work for port by April 2007. The arrangements for water and power supply for the construction are expected to be in place by March 2007. The construction for steel plant is projected to begin in September, 2008 and the commissioning of first phase is expected by end of 2010 in line with the original schedule.

In what can be called yet another silver lining to its foray to India, Posco may be drafted into Indian Railways Network, one of the largest in the world in terms of connectivity. In what would be the first investment by a foreign company in a railway project, Posco is all set to pick up 10% equity in a rail corridor connecting its steel plant with Orissa's Paradeep Port. It is yet another sign that Posco's Indian face is finally getting accepted in the mainstream.

The project would also be the first of its kind in the country, wherein it would be developed jointly with rail users — Public Sector Units (PSUs) and private companies. Indian Railways sources also confirmed that besides Posco, steel companies like Jindal, SAIL and MSPL Mining Company are also likely to join the consortium. "We have received a firm offer from Posco to invest 10% of the equity in Haridaspur (close to Posco's proposed plant)-Paradeep Port rail link, which is being developed by a special purpose vehicle (SPV) led by Rail Vikas Nigam Ltd (RVNL) of Indian Railways. The investment will allow the Korean company faster access to the port for shipping coal, iron ore and steel," Orissa government sources said. Posco is also planning to set up its own port at Jatadhari near Paradeep, which would also be serviced through the new track. The Haridaspur-Paradeep rail line project is likely to cost Rs 560 crore (\ 115 billion) and will have an equity component of Rs 270 crore. Posco is likely to fork out Rs 27 crore (\ 5.6 billion) initially for the 10% stake. It would reduce the distance and time of transportation of raw materials like iron ore and coal from Orissa's Keonjhar and Angul districts to the plant site. The RVNL board is understood to have cleared the project recently, paving way for the SPV formation and work on the project.

It is said that all global strategies are essentially local. Gone are the days when the mentions of multinationals used to generate awe and respect. Today, mutual respectability is what finally delivers. The perseverant firms that are pro-people and try at best to listen to the local murmurings are the final winner.

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Need for Temples of Learning in Bihar

Manish Kumar, Chennai, India

Bihar has a long history of organized education. Once upon a time, Bihar was a leading place in terms of higher education. Nalanda and Vikramshila University was the two most important centres for learning in India. Nalanda University being the focal point handled all branches including (Art, Architecture, Painting, Logic, Grammar, Philosophy, Astronomy, Literature, Buddhism, Hinduism, Arthashastra (Economics & Politics), Law, and Medicine, Arithmetic, Theology, Law, Metaphysics, Ethics) and housed up to 10,000 students at its peak. Students from China, Korea, Sri Lanka, and Indonesia and from all the regions of India came to Nalanda and Vikramshila uinversities to study.

But at present, both Bihar and Nalanda is in ruins. State is highly deficient in the area of good technical institutions. Some institutions of higher learning like Birla Institute of Technology, (BIT, Mesra Ranchi), Xavier Labour Relation Institute (XLRI, Jamshedpur), Indian School of Mines (ISM, Dhanbad), National Institute of Foundry and Forge Technology (NIFFT, Hatia, Ranchi), National Institute of Technology (NIT, Jamshedpur), Xavier Institute of Social Sciences (XISS, Ranchi) went to Jharkhand. Because of the lack of good technical, medical, research, and management institutions, Bihari students go to other states like Maharashtra, Tamil Nadu, Kerala, Andhra Pradesh, and Karnataka etc. The other reasons are the lack of opportunities in Bihar. Biharis are taking admission in large numbers in private engineering, medical colleges, and management institutes in South and West India.

While, we are on the need of temples of learning in Bihar, lets us see what has happened in India in the field of higher education and research after India got Independence in 1947 and then compare the statistics with Bihar. After India gained independence in 1947, her development in the field of higher education and research has increased drastically. At present (data of 2001) there are currently 268 universities, 50 deemed to be universities and 12 institutions of national importance and about 11,100 colleges established through Central and State legislation. Of the 268 universities, 18 are Central Universities and the rest State Universities.

In the field of nuclear power programme, Bhabha Atomic Research Centre (BARC), Mumbai and for the fundamental research in mathematics and physics the Tata Institute of Fundamental Research (TIFR), also at Mumbai are the autonomous institutes. These two institutes are the doing research in the frontier fields.

In Medical Sciences, to name a few, All India Institute of Medical Sciences (AIIMS), New Delhi, set up in 1956, Post-Graduate Institute of Medical Education and Research (PGIMR), Chandigarh, JIPMER, Pondicherry (1956), AFMC, Pune, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Tiruvananthapuram, Tata Memorial Hospital and the Tata Memorial Centre in Mumbai etc are carrying out teaching and research work in all areas and has evolved both as a premier teaching and research institution with extensive medical facilities.

The Indian Statistical Institute (ISI), a unique institution devoted to the research, teaching and application of statistics, natural sciences and social sciences. The Headquarters of ISI is located in the northern fringe of the metropolis of Kolkata. Additionally, there are two Centres located in Delhi and Bangalore. The institute gained the status of an Institution of National Importance by an act of the Indian Parliament in 1959.

In engineering, a group of seven institutes is collectively called IITs. They are-IIT Kharagpur, IIT Bombay, IIT Madras, IIT Kanpur, IIT Delhi, IIT Guwahati, and IIT Roorkee. Apart from IITs there are a large number of National Institute of Technology (formerly known as Regional Engineering Colleges) scattered throughout the country educating and training students to be future engineers. The first Indian Institute of Technology was born in May 1950 in Hijli, Kharagpur, in the eastern part of India. No need to

remind that all IITs and NIT's are autonomous universities and draft their own curriculum.

In the area of modern biology, biotechnology, and plant molecular biology, lots of institutions have been setup in last one-two decade. These are, for example, The National Institute of Immunology (NII), New Delhi, founded in 1981, promotes research in basic and applied immunology, research and development (R&D) of new vaccines and immunological reagents for communicable diseases and research into regulation of human reproduction. The Centre for Cellular and Molecular Biology (CCMB), Hyderabad, established in 1977, has major R&D programmes in biomedicine and biotechnology, genetics and evolution, cell and developmental biology, molecular biology, biochemistry and biophysics. In plant molecular biology, the National Centre for Plant Genome Research (NCPGR), New Delhi has broad research areas in plant genomics and transgenic, while recently initiating new research projects in chickpea genomics. Some of the other research institutes working in the area of scientific research are the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore (in frontier areas of science and engineering); National Centre for Biological Sciences (NCBS) also at Bangalore (in modern biology); National Brain Research Centre (NBRC), New Delhi (in neurosciences) and the National Institute of Pharmaceutical Education and Research (NIPER), Chandigarh (in pharmaceutical sciences).

Another world-class institution in the area of management is the Indian Institutes of Management(IIMs). The premier management schools of India are located in the cities of Ahmedabad, Bangalore, Kolkata, Lucknow, Indore and Kozhikhode.

Recently, two new institutions of national importance have been created by the HRD ministry. These two institutions are collectively called as Indian Institutes of Science Education and Research (IISER) and are located at Kolkata and Pune. The HRD ministry has reportedly been trying to push through the first batch of students for the two premier Indian Institutes of Science Education and Research (IISER) in Kolkata and Pune by July 2006.

A cluster of the premier industrial R&D organization called as the Council of Scientific & Industrial Research (CSIR) was constituted in 1942 by a resolution of the then Central Legislative Assembly. It is an autonomous body registered under the Registration of Societies Act of 1860. CSIR aims to provide industrial competitiveness, social welfare, strong S&T base for strategic sectors and advancement of fundamental knowledge. Today CSIR is recognised as one of the world's largest publicly funded R&D organisations having linkages to academia, R&D organisations and industry. CSIR's 40 laboratories and 80 field centers not only knit India into a giant network that impacts and add quality to the life of each and every Indian, but CSIR is also party to the prestigious Global Research Alliance with the objective of applying global knowledge pool for global good through global funding. CSIR's R&D portfolio embraces areas as diverse as Aerospace, Biotechnology, and Chemicals indeed, almost the ABC-Z of Indian Science!

In the area of Economics, Social Sciences etc lots of premier institutions (for example, Institute of Economic growth setup in New Delhi in 1958, Indira Gandhi Institute of Development Research (IGIDR) setup in Mumbai in 1987, Institute for Studies in Industrial Development (ISID) in New Delhi, Tata Institute of Social Sciences, setup in Mumbai in 1936, Centre for Development Studies affiliated to JNU was setup in 1971 at Trivandrum, Institute for Social and Economic Change established in 1972, at Bangalore) have been set up who are consistently engaged in interdisciplinary research and teaching in social development problems, agriculture, industry, poverty, health, economics etc. Besides this, there are other institutes also like Delhi School of Economics, Madras School of Economics, Gokhale Institute of Politics and Economics (Pune) who do teaching and research in the area of economics and social sciences.

Among well-known institutions catering to information technology is IIIT Bangalore, IIIT Allahabad, Atal Bihari Vajpayee IIITM Gwalior, IIITM Trivandrum. These are the institution of excellence in education, research, development, and training in basic and applied Information Technology and Management. Other noteworthy institutes in the field of information technology, computing and related field is the Centre for Development in Advance Computing (C-DAC) established in 1988. C-DAC, currently is engaged in various teaching and research programme which includes Software technologies, Enterprise

System Management (ESM), Geomatics, VLSI designs, Digital Multimedia, and the Programme for Advancing Computer Education - PACE. C-DAC has centre spread all over the India namely at Pune, Bangalore, New Delhi, Kolkata, Hyderabad, Trivandrum and Chennai.

India has also witnessed setup and running institutions in the area of Astronomy, Astrophysics, Theoretical physics, Physical and Life Sciences, Material Sciences, Plasma Research, Laser and their application, Theoretical Computer Science, Experimental and Theoretical Condensed Matter Physics etc. These are, for example, Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital, Indian Institute of Astrophysics (IIA), Bangalore, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune, Physical Research Laboratory (PRL), Ahmedabad, Raman Research Institute (RRI), Bangalore, S. N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkata, Centre for Advanced Technology (CAT), Indore, Harish-Chandra Research Institute (HRI), Allahabad, Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, Institute of Physics (IOP), Bhubaneswar, Institute for Plasma Research (IPR), Gandhinagar, Saha Institute of Nuclear Physics (SINP), Kolkata, The Institute of Mathematical Sciences (IMSc), Chennai,Variable Energy Cyclotron Centre (VECC), Kolkata, and Indian Institute of Science (IISC), Bangalore. The dynamism and the research capabilities shown by these institutes and their laboratory in their respective fields are known to every one.

Since, independence the creation and setup of Central Universities has gained momentum. There are 18 Central Universities at present under the purview of the MHRD, which have been set up by Acts of Parliament. 4 out of 18 are in Delhi itself, 4 are in UP, 2 are in Hyderabad, North-Eastern (including Kolkata) region has 6 central universities and the two others are at Wardha and Pondicherry respectively.

India has also witness, Institutions and Universities in the area of Legal and Law coming up. Some of the law universities for example Gujarat National Law University (GNLU) Gandhinagar, NLU Jodhpur, NALSAR University Hyderabad, NLSUI Bangalore, National University of Juridical Sciences, Kolkata, Tamil Nadu Dr. Ambedkar Law University, Chennai, Hidyatullah National Law University, Raipur, National University for Advanced Legal Studies, Kochi have done fairly well in terms of teaching and research in laws, cyber laws etc. Besides there are other important areas like dairy, agriculture, etc which needs special discussion.

India has witnessed an increasingly mediocre higher education system for decades. To compete successfully in the knowledge-based economy of the 21st century, India needs enough universities that not only produce bright graduates for export but can also support sophisticated research in a number of scientific and scholarly fields and produce at least some of the knowledge and technology needed for an expanding economy. But the important question is, where Bihar stands today in terms of higher education, research institutions etc. Let's look at some magical number of Bihar in terms of Universities, Technical Institutes, Research Institutions and Laboratory.

Number of Universities in Bihar: 11
Number of Law University: 0
Number of CSIR Lab: 0
Number of IITs: 0
Number of IIMs: 0
Number of Central University: 0
Number of Research Institutes for Physics, Astrophysics, Laser etc: 0
Number of IT and C-DAC Institutes: 0
Number of Life Sciences/Biotechnology Institutes and Centers: 0
Number of Institutes/ University/Research Institutes in Economics: 0
Number of Medical Universities: 0
Number of Mathematical and Statistical Institutes: 0

To add with, it is worthy to mention about the number of engineering colleges and medical colleges in Bihar. One can count it in finger, how many engineering and medical colleges Bihar is having. There are less that 20 medical and engineering college in Bihar, which is significantly lesser than those medical and engineering colleges of city like Pune, Bangalore, Chennai, Mumbai, Nagpur etc.

To continue with, let me put some statistics related to Bihar.

1. Even after Jharkhand was taken out of it, Bihar is India's third most populated state with a total population of 85 million.

2. Bihar has India's largest concentration in the below 25 years age cohort, with 58% in this category. It will retain this position till well into this century, which means that as India ages Bihar will

remain young! And what the young need most are health, education, and jobs.

3. It accounts for one-seventh of India's population below the poverty line i.e. nearly 40% of Bihar's population lies below the poverty line, the highest in India.

4. The state's performance lags seriously behind national trends. As opposed to an All-India per capita developmental expenditure (from 2000 to 2002) of Rs.6748.50, Bihar's is less than half at Rs.3206.00. The annual real per capita income of Bihar of Rs. 3650 is about a third of the national average of Rs.11, 625. In terms of per capita expenditures on Medical and Public Health, Bihar falls well behind with Rs. 86.20 as against the national average of Rs. 157.20. Despite this, its infant mortality rate (62 per 1000) is better than the national average (66 per 1000).

5. Educational enrollment and literacy rates are far below the national average. Bihar is also the only Indian state where the majority of the population - 52.47% - is illiterate

6. There are large differences in educational outcomes across gender, social and economic groups.

7. 80% of the bottom quintile household heads have no education.

For a change, let us look at the bright side of Bihar and Biharis.

1. It has a strong political clout in the national affairs with 40 members in the lower house and a large presence in the council of ministers.

2. Of the 700 students who qualified for IAS and IPS in the last 10 years, 25 per cent belonged to Bihar. According to a recent estimate, every district of the nation will be having either DM or SP as Bihari. Biharis are backbone of administration of the nation. The trend continues. Also, in recent years, large numbers of students from Bihar have been topping entrance tests conducted by Indian Institutes of Technology, IIM's, NIT's, CBSE medical etc. Talents of Bihar are going to different parts of the country and abroad to do research and higher studies etc.

3. The Patna model of taxation has earned much acclaim from United Nation (UN) and is now being copied by many countries. The states like Karnataka, Uttar Pradesh, Gujarat, Tamil Nadu and Madhya Pradesh have now adopted the Patna Tax system that helps simplify an otherwise cryptic and cumbersome tax structure.

4. The Cooperative Milk Producers' Federation Ltd, founded in 1983, is Bihar's own cash cow. Its Sudha milk and milk products is already the flavor of the state. Now it is extending its reach to other Neighboring states.

5. The state is self-dependent in grain production and is supplying rice to nearly some 13 states in the country. Begusarai district of Bihar is number one in maize production.

6. Bihar is ahead of many states in per capita deposits, getting Rs 7,000 crore annually.

7. NO one can defy that, Biharis are hardworking, intelligent, and sincere.

8. Bihar is a place of opportunity in terms of tourism, medical care, private investment, foreign and NRI investment, irrigation, infrastructure development, power sector, industrial sector and most importantly development of educational institutions that is the central theme of this article.

9. The infant mortality rate is 62 per 1000, which is below the national average of 66 per 1000. Even in terms of life expectancy, the average Bihari male lives a year longer (63.6 yrs.) than the average Indian male (62.4 yrs) and the state's performance in increasing life spans has been better than most during the past three years. Bihar has 7.04 mn. Hectares under agriculture and its yield of 1679 kgs. per hectare, while less than the national average of 1739 kgs. Per hectare is better than that of six other states, which include some big agricultural states like Karnataka and Maharashtra. Its per capita spending at Rs.484.10 on Education is as good as the best. AP spends Rs.493.90 and the national average is Rs. 586.80

Bihar has suffered a devastating loss of jobs, plight of central funds etc in the past few years. In addition, our state is burdened by high unemployment and lack of funds for good schools, universities, research institutions and 21st century technology and communications. Bihar is India's poorest and most backward state is undeniable. The facts speak for themselves. Bihar is not only the worst off of all Indian states, but also the gap between it and the rest is widening. But there is another reality as well, that is, India cannot progress without Bihar's advancement. It is much too big to be left behind. Thus, the development of Bihar is integral to India's development. India cannot go forward leaving Bihar behind. If India intends to grow at 10 per cent of GDP over the next few years, then Bihar is at present so behind that it needs to grow at 15 per cent to catch up with the rest of India.

Our state is lagging behind in many areas and we must find new answers to meet the challenges of educating and training our people in new

directions. I believe, strengthening our education system is the answer, from pre-school through our colleges, universities, and research institutions. Education is a basic right to which all children are entitled in the Bihar and India. There is a good reason for this: More than anything else, a solid education is the ticket to a better quality of life, including good jobs that pay decent wages and offer opportunities for advancement. And the benefits of education are more important today than they have ever been. Good academic institutions do not just lift educational standards of a state but also lift its morale, and lend it a status and an image that are imperative for the growth of a community. Providing this education to every young one's will go a long way toward fulfilling Bihar and India's promise of equal opportunity for all. More education means more choices in work and in life.

The Bihar government is putting lot of efforts to attract business through give-away programs like - tax credits and grants for infrastructure etc. But even when Bihar give them sugar coated tax deals, business and investment is not going to this poorest state because businesses want a strong educational system (apart from sound administration and better infrastructure facilities) for their workers and managers. To attract business, a state like Bihar needs a good transportation and communications system, a top-notch education system (in which Bihar is lagging manifold), a well-trained work force etc. The economic health of Bihar depends upon the investment in education system i.e. investment in temple of learning's. Bihar must support the public school fully and must make sure that every child should succeed. It must invest heavily in colleges and universities. Bihar must be competitive in terms of higher education and research based study. The data given above regarding the number of technical institutes, legal centres, research institutions etc reflects the current and pathetic situation of Bihar. There is so much being written about Bihari's talent in the field technology, medicine, research, etc. However, little attention has been paid as to the Bihar education system and temples of learning. None of Bihar universities occupies a solid position at the top in India. Bihar colleges and universities have become large, under-funded, ungovernable institutions. At many of them, politics has intruded into campus life, influencing academic appointments and decisions across levels. Under-investment in libraries, information technology, laboratories, and classrooms makes it very difficult to provide top-quality instruction or engage in cutting-edge teaching and research. Few in Bihar are thinking creatively about higher education. There is no field of higher education research. Those in government as well as academic leaders seem content to do the "same old thing."

Now as Bihar strives to compete with other developing and developed states of India, in the knowledge-based economy of the 21st century it require highly trained professionals, enough universities, good technical and management institutions, research labs, economics and development institutes etc. The quality of higher education becomes increasingly important. In broader terms, Bihar needs more and more temples of learning. The ancient Nalanda and Vikaramshila University in Bihar was a centre of learning that drew students from across the world. If Bihar and India Government takes initiative in opening up of new temples of learning and providing sufficient funds backed with sound administration to the existing educational system then that day is no far when it will bring back students who migrate to other states in search of better opportunities, the day is no far when Bihar will be standing in the first row in every walks of life whether its research, or job opportunities, or top notch colleges and universities, the days is no far when we can witness investment happening in Bihar, and finally the days of academic glory will be back.

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Human Resource Section

Human Resource Section

Review of the Effect of Indo-Pak relation on SAARC

Kumari Rashmi and Purnima Kumar

Abstract

In the present paper the attitude and relation between two important SAARC-member country India and Pakistan has been studied. The reviews on their differences like in establishment of SAARC (South Asian Association for Regional Cooperation), Kashmir issue, Terrorism and likewise in economic co-operation have been made. India and Pakistan have different views on different issues. According to Indian ideology violent activities happening in Kashmir are terrorism, Whereas Pakistan calls it freedom struggle for Azad Kashmir and indirectly supports those terrorist. Apart of Terrorism, the economic fears and political hostility have constrained the growth of trade and these obstacles have not been confined ties between India and Pakistan. The mutual behavior of India and Pakistan the two big countries as the member of SAARC, in population and area-wise, affects the motto and outcome of the SAARC. Visualising all that things, in 13th submit of SAARC, both the countries were willing to promote peace and co-operation in their personal relation for solving their common socio-economic problems.

Introduction

The South Asian Association for Regional Cooperation (SAARC), comprising the seven South Asian countries viz. Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka, formally came into existence in 1985 with the adoption of its Charter at first Summit in Dhaka (7-8 December 1985).[1, 2] The idea of regional cooperation was first proposed through 'a regional forum' by Bangladesh in 1980, with a view to holding periodic, regional-level consultations among countries in South Asia on matters of mutual interest and possible cooperation in economic, social, cultural and other fields.[3] The fundamental reason was primarily predicted on the premise that regional experiences elsewhere in the globe had been highly successful and that the countries in the South Asian region would benefited enormously from such cooperation, as it would strengthen their competitive position, both individually and as a group.

Infact, SAARC was founded in 1985 but has few achievements to show for itself due to nearly constant tension between its two important members, India and Pakistan. So, a review has been made on India and Pakistan's attitude on different issues, and how Indo-Pak relation affects the SAARC.

Review on India and Pakistan attitude

India and Pakistan as two counties are standing in front of each other having different ideologies, unable to establish a mutual acceptable power equation in south Asia. Affecting the national and international politics, India and Pakistan, as the member of SAARC, in population and area-wise, affects the motto and outcome of the SAARC. Both of the countries have adopted opposite approach towards each other on several occasions as follows:

Establishment of SAARC

At the time of the formation and establishment of SAARC, India and Pakistan, both had different thought and doubts. Pakistan was suspicious about the dominance of India in any regional structure due to its area, economy, military power, industry and science and technology.[5] Pakistan was trying to increase the number of muslim countries in SAARC by including Iran and Central Asian countries. India and Pakistan had different thought in this matter.

Violation of the SAARC-charter

The member countries of SAARC became failure several times to keep up with the objectives and spirit of SAARC as promised in SAARC Charter.

Many times Annual SAARC summit was postponed or extended due to misunderstanding between the members, which obviously violated the charter of SAARC. The sixth summit scheduled to be held in Colombo on 8th Nov. 1991 had to be postponed because India refused to go

there in absence of the King of Bhutan, Who had expressed his inability to participate because of domestic preoccupation. India insisted that the heads of all countries must be present for summit. The two SAARC members Sri-Lanka and Pakistan were blamed India for postponement of SAARC summit in violation of SAARC charter. Pakistan suggested that the charter of SAARC should be modified to avoid "Such disruptive postponement in future" like the recent one. The Jinx on the SAARC summit has not gone. The next summit scheduled in Dhaka for 12-13 December 1992 became a casualty of the aftermath of the destruction of the Babri Masjid in India. The large-scale violence that followed in Bangladesh and Pakistan despoiled the atmosphere for a summit. It was rescheduled for 14-15 January 1993, but was postponed because India insisted that Atmosphere was not right at that time for holding the summit. Pakistan again blamed India for violation of SAARC Charter and declared that it wanted to amend the SAARC charter and to raise bilateral issue.

Just after the Lahore journey of the former Prime Minister of India, Mr. Atal Bihari Vajpayee with objective to normalised the relationship with Pakistan, India had faced the Kargil war with the newly formed Pakistani military Government under the leadership of Gen. Parvej Musharraf.[9] Due to the tense situation between India and Pakistan the 11th SAARC summit which was to be held in November 1999 was postponed, and finally it held on 4-6 January 2002. So, the 11th SAARC summit was held two year later from the fixed scheduled date. Pakistan had complained that India was alone in proposing postponement of Kathmandu Summit on Nov. 1999 in clear violation of SAARC charter.[10] The "Mukti-Paani" Peoples' Forum, Kathmundu reiterated that the excuse given for not holding the 11th SAARC summit was against SAARC Charter and spirit. Therefore, such excuses were not congenial for the spirit of co-operation, sense of unity and therefore were directly against the interest of the peoples of the region. The 12th SAARC summit scheduled to be held on 4-6 January 2003 was also postponed for one year due to India's absence in the summit. Pakistan's demand of public-poll in Kashmir under the UNO control (United Nation Organisation) was the big hurdles for Indo-Pak peace talk. Due to the Pakistan's adamant on Kashmir issue, which was to be raised on the dias of SAARC by Pakistan, India refused to attend the 12th SAARC summit to be held at Islamabad in 2003.[11] On 17th December 2003 Pakistan's President Gen. Parvez Musharraf proposed India to solve Kashmir Issue, assuming this as bilateral issue, and the way for normalising the Indo-Pak relation opened.[12] Thus, the 12th SAARC summit was held after one year on 4-6 January 2004 at Islamabad.

According to the SAARC charter Bilateral and contentious issues are excluded from its deliberations. India and Pakistan both were agreed not to raise their difference for SAARC consideration, while constituting SAARC.[6] Inspite of knowing the above facts and rules, Pakistan always raised its bilateral issues with India on the forum of SAARC. Pakistan had been making its amply clear that no worthwhile progress could be expected unless India resolved the "core problem" of Kashmir to Pakistan's satisfaction.[12, 13] India stoutly resisted that these attempts of Pakistan were the violation of social and main charter of SAARC. In social charter of SAARC all members' countries must cooperate for the development and peace of the region. But Pakistan denied it, giving importance to Kashmir issue. While the issue itself considered in a separate section on SAARC, it may be noted here that Nawaz Sharif made use of the 6th SAARC summit at Colombo to denounce India and raise the Kashmir Issue. During 8th SAARC summit on 2-4 May 1995 in New-Delhi the King of Bhutan and Prime Minister of Bangladesh favored member countries manifesting the will to make use of informal bilateral consultations during summits to resolve existing problems and difficulties. Later on SAARC members accepted it.

Economic Issues

Apart of terrorism, the economic fears and political hostility have constrained the growth of trade and ties between India and Pakistan. Infact, before the 12th summit denying MFN status to India by Pakistan and imposing curbs on it, created obstacles in the development of SAARC economic cooperation and this way Pakistan has violated the WTO charter as well as the SAARC charter, as it is related with regional economic cooperation.[14]

SAPTA's modified form i.e. SAFTA (South Asian Free Trade Area) was signed finally during 12th SAARC summit, which was held on 4-6 January 2004.[15] The transformation of SAPTA to SAFTA had taken a long period i.e. about 10 years. The difference between India and Pakistan resulted the formation of sub-regional economic cooperation Bangladesh–Bhutan-India-Nepal

growth quardenga (BBIN-GQ) inside the association.[2] Pakistan blamed India to isolate Pakistan inside the SAARC, but India denied it by expressing its willingness to extend sub-regional cooperation with Pakistan. Pakistan says here that before confirming economic co-operation we must resolve our conflicts over political issues. On the other hand India is primarily interested in regional economic integration and secondarily political issues.

Reason of Differences

It is not a matter of surprise on having different and opposite approach toward each other. India and Pakistan as the division of Indian sub-continent region was an unwanted gift of British withdrawal. The main reason of their differences is Kashmir issue. Nuclear issue is also an important point of dispute. Both countries have increased nuclear capability, for the defense. Specially, Pakistan has taken critical Chinese assistance like important component M-11 Ballistic Missile.

External intervention in South Asian region is also an important reason of tension between India and Pakistan. In the middle of March in Year 2004, when Indo-Pak peace talk was booming with hope and trust, the decision of USA to grant the status of 'Major Non-NATO ally (MNNA) to Pakistan caused major heartburn in India.[27] However, the US was willing to consider the similar arrangement with India, but India rejected it. Power competition between the United States and the Soviet Union and between the China became intertwined with the conflicts between India and Pakistan, so that India was unable to achieve its aim of insulating South Asia from power politics. These so called superpowers always tried to use Pakistan as their interest.

Conclusions

SAARC is comparatively a young association in respect to other regional association but with genuine political will, especially on the part of India and Pakistan, it can grow into a living symbol of South Asian regional cooperation. Neither India nor Pakistan should force each other to accept a solution on Kashmir of their choice. Both of them need to initiate a purposeful dialogue. They had to manage their differences and conflicts that is the part of diplomacy. There is no need to use SAARC to solve the differences between India and Pakistan. Simultaneously, Economic fears and political hostility have constrained the growth of trade and these obstacles have not been confined ties between India and Pakistan. .

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A Guide to Personality

Mohammad Arshad Hussain, Saudi Arabia

This article is for the promotion of individual understanding of the theories and practical applications of personality. I hope after studying this article, you will gain a deeper understanding of personality and know yourself better.

Development of Personality

Introduction

You know that different people have different personalities. Each individual is different; but why? What is it that causes these differences? What is the origin of these differences? This is one of the most fundamental questions that psychologists face. This is also the base question of biology / behavioral genetics.

Behavioral genetics combines psychology and genetics to study genetic influences on behavior. These behavioral geneticists study which psychological characteristics, such as temperament and emotional stability, are passed on from parent to child. They try to determine what percentage is related to differences in genes and what percentage is related to environmental differences.

Psychologists say that there are two main factors that affect the development of a person's personality. They are genetic factors (some call this factor "Nature") and environmental factors (also referred as "Nurture"). Psychologists have, in the past, had disputes over the topic of "Nature VS Nurture." "Nature VS Nurture" indicates that biological and environmental factors compete against each other to develop a person's personality. Also, one of these two factors may be more dominant than the other. Scientific discoveries have shown to us now that both of these two factors are needed for a person's personality to develop normally. Psychologists are now interested in finding out to what extent each of these competing factors affect personality development.

Genetic factors

Biological factors such as our hormones and brain structure influence our behaviour, but our genes do not have programs for specifying our personality traits. Their actual job is to control the development of our nervous and endocrine systems, which in turn controls our behaviour. Therefore, our genes do not have direct control over our personality traits, but they do have a role in influencing our behaviour. Complex human behaviour is not determined by a single gene.

As seen from the above, genetic factors play a major part in the formation of personality, but not every personality characteristic is originated from genetic makeup. We will look at how genetic factors affect environmental factors and their correlation in personality development later.

Environmental factors

Most experts believe that child's experiences in the family are important for his/her personality development. These include whether a child's basic needs are well met and how a child is brought up, which could leave an enduring mark on the child's personality.

How about culture and society then? Do the culture and the society we are brought up in affect our personality?

Researchers, when comparing cultural groups in specific aspects of personality, have found some interesting differences. Northern European countries and the USA have individualistic cultures that put more emphasis on individual needs and accomplishments. Asian, African, Central American, and South American countries have collectivist cultures that focus on belonging to a larger group, such as a family, tribe, or nation. In these cultures, people believe cooperation is more important than competition. Individualistic cultures and collectivist cultures are very different.

As seen from the above, the environment we grow up in, including the home environment with the influence of parents and siblings, and the culture and society plays an important role in personality development too. Now we will look at the interaction and correlation of genetic and environmental factors.

Interaction of Nature and Nurture

Most psychologists today agree that not only both heredity and the environment play a role in the development of personality, but also that these two interact to influence the development of personality.

A person's temperament is formed both by genes and environment. Researchers state that the continuity and discontinuity of temperament is a result of the interaction between the inherited characteristics of the individual and the environment. They especially believe that in order to have a healthy development, there must be a good fit between the individual's temperament and the home environment. When parents of a difficult child give him/her a happy, comfortable and stable home life, the child's negative behaviors will improve as he/she grows older.

Most behavioral traits are multifactorial, which means they depend on more than one genetic or environmental factor. Even from the moment of birth, biological factors and environmental factors are interacting to form a person's personality. Parents not only pass on their genes to their offspring but also provide them with a home environment to live in, both of which are results of the parents' genes. There is a correlation between the child's inherited characteristics, which is called genotype, and the environment. Here is an example to illustrate. Intelligent parents will have a higher chance of giving birth to intelligent children. At the same time, intelligent parents will be more likely to provide their children with a good learning environment, one which is intellectually stimulating, by teaching their children themselves and giving them books, lessons, activities and so on.

Environmental influences outside the family environment, such as school and friends, are often more important to the development of personality. However, these apparent "outside influences" may have more to do with genes than it would seem at first. People seek out or even create environments to which they are genetically predisposed. For example, a combative person is more likely than a peace-loving person to find an environment in which arguments are likely to take place or to create such an environment by starting fights.

As seen from the above, an individual's genotype and the environment are not just independent sources of influence that add together to form an individual's personality. The genotype is in correlation with the environment. An individual's genotype also shapes the environment. Interaction and influence of heredity and environment with each other form a person's personality.

Behaviour consistency

By now you should know that personality is fairly fixed patterns of our thoughts, emotions and behavior under different circumstances. Our personality makes us act in certain ways; it gives us a consistent tendency to behave in a certain manner. Therefore, consistency is a core concept of personality. But how stable is our behavior? Different psychologists have different opinions. There has been a lot of research on stability of behavior over time and across situations, which is behavioral consistency.

There has been research on the study of stability of children's behavior; however, there have been different interpretations on the results because some behaviors and some phases in development are more stable than the others. An example of a reasonably stable behavior pattern is aggression. Children who appear to be aggressive may grow up to be aggressive adults. Generally, children's behaviors become more stable as they become older.

Personality and profession

Our personality is influenced by biological and environment factors. Biological factors (genes) are inherited from generation to generation. Environmental factors are Social Culture, Home, School, Temperature, Climate, and Political Situation etc. Our personality is developed in years by the influence of those factors. Therefore, individual should choose a profession where he / she can find similar group of people and environment. It helps an individual to perform better and compete for the best. If an individual

works with different mindset people and in different environment, he / she will not feel comfortable and performance graph will decline. One has to be very serious about his or her professional career right from the school days. He / she has to try to choose a career according to prevailing situation and move within the framework of that ambition. Managing the factors influencing our life is the key factor to deliver desired results in profession, family, society etc. To manage those factors we should adopt 5Ps, i.e., Prior Planning Prevents Poor Performance.

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Knowledge is Power

Posted by Sri Swayam Prakash, Ajmer, India

"KNOWLEDGE capitalism" is an important outcome of the information revolution. It recognises "knowledge" as the most precious asset of human beings and "knowledge management" (KM) as the reason for the success of various organizations. Learning organization (LO) is a new concept which has emerged as a result of the research conducted for devising strategies for organizations to implement KM for their survival in today's competitive world. Universities are recognized to be in the knowledge business and are increasingly exposed to market pressures in a similar way as the other organizations. The role of universities has, in many respects, remained unchanged for centuries. The advancements in educational technologies, diversified expectations of learning achievements and the invention of new learning methodologies forced universities to change their conventional role and adopt new strategies to play their role in the changing world. KM may have something to offer to universities; nevertheless proper planning and implementation strategies are required.

Knowledge Management (KM) is, today, the subject of much debate. Although there is a recognition of knowledge as a key business asset, organizations are still in the early stages of understanding the implications of KM, while a fair percentage of senior managers believe that KM may just be embellished information management and Business Process Re-engineering (BPR). As many BPR efforts proved futile, there concern is that KM may fall victim to the same perils. However, research shows that KM gives an edge to organizations to compete market with intelligence, creativity, and originality. It also helps organizations to sustain their growth, marshalling the skills and expertise of their employees.

Like other institutions, universities are also increasingly exposed to market pressures. The advancements in educational technologies have diversified expectations of learning achievements. Inventions of new learning methodologies have forced educationists to devise strategies for facilitating them in developing marketable quality product. KM may have something to offer to universities; nevertheless proper planning and implementation strategies are required.

Knowledge belongs to the family of steadily increasing invisible assets of mankind. In the era of knowledge-based economies, it remains easier to understand knowledge at a more abstract level than by defining data as a set of raw facts, information as an organized set of data and knowledge as meaningful information. Zeleny defines knowledge as the understanding, awareness, familiarity acquired through study, investigation, observation or experience over the course of time. It is an individual's interpretation of information based on personal experiences, skills and competencies. Knowledge is seen as neither absolute nor universal. It is local, changing and has to be reconstructed regularly on the basis of experiences. Knowledge leads to wisdom, acquired as an individual gains new knowledge through the transformation of collective experiences and expertise.

Human beings acquire two types of knowledge — explicit and tacit. Explicit knowledge is described in formal language, like mathematical expressions, statements in textbooks, etc. Whereas tacit knowledge is automatic, resembles intuition and is oral. It is highly personalized, context sensitive, hard to measure and difficult to capture and manage. Tacit knowledge is usually considered less valuable than explicit knowledge. Nevertheless, current research has proved it as an important asset to organizations. Proper usage of tacit knowledge is essential for gaining competitive advantages. For this purpose, organizations need to share their tacit knowledge through expressing and demonstrating their beliefs, perceptions, skills and expertise.

Another aspect of knowledge is that it becomes ephemeral with time. Many of today's truths become tomorrow's fallacies. It has been observed that new knowledge is usually more tentative than facts that have been tried and proven over many generations. Hence, the ability to verify new knowledge has become more important. In parallel, the knowledge required for problem-solving and decision-making is usually context sensitive. For making knowledge more practical, generalisation is required which is not an easy task.

KM, generally, defines the process through which organizations generate value from their intellectual and knowledge-based assets by sharing them among employees, departments and even with other companies to devise best practices.

For implementing KM, organizations need to encourage the process of transforming tacit knowledge into explicit knowledge, to manage the process of "change" and to make knowledge available and accessible company-wide. A nine-step approach to KM could be considered in this regard. The steps are: transform information into knowledge, identify and verify knowledge, capture and secure knowledge, organize knowledge, retrieve and apply knowledge, combine knowledge, create knowledge, learn knowledge and disseminate /sell knowledge.

In general, the organization, distribution and refinement of knowledge are considered to be the most important tasks in KM. Customized or third party KM tools can be used for this purpose. These tools organize collected knowledge by indexing the knowledge elements and offer various facilities like filtering knowledge based on content, establishing relationship among elements, etc. The insights from the decision support applications can be used for refining the existing knowledge and feedback into knowledge organization.

Displaying knowledge to the organizational members is another important area. Organizations need to devise standard format for this purpose, otherwise it may cause difficulties for the authorities concerned to reconfigure, recombine and integrate knowledge from distinct and disparate sources. Adapting easy to understandable formats could make the process of KM much easier. Knowledge sharing is also an important aspect of KM. Information and communication technologies have provided a perfect platform for knowledge sharing and the emerging technologies can further advance it.

Traditionally, universities have two main roles: creating and disseminating knowledge where research is the main vehicle for creating it and teaching for disseminating it. Technological advancements have changed the nature of and the role of education profoundly.

Today's knowledge-oriented society has opened up new horizons for universities. For playing their continuing role in today's society, universities must consciously and explicitly manage the processes associated with the creation of knowledge assets, and recognize the value of intellectual capital. One challenge that universities occasionally encounter is the complaint that graduates do not possess the knowledge and skills that the global market demands for a secure future. The students' needs are increasingly seen to be continuous throughout their working life and require periodic up gradation of knowledge, skills and competencies.

Such disparity raises new concerns regarding the role of universities and demands for creating a flexible and innovative relationship between work and education so that students can match their talents with current workplace demands. For this purpose the reconnection of learning with experiences is required so that work should no longer be seen as something that happens at a later stage in life. These goals can be achieved by transforming universities into learning organizations adopting KM. Nevertheless, it requires serious planning and considerations.

There is, however, no single model or specific structure of a learning organization. A learning organization strives to create values, practices and procedures in which learning and working become synonymous throughout the organization. In this regard, the following recommendations could be considered:

1. Mission statement, vision, philosophy, goals, objectives, and expected outcomes must be defined and be available to all.

2. Learning of all should be central in universities.

3. Information technology (IT) should be used to automate universities processes to reduce fragmentation and duplication of information.

4. E-culture should be established for knowledge, information and resource sharing.
5. A strong structure of governance should be created.
6. The total cost of learning must be reduced.

7. Long-term policies and strategies should be designed for promoting compulsory and optional learning activities for all.

8. Employees must be encouraged to improve their qualification, skills and competencies through benefits.

9. Learning committees and special interest groups of employees should be established by incorporating members from industry, concerning organizations and other stakeholders.

The above recommendations above underlie the effective deployment of KM in universities for converting them into learning organizations where work should be viewed as part of a "progressive" curriculum and not just paid employment. Current human achievements have propelled universities to reconsider their role in today's knowledge-oriented society. In order to sustain their role, universities must consciously and explicitly manage the processes associated with the creation of knowledge assets.

Nevertheless, appropriate ways to monitor the intensity, volume and effectiveness of the knowledge assets embedded in the organization are required. In any case, it should not be overlooked that the present era requires knowledge management in universities for the sustainability of life-long learning or action learning, thus, developing all elements of human competence.

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Right to Information Act

Lalit Kumar, New Delhi, India

In recognition of the need for transparency and accountability in the working of every public authority, the Indian Parliament enacted the Right to Information Act in 2005. The Act provide for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities in order to promote transparency and accountability in the working of every public authority. The Act extends to the entire country except State of Jammu and Kashmir. Under the Act the Public Authorities are required to designate Central Public Information Officers or State Public Information Officers, as the case may be, in all administrative units or offices to provide information to persons requesting for the same under this Act. The public authorities are also required to designate authority (ies) senior in rank to CPIO, as Appellate Authorities, who will entertain and dispose off appeals against the decision of the CPIO as required under the Act. A person who desires to obtain any information under this Act has to make a request in writing accompanying a fee of Rs. 10/- by way of (a) cash against proper receipt, or (b) demand draft bankers' cheque payable to the Account Officer of the Public authority concerned to the Central Public Officer or State Public Information Officer, as the case may be, specifying the particulars of the information sought by him or her. However, the information disclosure of which would prejudicially affect the sovereignty and integrity of India, the security, strategic, scientific or economic interests of the State, etc, are not open to disclosure.

2. On receipt of the request, the Central Public Information Officer or State Public Information Officer shall as expeditious as possible, and in any case within thirty days of the receipt of the request, either provide the requisite information on payment of such fee as may be prescribed (Rs. 50/- per diskette or floppy and for information provided in printed form at the price fixed for such publication or Rs. 2/- per page of photocopy for extracts from the publication) or reject the request for any of the reasons specified under the Act. Where the information sought for concerns the life or liberty of a person the same has to be provided within forty-eight hours of the receipt of the request. Any person who does not receive the decision from CPIO either by way of information or rejection within the time frame, may within 30 days from the expiry of period prescribed for furnishing the information or 30 days from the date of receipt of the decisions, prefer an appeal to the Appellate Authority.

3. Under the Act, the Central Government and all the State Government were required to constitute Central Information Commission (CIC) and State Information Commissions (SICs). Where the Central Information Commission or the State Information Commission at the time of deciding any complaint or appeal is of the opinion that the Central Public Information Officer or the State Public Information Officer has without any reasonable cause refused to received an application for information or has not furnished information within the time specified or malafidely denied the request for information or knowingly given incorrect, incomplete or misleading information or destroyed information which was the subject of the request for obstructed in any manner in furnishing the information, it shall impose penalty of Rs. 250/- each day till application is received or information is furnished, subject to maximum of Rs. 25,000/.

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NRI Experience

First time arrival experience of South Korea

Dr. Manis Kumar Jha, Daejeon, South Korea

Nobody wants to leave his mother land if good possibilities and opportunities are available in his own country? We Indians have our glorious past…but just due to changes in moral values and lack of good leadership, large no. of un-employment; job un-satisfaction, brain drain has been started. Some people feel it is better to brain-drain in comparison to "brain in drain".

Any way I want to share my experience of arrival in Korea. When I was coming first time to Korea from India. I was a little tensed due to the previous feed-back of language problem. Anyway I reached Incheon air-port safely. A Korean young and smart boy was waiting at air-port to receive me. I became very surprised as he asked me Dr….and repeated two times loudly. I became very happy and my tension goes away as some one was now there to take me to my right work place. But he immediately asked me "Are you going to meet Prof. Reeki-Jong", then I believed he was the wrong person, because my Professor's name was Leeki-Jong. I immediately said him sorry and started searching the right person. But that young boy has shown me his Identity Card, Professor's visiting card……etc then I was convinced that he was the right man. So after taking break fast, Journey for my institute was started. When I reached institute Prof. Leeki-Jong was very happy to meet me and he asked me "Would you like to take "Low fish"?? I thought low fish means "small fish". I said "Yes". But Prof. seems to be very surprised and said that you are a special Indian, very good, generally Indian people do not like low fish…..Then I was again confused…I asked "Sir, Could you explain me the method of preparation?"….He answered me that it needs not any special preparation. Simply clean fish and take it directly……I said that it is impossible for me.

Second day meeting was started. One researcher was presenting the paper was related to LEAD metal; he was speaking RED in place of LEAD. Now I understood what is the real problem?

Actually Korean Pronounce L as R, and they pronounce R as L. So he wants to ask me would you like to take ROW fish. Now I started laughing and share these pronouncing problems with Koreans. They also started laughing.

Living in Korea

Minakshi Bikramaditya, Daejeon, South Korea

This is my first experience of visiting any foreign land on 3rd April, 2006 with my husband Mr. Bibhuti Bikramaditya. After landing at Incheon Airport which is one of the top 5 airports in the world, I found myself in a different world. I was stunned after having a look to this beautiful & ultra modern country. It was spring season when I came here. While traveling from Incheon airport to my house at Daejeon city of Korea, I saw six lane roads, only cars and buses on these roads, flowers were blooming all along the roadside, bus was passing by tunnels and islands. That scenic beauty was soothing my eyes. The Daejeon city (one of the metropolitan city of Korea) is around 250 km from the Incheon airport but what a magic,, Bus which was air-conditioned took only 2 hrs to reach at the destination. Though we were tired because of 8 hours long flight journey, we didn't find any jerk in the bus.

As soon as We reached at house in apartment provided by the company, I found house well equipped with all modern facilities, like electronic room heaters cooking gases pipeline, Freeze, air conditioner, washing machines and very amazing thing was that everywhere electronic sensors, I can not enter my house without giving password to the main gate of apartment but if you are coming from house, main gate was automatically opened. Looking all these things in a very first day, I was surprised; I found myself as if I am in a wonder land.

Within few weeks, I got time to visit Seoul by KTX the fastest train of Korea and second fastest after Japanese Rail which runs at 300 km per hour and it took only 50 minutes to reach from Daejeon to Seoul. Seoul which is capital city of Korea is a beautiful where it seems half of the population runs under the subways. They developed subway in a much planned way. I was thinking how they maintain these three storey subway under the earth, every one leads fast life. Everywhere I saw use of CCTV, not only in the govt offices and companies but also on the roads to control traffic systems, "Big-big TVs" on every "chauk – chauraha" ,every nook and corners. There was my marriage party in one Indian restaurant called "Chakra" which is at famous place; you can say foreigner's land of Seoul called Itaewon. And we decided to go by Taxi; I saw taxi equipped with telephones, wireless, Air conditioners, TVs, Radios and more than this they were using GSM which was automatically showing the path where we had to go. In India, people now started to think to implement GSM at specific places, but here it is common. By seeing all this, I was thinking

"Kash Bharat Ka Bhi Har Shahar Aisa Hi Hota".

Now I am living here for 6 months and let me give you some information about people and their lifestyles.

In my view, Korea is an ultra modern country. Korean people are very polite, co-operative in nature. Even though they do not understand much English, they put their whole effort to help foreigners. They have a rich work culture. They toil very hard. And the most important thing that I noticed is, there is not much difference between the poor & the rich. Middle class people constitute the major population of Korea.

Each hand has a job. Every people enjoy his weekends with family and friends at places like beaches, resorts, islands etc. There are many islands; Jeju Island is very popular among them because of beautiful beaches, village folks, strange caves and beautiful resorts. Korean Govt wants to develop this island as best tourist spots and also commercial center of Korea like HONGKONG.

Buddhism & Christianity are the two major religions here. But many Koreans do not believe in any religion. Churches are very frequent. You can find one church after a distance 100 m but Buddha temple are located over mountains. It is very hard to climb over those Rocky Mountains. The popularity of Budhism is decreasing day by day.

Koreans have good respect for Indians not only because of Buddhism but also because of our talents and intelligent brains. They are very much curious to know about our culture, lifestyle and religious fervor.

I have met many Koreans who visited India. There was one incident happened with me that I never forget. It took place in Itaewon. I was walking through subway when I met that boy. He said me hello. When I answered him then he asked me "where are u from?" he seems happy after hearing that I am from India. He told me that he has visited

many places in India. He explained his experience while traveling tourist places in India particularly "Taj Mahal of Agra, places of New Delhi, Mahal of Jaipur and Varanasi etc more than this, he also sang India's national anthem ***"Jan Gan Man Adhinayak Jay Hey Bharat Bhagya Vidhata".*** I was overwhelmed by hearing our national anthem from a foreigner's mouth.

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Interesting Facts & Articles

Interesting Facts & Articles

Let Einstein Help You Board Your Plane

***Dr. S.G.T Bhatt**, Daejeon, South Korea*

FROM YOUR chair in the departure lounge you can already see the plane, tanks topped up, ready to go. All that stands between you and a speedy departure are your fellow passengers.
"Ladies and gentlemen, we are now ready to begin boarding..."

The surge begins, and within a few minutes you are all hopelessly backed up in the bridge onto the plane. It's enough to give you air rage. What's so hard about getting into a seat?

You may not realize it, but it's a question with cosmic significance. While shuffling on board a plane feels like a distinctly Earth-bound experience, there's more to it than that. In what appears to be the first out-of-physics application for Einstein's theory of relativity, it seems the answer to faster boarding lies in a trip through space-time.

And, you'll be glad to hear, this approach shows there really are ways to improve the experience.

A few seconds' thought will give you some of the options airlines could consider. One is random boarding: everyone for themselves. This is not as chaotic as it sounds, but nor is it edifying, and seems unlikely to be the most efficient approach.

At the other extreme you could be ultra-organized and specify the exact order in which you want everyone to queue up. In such a rigidly marshaled scheme, however, you'd spend so much time ordering people about that it would be no better than a free-for-all. And any airline that tried to be that bossy would quickly find itself without any passengers to worry about. After all, one person's orderly queuing protocol is another's intolerable control-freakery.

In between lie myriad options: calling passengers by rows, half-rows, blocks of rows, back-of-plane-to-front-of queue, and "outside in" - window seats first, then middle, then aisle - and so on. They all sound reasonable enough, but there's scant evidence to prove that one is better than another. Isn't there a more scientific way to work this out?

Enter Eitan Bachmat and his colleagues at Ben-Gurion University of the Negev in Israel. Bachmat wasn't initially aiming to solve the problem of "enplaning", as airlines rather grandly call it. He was studying the performance of digital storage systems such as PC hard drives, looking at how to read and write data most efficiently. Say you send your hard drive a big bunch of read/write requests. What you want to know is the quickest way to carry out those tasks. How do you find the fewest drive rotations needed to do the job?

Boarding for bozos

One day a colleague who saw this work said, "Hey, that looks a lot like airplane boarding," and so Bachmat and his colleagues decided to explore this parallel route. "We thought we could do this and take stuff back to the hard drive problem," he says.

The first step, they realized, was to see what actually holds things up when you're waiting in the aisle of the plane. While that bozo up ahead of you is hunting for his iPod and then trying to jam that stupidly big bag into the locker before taking his seat, everyone behind is either standing waiting to get past - or, if they have already reached their row, doing pretty much the same thing as the bozo. Once those passengers have sat down, everyone moves on a bit, and the process repeats itself. At each stage, some passengers remain blocked by those in front: the blocked wait their turn, and then become blockers, and so on. What everyone wants is to find a way to minimize the time from the start of boarding until the last person sits down and buckles up. This is easy enough in simple approximations, but as soon as your model includes variables like distance between rows, width of passengers' bodies, time taken to stow luggage and so on, it quickly becomes intractable.

Fortunately, physics has something to say about problems like this. Odd as it may seem, it occurred to Bachmat and his colleagues that the way passengers fill up a plane looks like relativity's description of how things move through the four dimensions of space-time under the influence of gravity.

According to relativity, an object in "freefall" follows the trajectory that ages it the most. Throw a stone into the air: it will trace out an arc and return to the ground. Attach a stopwatch to the

stone and you would see that, out of all for really high congestion, random boarding soon becomes the better option. For the moderate-squeeze conditions that are the reality for most of us, the best balance is a high level of row randomness combined with a touch of back to-front.

"For moderate-squeeze conditions the best balance is a high level of row randomness combined with a touch of back-to-front"

Unsurprisingly, you can improve things significantly if you can persuade people to arrange themselves in window middle-aisle order for each row. Teaming that with a bit of back-to-front helps, but row order makes relatively little difference compared with the order within each row. "Unless you can really force passengers [to do what you want playing with the row orders isn't going to get you very far," says Bachmat.

What also emerged is that boarding time is proportional to the square root of the number of passengers. Considering how complex things become as the numbers increase, that's actually not bad, but it still has significant implications for today's ever-bigger airplanes, like Airbus's 555-seat super jumbo, the A380. Airbus has clearly anticipated the problem - even without the aid of relativity. "You can get people in on two different levels at once," says spokesman Justin Dubon. "It's tantamount to loading two planes at once." In tests on real aircraft, all 555 passengers could be seated in just 22 minutes, compared with 21 minutes for the 471 passengers on a 747.

So are Bachmat and his colleagues sledge hammering a trivial problem by using relativity? Hendrik Van Landeghem of the University of Ghent in Belgium doesn't think so. Working with Ghent colleague Annelies Besuselinck, Van Landeghem carried out a simulation-based study in 2002 (see "All aboard"), and he is impressed by Bachmat's further step. "I actually think it was fairly original that they attempted such a thing. If you are able to validate simulations by mathematical formulation it strengthens both approaches." Maybe he is pleased because the results tally well with his own. "It has validated what we did, which means that we did a good job," he says.

Airlines themselves remain oddly uninterested in any of this work, however. Van Landeghem did manage to establish collaboration with Belgian airline Sabena, but the airline went bankrupt before they could take it forward.

There has been no further interest from any airline, Van Landeghem says. Neither has Bachmat been offered a chance to try out his new application for relativity. "I would be very happy if an airline that does unassigned boarding would work with us," he says.

Aside from honing their boarding policies, what else could airlines do? One thing stands out a mile: "Widen the aisle, to make it one-and-a-half person to allow bypassing, that would have the single greatest impact," says Van

Landeghem. Bachmat agrees: "If you had several entrances and more aisles that would help."

You are unlikely to see airlines ripping out seats to make more space any time soon, but there are things passengers can do to ease things along. "Keep your distance from your peers to lower the congestion parameter," says Bachmat. And obviously, take less carry-on luggage with you. "Be disciplined," he says. So next time you're surrounded by dithering travelers as you board your plane, take comfort from the fact that you're all acting out some very clever physics. "I think it's exciting," says Bachmat. "It's kind of nice that you can tell people that they compute a relativistic calculation with their feet."

***About the Author**: This article was posted by S.G.T Bhatt who is working as senior scientist at KRICT, Daejeon, South Korea and in India he worked as vice president of ONGC. This article was taken from New Scientist for which he is a member.*
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Some Interesting Facts

Lalit Choudhary, New Delhi, India

- The queen of England does not have the right to vote in any British election.
- The queen of England has two birthdays.
- The Queen termite can live up to 50 years and have 30,000 children every day.
- The raised reflective dots in the middle of highways are called Botts
- The Ramses brand condom is named after the great phaoroh Ramses II who fathered over 160 children.
- The rapid rate of expansion of gas is what gives steam its power. One volume of water, at normal atmospheric pressure and at the boiling point, yields 1,670 volume of steam.
- The reason firehouses have circular stairways is from the days of yore when the engines were pulled by horses. The horses were stabled on the ground floor and figured out how to walk up straight staircases.
- The reason most mosquito bites itch is because mosquitoes inject saliva into the persons skin before they suck your blood. They take it out once they are done, but if they are forced to fly away, they don't get a chance to draw the saliva out. And it is their saliva that causes the itch.
- The reason why the very beginning of The Wizard of Oz is black and white, is because color was not available at that point. When color was available, the writers decided to start using it in Munchkinland.
- The record for the biggest one day rainfall was set on Reunion Island in the Indian Ocean, on March 15, 1952, where 74 inches of rain fell in 24 hours.
- The record for the most weddings is held by King Mogul of Siam, who had 9000 weddings and 9000 wives.
- The red capes used to taunt bulls in bullfights are the same shade of red as the bull's blood. That way you can't tell it is covered with the bull's blood by the end of the fight. Fight spectators like bullfighting, but not blood.`
- The red kangaroo of Australia can jump 27 feet in one bound.
- The red sea is not red.
- The red spot on the 7up cans comes from it's inventor. He was an albino (albinos have red eyes).
- The regular garden variety caterpillar has 248 muscles in its head.
- The Republic of Israel was established April 23, 1948.
- The revolving door was invented August 7, 1888, by Theophilus Van Kannel, of Philadelphia, Pennsylvania.
- The Ribbon worm will start eating itself to avoid starvation
- The ridges on the sides of coins are called reeding or milling.
- The right lung is slightly larger than the left
- The right side of a boat was called the starboard side due to the fact that the astronavigators used to stand out on the plank (which was on the right side) to get an unobstructed view of the stars. The left side was called the port side because that was the side that you put in on at the port.

- The river Danube empties into the Black Sea.

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- The rose family of plants, in addition to flowers, gives us apples, pears, plums, cherries, almonds, peaches and apricots.

- The rosy periwinkle plant, found in Madagascar, is used to cure leukemia.

- The rumble that is created when a Harley's engine runs has been patented by the company

- The Russian Imperial Necklace has been loaned out by Joseff jewelers of Hollywood for 1,215 different feature films.

- The S in Harry S Truman stands for nothing.

- The safety pin was patented in 1849 by Walter Hunt. He sold the patent rights for $400.

- The Sahara Desert expands at a rate of about 1 km each month.

- The Sahara desert is larger as Europe and large then the combined areas of next largest 9 deserts.

- The Sahara Desert is over twice as big as the second largest desert in the world, The Australian Desert. The Sahara is 3.5 million square miles compared to the 1.47 million square miles of the Australian. This is "true" in the generic sense of the Australian Desert. There is no Australian Desert. It is divided into many different deserts. What would be true would be to say the Sahara is bigger than the desert space in Australia (which is A LOT not sure how much as a percentage of the total land mass of Australia).

- The sailfish can swim faster than a horse can gallop.

- The saluki is the oldest known breed of domesticated dog. Carvings of animals resembling the saluki have been found in excavations of the Sumerian Empire. They are believed to have originated from between 6,000 and 7,000 B.C.

- The salute of uniform bodies (eg. army, police) originated from knights who lifted their visors to show their face to a royalty.

- The same material that is used to make bulletproof glass is also used in Tupperware's Rock 'n Serve containers. The container, however, is not entirely bulletproof. Due to the lifetime warrantee on Tupperware products, the company will replace it for FREE! (Just in case you're in quick need of a shield and a Rock 'n Serve is the only thing handy)

- The San Diego Zoo in California has the largest collection of animals in the world.

- The sandwich is named for the Fourth Earl of Sandwich (1718-92), for whom sandwiches were made so that he could stay at the gambling table without interruptions for meals.

- The Santa Maria was the only one of Columbus's ships not to return to Spain. It hit a reef on December 5, 1492 and sank.

- The saying 'once in a blue moon ' refers to the occurrence of two full moons during one calendar month. The last two occurred in January & March 1999. The next one isn't until the end of 2001.

- The science-fiction series "Lost in Space" (set in the year 1997) premiered on CBS in 1965.

- The sea contains about 1/2 of the world's known animal groups

- The Sea of tranquility is found on the moon.

- The SEALs have been deployed in Vietnam, Laos, Panama, Bosnia, Haiti, Somalia, and Colombia.

- The search engine "Lycos" is named for Lycosidae, the Latin name for the wolf spider family. Unlike other spiders that sit passively in their web, wolf spiders are hunters, actively stalking their prey.

- The secretary-bird swallow hen's egg whole without breaking its shell.

- The sentence "The quick brown fox jumps over a lazy dog." uses every letter of the alphabet!

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Appleby on Bihar: get the facts right

Bibek Debroy, New Delhi, India

Where in his reports and papers did Paul Appleby rank Bihar as the second-best governed state?

Something has always puzzled me and perhaps readers of Business Standard have the answer. But let me begin with a quote from a recent speech delivered by the PM at the International Conference on Agriculture for Food, Nutritional Security and Rural Growth. This Conference was in Delhi and the speech was delivered on May 27. Here is the quote:

"We do need a lot more attention to be paid to the management of our agricultural research and technology system. We must also ponder why is that Bihar which was chosen to be the original location of the Indian Institute of Agricultural Research, why it has failed to catch up with the rest of the country? Bihar, in 1950 was described as the second-best governed state in the very famous Paul Appleby Report. From that point, from that benchmark where Bihar is today in terms of its absorptive capacity? This is worthy of exploration, why a state like Bihar has not been able to catch up with the rest of the world?"

I don't want to focus on why Bihar has fallen behind. My being puzzled has more to do with facts. We have heard this before, the Paul Appleby Report ranking Bihar as the second-best governed state, the first being UP. This factual assertion has now been endorsed by no less a person than the PM himself.

"The Bihar administration was considered to be one of the best in India by Paul Appleby in the fifties, but Bihar is now synonymous with everything that could be called bad about administration." This is another such quote from a journalistic piece and I needn't name the author.

Paul Henson Appleby (1891-1963) visited India in 1952, 1954, 1956 and 1960-61. As a consultant to the Ford Foundation, he produced his first report in 1953, titled, "Public Administration in India: Report of a Survey". And there was a second report in 1956, titled, "Re-examination of India's Administrative System with Special Reference to Administration of Government's Industrial and Commercial Enterprises". So the PM's speech-writers have got the year wrong. There was no Paul Appleby Report in 1950. The year should have been either 1953 or 1956. Rather interestingly, in the first report, Appleby stated the following. "I have come gradually to a general judgment that now would rate the government of India among the dozen or so most advanced governments of the world." There was emphasis on the word "now" and Appleby was primarily referring to the democratic structure, not to efficiency of administration or effective governance. Nonetheless, the compliment to India is remarkable.

But to get back to the point, where in his two reports did Appleby rank Bihar as the second-best governed state? I have read both reports and can't find it. Strictly speaking, the subject of the second report had nothing to do with ranking states. If Appleby had undertaken such a ranking, it should have been in the first report. And certainly in the 1950s, this business of cross-country or inter-state rankings wasn't that fashionable. Governance wasn't the buzzword it is now. Nor was there any literature on what variables to include in governance and how to weight and aggregate them into an index.

In writing the first report, Appleby interviewed hundreds of ministers and administrative officials and the introduction says, "The study took me on tours across India covering 9,000 miles by road, rail and air. This permitted very brief visits to 10 states outside Delhi." Not only were visits to states brief, as I have said, I can find no rankings in the first report, nor anything that is specific to Bihar. Can BS readers think of any other report that Appleby wrote? Incidentally, I have also gone through three papers Appleby published in the Indian Journal of Public Administration and can find no such references there either.

Or is this just a myth, like the one about Keynes talking about employing people to dig useless ditches and then cover them up? (Keynes never wrote this. It was something ascribed to him by his followers.) Was it a legend deliberately cooked up by the political system to prove that Bihar was a well-governed state under Congress rule? At this rate, we may soon have a quote from Humphrey Appleby on Bihar. In case you have forgotten who he was, "Well briefly, Sir, I am the Permanent Under Secretary of State, known as the Permanent Secretary. Woolley here is your Principal Private Secretary, I too have a Principal Private Secretary and he is the Principal Private Secretary to the Permanent Secretary. Directly responsible to me are 10 Deputy Secretaries, 87 Under Secretaries and 219 Assistant Secretaries. Directly responsible to the Principal Private Secretary are plain Private Secretaries, and the Prime Minister will be appointing two Parliamentary under Secretaries and you will be appointing your own Parliamentary Private Secretary."

After all, with reference to the PM's speech, Sir Humphrey did say, "Oh Bernard, a good speech isn't one where we can prove the minister is telling the truth, it's one in which nobody else can prove that he's lying."

About the author: *Bibek Debroy is editor of "IndiaToday". This article is based on reports of "Applybye" who once claimed that Bihar was developed state second to none at the time of Independence.*

Watch Out! Your Computer Can Kill You

Lalit Choudhary, New Delhi, India

As more and more work, education and recreation involves computers, everyone needs to be aware of **the hazards of computer-related health disorders like carpal tunnel syndrome, repetitive stress Injuries, computer vision syndrome, cyber addiction, etc.** These conditions can be serious and painful and if neglected can cause young and physically fit individuals leave computer-dependent careers or be permanently disabled.

Here are some of the most prominent computer related health ailments.

Carpal Tunnel Syndrome (CTS): Common actions like mouse clicks that need constant wrist and index finger movements and typing that requires repetitive finger movement, are most likely to strain tendons and ligaments, leading to microscopic tearing, pain and swelling. The swelling pinches the median nerve that runs through the narrow carpal tunnel at the wrist, causing CTS. Soreness, numbness, a tingling feeling and wrist pain are other symptoms. CTS is not something which goes away after popping a few pills. The healing process for CTS is usually long and frustrating, depending on how serious the condition is.

Repetitive Strain Injuries (RSI): They occur from repeated physical movements which cause damage to tendons, nerves, muscles and other soft tissues. RSIs are on the rise with increased computer use, faulty typing techniques, poor body posture and positions. Lack of adequate rest between work and excessive use of force while using the mouse or the keyboard can lead to RSIs. The symptoms of RSI are tightness, discomfort, stiffness, burning in the hands, wrist, fingers, forearms and elbows. Tingling, coldness and numbness of the hands with loss of strength and lack of co-ordination occur. There is pain in the upper back, shoulders and neck and a need to massage them.

Computer Vision Syndrome: There is no scientific evidence to indicate that regular use of computer threatens eye health or results in permanent visual damage. Computer vision syndrome is the complex of eye and vision problems related to near work which are experienced during computer use. The symptoms consist of fatigue, headache, dry eyes, eye strain, blurred vision, neck pain, backache, altered colour perception, double vision, etc. People who use computers for more than two hours a day can develop computer vision syndrome. Predisposing conditions like uncorrected or improperly corrected refractive errors, binocular dysfunctions and focusing deficiencies may exacerbate the problem. Poor lighting, inadequate viewing distance, improperly designed workstation, poor contrast, glare and reflection all contribute to computer vision syndrome.

Depression: A recent study has found a high degree of co-relation between the time spent online and an increased incidence of depression. It is believed that these individuals lead an unfulfilled social life, which leads to further loneliness and depression.

Computer or Cyber Addiction: This is a problem very similar to pathological gambling or compulsive shopping. The symptoms of computer addiction are quite specific. The psychological symptoms are: having a sense of well-being or euphoria while at the computer, inability to stop the activity and craving for more time at the computer, neglect of family and friends, lying to employers and family about activities, feeling empty, depressed or irritable when not at the computer.

We usually think that excessive use of keyboards is the culprit behind various computer-related aches, but researchers have shown in a number of studies that the keyboard is innocent in all this, with two exceptions: typing for long periods either with an ergonomically incorrect setup or with a cramped notebook keyboard. The real villain of the computer age is the seemingly benign mouse. Whether it's building a PowerPoint presentation, drawing a picture, surfing the Web or chatting, we all find ourselves “mousing” around for long periods. Hence, we see epidemic-like numbers of people suffering from ailments such as mouse wrist, mouse elbow, mouse shoulder and mouse arm.

It's even possible to develop eczema on the tips of your thumb and fingers if you excessively rub these parts against your mouse pad, a malady known as mouse fingers. This term also refers to the pain that shoots through your hand when you move your index and middle finger after a too-lengthy mouse session.

It's not possible that you stop using a computer, but you can learn how to use it right. Many of the ill-effects of computer use can be lessened or avoided altogether by utilising correct typing technique and posture, ensuring correct set up of equipment and good work habits.

Monitor: Place the computer monitor and keyboard directly in front of you so as to avoid twisting your neck. Monitor should be 20-24 inches away from the eyes and the height of the monitor should be 5-15 inches below horizontal line of sight. The mouse and keyboard should be at the same height. Choose a monitor with good resolution for clarity of characters on the screen. The screen refresh rate should be least 60 Hz to eliminate screen flicker. Dark letters on a light background should be used to reduce eyestrain. Brightness and contrast should be adjusted.

Keyboard: Don't bang the keys while typing. Use a light touch instead. Avoid bending your wrists up and down while typing. Use both hands when typing combinations like 'Shift' or 'Ctrl' with other keys. Don't rest your wrists on the keyboard while typing. Keep hands freely above, with the keyboard tiled downward. The keyboard should be placed at approximately elbow height with the surface at a comfortable angle. The hands and wrists should be held in a neutral position when typing. The wrists should be straight and not bend upwards, downwards or sideways. The shoulders should be relaxed, the upper arms should hang comfortable down along the sides of the body and the elbows should not be cocked out away from the body.

Mouse: The mouse should be placed in an easy reach zone so that the shoulders and upper arms can be relaxed and close to the body while operating the mouse. Keep the wrist and hand in a neutral position, never bent. Use as little force as possible when clicking or dragging. Check mouse settings like click speed to see if you're really comfortable with it. If you scroll long Web pages a lot, a scroll mouse will reduce strain on your wrist. Use a good mouse pad with a smooth surface that encourages accurate mouse tracking. Avoid lifting or shuffling the mouse repeatedly.

Desk Configuration: If the screen is placed off to one side, the keyboard should still be positioned centrally to avoid twisting the torso, often if the screen is off to one side, the user will support one elbow on the desk putting strain in the muscles of the back. Have a set of drawers that prevent sideways movement. The L shaped desk layout allows more space and freedom of movement if writing and keyboard activity is required but when two desks are butted onto each other, one set of drawers can restrict movement. The set of drawers restricting movement can be removed with a screwdriver. Ideally desks should be purchased without drawers and then modular drawer units can be placed in convenient locations.

Posture: You should be able to view the computer screen comfortably with your head in a relaxed, neutral position. Good posture and support in the lower back are also important to avoid muscle strain or pain in the back.

Exercise: Engage in a regular exercise programme, with the advice of your doctor. Eat a healthy diet. Drink lots of water to keep joints and tendons lubricated. Get plenty of rest. Explore ways to relieve stress, such as meditation or massage in addition to exercise. Briskly rub your hands and palms together for 5 to 10 seconds, until they are warm. Cup the warmed palm over your closed eyes. Relax your brow. Breathe regularly and easily.

Anyone in a sedentary job should stand up, move about, or exercise their arms, legs, back, neck and shoulders frequently. The remedy lies in regular exercise for back and neck muscles before the start of work or in the morning for the day-long work. The exercise is a must to give you a good posture at work because this is the best food for the body. The back muscles should support your back and neck. The exercise for whole back is spinal extension exercise. If you lie on your bed with face down or in prone position, keep limbs on the sides of your body, slowly raise your head and shoulders, stay for a moment and go back to your position. Repeat the action at least 20 times. Instead of playing computer games, play physical games to keep fit.

Vision: Have your vision checked frequently. If you wear corrective lenses inquire about lenses that have a focal distance designed for working at a computer. Contact lens users should blink

frequently and use eye moisturizing drops to avoid dry eye syndrome. Increase the font size. Reduce glare by using glare reduction filters and hoods. Spectacles with anti-reflection coating can be used. Roughly every 15 minutes, a short break should be taken to look away from the computer screen and around the room while making a conscious effort to blink several times.

Room Temperature: Keep your office temperature at a comfortable level. Keep office noise at a level that is not distracting. Reduce exposure to electromagnetic radiation by placing workstations more than 4 feet from the backs of other workstations and moving copiers and laser printers away from workstation areas.

The Work Station: The elements of a good work station setup include - a good adjustable chair with firm support, a good seat cushioning with a waterfall front edge, pneumatic seat height adjustability, swivel seat, five legs with casters. The seat should provide firm support to the lumbar region of the back and should accommodate a slightly backward lean. The chair's adjustment controls should be easy to operate and to reach. If the chair height is too high at the lowest adjustment, a footrest can be used.

Use proper posture to reduce stress on the muscles, bones and tendons. Use a telephone headset or a shoulder rest on the telephone receiver to avoid bending the neck and raising the shoulder to hold the phone. Keep the shoulders and arms relaxed while typing. Keep your whole body as relaxed as possible. Breathe regularly and deeply. This can help keep you relaxed and alert. Try to relax mentally. Stress can make your body tense and your work less efficient

20/20/20 exercise: Take a short break of 20 seconds approximately every 20 minutes and look at an object more than 20 feet away.

Use Proper Lighting: Eyestrain is often caused by excessively bright light coming in from outside and excessively bright light inside. When you use a computer, the ambient lighting should be about half that used in most offices. Eliminate exterior light by closing drapes, shades, or blinds. Reduce interior lighting by using fewer light bulbs or fluorescent tubes, or use lower intensity bulbs and tubes. If possible, position your monitor so that windows are to the side of it, instead of in front or back.

There are some alternative devices in the market, which include graphic tablets and pens, touch pads, touch screens, and footswitch-operated mice. Mouse wrist supports are available to elevate the hand and wrist. These may or may not be any better for the user, depending on their design and on the user's size, abilities or preferences. There are some software in the market to remind you to take breaks.

Computer-related health problems are becoming more and more common as technology advances. Surely precautions need to be taken; otherwise computers won't always make our lives any easier! No amount of ergonomic gizmos will make much of a difference if you don't take a break from your computer. Try and cut down the time you spend at your PC.

***About the Author**: Mr. Lalit Choudhary is webmaster of BiharBrains and He is by profession web designer at New Delhi based company.*

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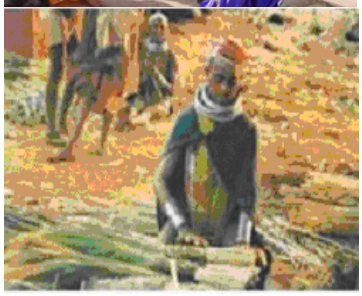
POEMS AND THOUGHTS



ये तिरंगा तुम बतलाना
किनके सँपनो सा भारत अपना है,
गाँधी,भगतसिन्ह,नेताजी या आजाद,
बतलाओ किनके नजरों का सँपना है ?
कौन सोचा था भरात का भाग्य यों हीं पेल्टेगा,
किसकी योजाना थी, कल जर्मी को लोग जर्मी का लुटेगा.
है आजाद वतन पर, हम आजादी नहीं समझते हैं,
मुक्त हवा में रहकर भी, संघर्षों में सांसे लेते हैं ।
किसका सँपना था भारत में वर्गवाद फैलाने का ?
किसने ना सोंचा था जड़ से जातिवाद मिटाने का ?
कौना सोंचता था बतलाअओ भारत का यह हाल रहेगा
माँ की पेट में पलता बच्चा भी बदहाल रहेगा ।
हम नयी सदी में जा रहें हैं बाल विवाह भी मना रहें है।
जात–पात का पतरा पढते,धर्मपर मानवबलि भी चढा रहें हैं।
कुप्रथाओं का बोझ लिए हम दौरे जा रहें हैं किधर,
जगतगुरू का भट्काव देख है दुनिया को अचरज ।
हम समता क्यों नही ला पाएँ, विषमताएँ बढती जाती हैं,
किस विभिन्नता में हमारी एकता लुटती जाती है ?
एक तर फ की अट्टालिकाएँ,जो गगन को छूते हैं,
दूसरी ओर की झोपड़ीयाँ,छप्पर जिसकी चूते हैं।

एक फिर लडाई लडनी है इस भू की गुलामी दोहरी है,
बाहरी तो कब कट चुका,अब भीतर की जंजीरें हटानी है।

डॉ.राजकिशोर प्रसाद
बी.आर.ए. बिहार विश्वविद्यालय, मुजफ्फरपुर, बिहार ।

Why I Love your Friendship

Kishore Kunal, Busan, South Korea

No I am not talking about the lines that crease up your face even when you are straight-faced. These are the lines that define a full and beautiful laugh... like you. Is this lethal leg which provokes others to become obsessed? Is this smile cute and your dimples cuter? Is this tiny pinch on flat tummy? I excogitated for long.

This is due to your enthrallment which gives me pleasure. Your progeny like chastity that indulge my heart glow. I like your empathy. True friendship comes when silence between two people becomes a language.

Life ends when you stop Dreaming, Hope ends when you stop Believing, Love ends when you stop Caring, Friendship ends when you stop Sharing .We will be best friends until forever, wait and see.

About the Author: *Kishore Kunal has completed his master degree in Computer Vision from Dongseo University, Busan, South Korea.*
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Human Bonding Needs Unconditional Love

Kishore Kunal, Busan, South Korea

Raksha Bandhan is the affirmation of love between siblings. Originally observed among martial races of north India, the festival has assumed a pan-Indian character and is now celebrated not only all over the country but also in many other countries. Rakhi is a talisman tied by a sister on the wrist of her brother and has come to symbolize protective bonding of love. Love is said to be the longing of soul for soul. God, full of love, is the ocean of kindness. The human body embodies the essence of God. Sat Chit Anand, accrued from meditation, allows us to glimpse Brahmn which is unparalleled bliss. The love between mother and child, lovers, friends or siblings is a reflection of Divine love. If we go in philosophical root of love, the influential thinkers of the worlds like Freud and Jung, give their views about love. The basic purpose of life is to become one with God, who is love personified. What better way to do this than to first express your love for fellow human beings? And the family is a good place to start. Love, when its scope is enlarged to include the Divine, transports one to Supreme Consciousness. The path of Bhakti or devotion brings us closer to God and enables us to even become one with Him. Unlike jnana or karma margs, the routes taken by intellectuals and men of action, Bhakti is easy to practice. Unconditional love leads to God. The only requirement is to develop longing for Him. God reveals Himself to the bhakta in stages, depending on the intensity of efforts and longing for Him. The lives of saints bear this out. Even the illiterate or those uninitiated by a guru can scale the heights of spiritual glory with unconditional love. No obstacle can deflect the devoted from their chosen ideal. But the path of devotion is not easy. Stories of With inputs from speaking tree and sacred space.

saints bear testimony to this. Krishna intoxicated Meera was harassed and ostracized by her family and friends on grounds that she was neglecting her domestic responsibilities. Kabir's doubtful parentage stood in the way of his acceptance by others. Vilvamangal suffered till a prostitute's jibe turned him inward, away from the carnal pleasures that had enslaved him. Jnaneshwar's parents ended their lives, unable to fend for their children. Chaitanya was censured by the Sultan's officers for the supposed public nuisance caused by his kirtans. The boundless passion of the gopis for Krishna — often misinterpreted as being libidinous in nature — is nothing but pure Bhakti. Swami Prabhupada explained that the "Love of Krishna or Krishna consciousness is the perfect ional stage of real knowledge in understanding things as they are.. The gopis are the typical example of this perfection stage of knowledge. They are not simple mental speculators. Their minds are always in Krishna... Since the gopis are on the platform of pure transcendental knowledge, their minds are always filled with Krishna consciousness... Unless the so-called man of knowledge comes to the platform of Bhakti, his knowledge is certainly impure and imperfect". The Gopis teach us how to be perfect devotees. Their route to godhead is one of unconditional love and utter devotion. Raksha Bandhan glorifies filial bonding of love that can be extrapolated to include everything in the universe. Ultimately, love is God.

About the Author: *Kishore Kunal has completed his master degree in Computer Vision from Dongseo University, Busan, South Korea.*
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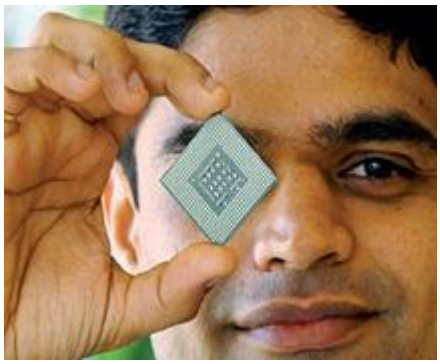
Recent News & Science Breakthrough

India to open its first chip fab

India's first semiconductor assembly and test plant will open in Hyderabad by the end of the year and will eventually expand into a full fabrication facility.



The plant is a joint venture between a Semindia, a consortium and the Indian government, says researcher iSuppli. The plant will be built in two phases. The first phase will cost $1 billion for chip assembly and testing facility. The second phase, which will cost $2 billion, will involve the building of a fabrication plant which will be finished by 2008. AMD has entered into an agreement with Semindia that covers the manufacturing, technology licensing and business development of AMD's x86 microprocessors in India. Semindia will also be able to license AMD's process technology and will work with AMD on joint development of new semiconductor designs.

The plant will focus on niche semiconductor products and will supply eight to 10 customers including AMD, says iSuppli

Source:
http://www.purchasing.com/article/CA6338225.html?text=india

US-Based Indian Engineer Honored With Hind Ratan Award

United States based engineer Mr. Asif Rashidi (Shibli), was honored with the prestigious Hind Ratan Award in recognition of his outstanding services, achievement and professional excellence by Shri G. M. C. Balyogi, Speaker, Lok Sabha in a function organized by the NRI Welfare Society of India held at New Delhi on 25th January 2002. He is originally from Biharsarif dist of Bihar in India.

Altogether 30 NRIs from all over the world in various fields were selected on the Republic Day by the society for their outstanding services, achievements and contribution in diversified fields.Mr. Rashidi, in his address, called upon the Government of India to look into the problem of NRIs willing to invest in India but were hesitant to do so due to the bureaucratic red-tape in the country. Mr. Rashidi stressed the need for paying more attention by the Government of India in an attempt to build confident amongst NRIs. Several key leaders also addressed the large gathering including Shri K. C. Pant, Deputy Chairman Planning Commission, Sri. Shivraj Patil, M.P. & Dy. Leader of Congress in Lok Sabha; Dr. Bhishma Narain Singh, Former Governor and President of the NRI Society; Shri I. D. Swami, Union Minister for State for Home Affairs All distinguished speakers commended the contributions made by the NRIs in India's economic resurgence and progress.

Source:
http://www.patnadaily.com/features/rashidi.html

Bhojpuri site bags award

Jamshedpur, Aug. 6: *Bhojpuria.com*, a Bhojpuri portal, won the prestigious Manthan-American Foundation of India (Manthan-AFI) award in e-culture category at a function held at the NCUI Auditorium in New Delhi on Saturday.

"Manthan-AFI award is a first of its kind initiative in India to recognise the best practices in e-content and creativity and is sponsored by Digital Empowerment Foundation (DEF) in partnership with World Summit Award and American India Foundation, a body formed by Indian diaspora," said Osama Manzar, founder and director of DEF.

A brainchild of Infogate Exporters Private Limited, a city-based software company, this portal is the only website promoting Bhojpuri culture.

The portal bagged the top position in the award ceremony followed by *indiaheritage.com* — a popular travel portal — and *anandautsav.com* a venture of ABP Private Limited.

The e-culture award was given to websites preserving a cultural heritage by demonstrating cultural assets clearly and informatively using modern technology.

"The winners of this prestigious award automatically qualify for the UN World Summit Award next year in Geneva," added Manzar.

"It's a matter of great pride for the entire Bhojpuri community spread across all the world to be recognized by such an esteemed panel of jury," said Sudhir Kumar, director of Infogate Exporters

Source:
http://www.telegraphindia.com/1060807/asp/jamshedpur/story_6578336.asp

Bihar will be a developed State by 2015, promises Nitish

Patna, Aug 10. (PTI): Resolving to make Bihar a "developed state" by 2015, Chief Minister Nitish Kumar on Wednesday said the NDA Government was committed to making life better for people living below the poverty line. Speaking at a function organized by the All India Freedom Fighters' Association on the occasion of the 64th anniversary of the "Quit India Movement", Kumar said efforts were being made to make India "a developed nation" by 2020, 'but Bihar will be able to attain the status of a developed State five years ahead of it".

Regretting the Opposition allegation of non-development, he asked the leaders of Oppostion parties to go through tenders being advertised everyday in newspapers for development projects.

"We will start the development work on a war-footing after the rainy season," he asserted.

Saying that half of the population in the State lived below the poverty line, Kumar admitted that most of the villages still did not have metalled roads, electricity and sufficient drinking water. "We have taken up the challenge and we will get all these civic problems solved very soon," he claimed.

Asserting that there was a marked improvement in the law and order situation in Bihar, Chief Minister said, "The rule of law is visible in the state now."

The meeting adopted a resolution seeking to declare families of freedom fighters as 'family of nation' in recognition of their contribution to freedom.

Source:
http://www.hindu.com/thehindu/holnus/002200608100311.htm

Doctor Receives Prized Ellison Medical Scholar Award

San Antonio, TX: July 22 2006
Dr. Ravi Ranjan, a researcher at the Health Science Center at San Antonia, Texas, has been honored with Ellison Medical Foundation New Scholar Award for his outstanding research in the field of brain molecular changes that reduces one's ability to learn and remember as one ages.

The recipient of a $200,000 grant, Dr. Ranjan, Ph.D., is one of the only three Texas scientists to

receive the New Scholar Award.

Source: www.patnadaily.com

TI to open new research unit in India

Microchip giant Texas Instruments said on Wednesday it plans to expand its research and development presence in India by opening a new facility in the southern city of Chennai, an upcoming technology hub. The Dallas-based firm already has a research unit in Bangalore, India's tech capital, one of the first to be set up in India by a multinational firm more than two decades ago.

The new unit would be close to the Chennai manufacturing plants of major customers, such as handset giant Nokia and Flextronics. The city is also home to Indian Institute of Technology, a globally recognized engineering college. The Bangalore facility has been an integral part of the company's efforts to develop a single chip housing all the functionalities of a phone, a development that would cut costs.

India has set a target of 250 million telephone users by 2007, and currently has 104 million Wireless customers.

Apart from a booming telecommunications market, it is also a globally feted hub for software services. A growing tribe of companies such as Motorola and ABN Amro Bank get millions of dollars worth of software developed in India.

Despite spectacular growth, spurred by the lowest mobile call rates in the world, mobile penetration in a billion-plus population is only about 10 percent as networks are still largely city-centric.

"Today, there is a huge opportunity to connect the unconnected as the majority of India's population does not have access to communications services," he said.

Source: http://news.zdnet.com/2100-1035_22-6093336.html

Patna software park soon (LEAD)

Patna: the Software Technology Park of India (STPI) in Patna set to begin next month.

The proposal to set up the park was mooted during the erstwhile Rabri Devi government in 2004.

Bihar Science and Technology Minister Anil Kumar Sinha said the STPI would be built at a cost of Rs.300 million on a three-acre land.

The park, expected to boost the nascent software industry in the state, would be fully functional in a year and would offer high-speed Internet connection besides state-of-the-art equipment, Sinha said.

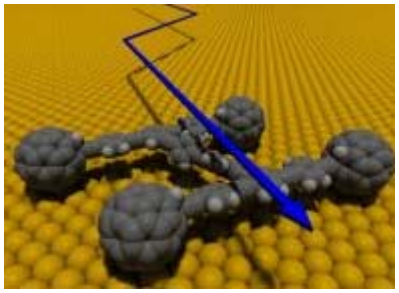
Bihar set up a state-run software technology park three years ago.

Source:
http://www.dailyindia.com/show/16728.php/Patna_software_park_soon(LEAD)

Nanotechnology: World's Smallest Car

Sun, 23 Oct 2005: Scientists at Rice University have built the world's smallest car.

The car has a length of 3nm and a width of 2nm. It rolls on buckyballs, which consist of 60 atoms pure carbon formed like a sphere.



The movement of the nanocar is controlled by electricfields.

Maybe the vision of nano robots cutting my lawn

will become a reality after all. Little nano lawnmowers would drive up each grass blade and cut it off and keep it at a constant height, that would be the life.

Source: http://www.i4u.com/article4437.htm

Paswan Promises to Bring an IISER in Bihar

Tokyo, Japan: In the last week of July, 2006 Dr. Raj Kishore Prasad a member of BiharBrains Tokyo as a representative of BiharBrains met Hon'ble Union Minister for Fertilizers and Chemicals and Steel Sri Ram Vilas Paswan Four season hotel at Tokyo who came here an official visit with delegations He discussed issue of an IISER (Indian Institute of Science for Education and Research) for Bihar. He also submitted memorandum in support of the demand of IISERin Bihar. Fortunately, despite his very hectic schedule, he agreed and and promised to all possible effort in bring IISER into Bihar

Source:
http://www.patnadaily.com/features/paswan_in_japan.html
http://www.bihartimes.com/mainpage/vv34.html

BAJANA signed first NRI investment MoU with Jharkhand CM ,Sri Arjun Munda

Sunday, July 23, 2006 – NewYork, USA

BJANA hosted a luncheon meeting for visiting Jharkhand Chief Minister, Mr. Arjun Munda and his team on Sunday, July 23 at the residence of Drs. Arvind and Chitra Kumar. BJANA president, Mr. Birendra Kumar greeted the visiting and local dignatories, including Congressman, Frank Palone and exhorted the community to come together and work for common good for our people in this country as well as back home in India. The Chief Minister spoke about the progress and opportunities in his young and "Organic" state and asked for help in the field of health care and agriculture. His government has taken initiative to provide about 250 acres of land to open a "Health Park" near Ranchi to house a multi-specialty hospital and residential complex.

The Special Secretary to Jharkhand CM, Mr. R.N.Sharma highlighted the investment opportunities in Health Care services.

The meeting culminated with signing of a historical MoU for opening a state of the art specialized cancer care center in Ranchi, Jharkhand which will provide screening, diagnosis and treatment of all kinds of cancer. Such facility only exists in select cities in India and would help the people of Jharkhand and neighboring states who otherwise had to make trips to bigger cities like Mumbai for diagnosis and treatment.

Several dozen BJANA members attended the event and had an opportunity to discuss about ideas /projects for state of Jharkhand.

Source: www.bajana.org

Bihar's tiny school is churning out IIT-ians

Rediff, August 16, 2006:

Every April, some 230,000 Indian youths sharpen their pencils and sit for the intensely competitive entrance exam to the Indian Institutes of Technology (IITs) -- the seven prestigious schools that train India's top-notch engineers and entrepreneurs. After the grueling six-hour test, only 5,000 students are offered a place in the IITs.

Most come from middle-class backgrounds and prepare for the exams through private coaching. But in the past few years, a small group of desperately poor, talented students have made it into the IITs, thanks to the Ramanujan School of Mathematics.

The school, named after a famous Indian mathematician, is even more intense than the IITs themselves. Located in Patna, the capital of Bihar, one of India's least developed states, the Ramanujan School trains just 30 students a year to take the IIT exam.

Anand Kumar, 33, a local mathematician, and Abhayanand, 52, Patna's deputy director general of police and a lover of physics, founded the school in 2003 to help promising locals get ahead in the caste-based society.

They scored Bihar's least privileged communities for 30 bright students to coach for the exam, providing free lessons and housing. They call their group the Super 30. "Intelligence is not birth-specific," says Abhayanand. In the first year, 16 of the group made it into the IITs. The next year, 22 made it. "This year," Kumar says confidently, "all 30 will get into the IITs."

Santosh Kumar, 19 (no relation to Anand Kumar), is one of this year's Super 30, and his story is typical of his classmates. He's from Dumari, a village in the Bihata district, about 22 miles from Patna.

Nearly all the village's 3,000 residents scratch out meager livings as farmers. Santosh's sister and three brothers studied up to 10th grade but then returned to the fields. "Studying further required money, so that was that," he says. Santosh wanted more. His school had no roof, no doors, and no teachers half the time, but he borrowed books and tutored two young students for 70 cents a month. He also sold vegetables the family cultivated in a nearby market town.

"I didn't even know which subjects I was good at, and I'd certainly never heard of IIT. No one had," he says. Then an eighth-grade teacher noticed his mathematical talent and encouraged him to study further.

Santosh saw that "education was the only way out of poverty," he says. At first, he planned to study so he could become an officer in the Indian civil service. After high school, he enrolled in the Patna College of Commerce, and then he heard about the IITs and the Super 30.

"I went straightaway to Anand Kumar and told him: 'I dream of IIT, but I have no money.' He gave me his test, and I came second in the class. [He] let me into his Super 30 -- free," Santosh recalls.

For seven months, Santosh studied every morning for four hours, then sat down for a three-hour test in math, physics, and chemistry, and after a break studied three more hours.

From six to nine in the evening, he attended a class in the same subjects and prepared for the next day's test until 2 a.m. His work paid off last spring, when he won a coveted seat at the IIT in Kharagpur, near Calcutta. (He ranked 3,537 out of the 5,000 students chosen.) Santosh now aims to earn a doctorate in chemistry and become an inventor. His hero is APJ Abdul Kalam, India's current President and father of the nation's missile program. Just as important, Santosh is on track to becoming the first person from Dumari to graduate from a university, making him a hero in the eyes of his village.

Source:
http://in.rediff.com/money/2006/aug/16iit1.html

Understanding the role of master regulators

YOUNG ACHIEVER: *M. Madan Babu is a Group Leader at the Laboratory of Molecular Biology at the University of Cambridge, U.K.*

After obtaining a B. Tech from the Centre for Biotechnology at Anna University, Chennai, M. Madan Babu headed straight for the Medical Research Council's Laboratory of Molecular Biology (LMB) at the University of Cambridge, U.K., for a Ph.D programme. He earned his doctorate in just three years.

His next destination was the National Center for Biotechnology Information, which is part of the National Institutes of Health, Maryland, U.S. After a year and a half, 26-year-old Babu, a Max Perutz prize winner, is back at LMB as a group leader raring to make a mark in a field which he has worked in for the last five years — systems biology. Science Editor, R. Prasad interviews him:

Can you elaborate on this?

Genes get transcripted to mRNA, and the mRNA, in turn, gets automatically translated into proteins. A lot of regulation is required to produce mRNA because the production of mRNA consumes substantial energy. And you don't want mRNA to be produced if the protein is not required in the first place. Not all proteins are required at all times.

That is the basis of transcriptional regulation. So the point is to produce the right protein at the right time. The primary problem that I addressed was in understanding how regulatory systems evolved; and to know the players and how these players evolved.

What are the potential applications of your work?

We can engineer microbes in a more rational way. For instance, if we know the pattern of interactions between proteins, we can either knock off or introduce a new interaction to increase the production of particular proteins. Pharmaceutical companies that use fermentation technology can use this to increase the production of molecules of interest.

In the case of pathogens, if we can knock off the master regulators, we can essentially cripple the system; we can completely destroy the organisms. So, the point is to look out for the most important link to destroy the [pathogen's] system.

Nanoparticles detect apoptosis in real time

Apoptosis is normal physiological process that is programmed in the developmental plan of an organism, therefore it is also called as ‘Programmed cell death” (PCD). The term apoptosis, is an ancient Greek word for the falling off of petals, flowers, or leaves from trees. In multicellular eukaryotic organisms, unwanted cells are eliminated during embryonic development, metamorphosis, and tissue turnover. Apoptotic effect may also triggered by effective anticancer drugs. Now, researchers in South Korea have developed a cell-permeable, biocompatible, and autoquenched imaging probe, polymeric nanoparticle that is capable of real-time imaging of apoptosis in living cells, that could provide an early sign that apoptosis is occurring as a result of anticancer therapy. The results of their work, published in the ***Journal of the American Chemical Society (Kim et al, 2006, 128: 3490-3491)***, could provide a boost for both clinical oncology and cancer research.

The availability of a real-time assay of apoptosis would provide a critically useful tool for oncologists, who would then have the means to determine if a given therapeutic approach was working soon after that therapy, was started. Cancer drug development would also benefit from a real-time apoptosis assay if such an assay could be used to provide rapid and sensitive results in high-throughput drug screening experiments.

A research team headed by Ick Chan Kwon, Ph.D., of the Korea Institute of Science and Technology, in Seoul, created their apoptosis-detecting nanoparticle by linking a fluorescent dye to a biocompatible polymer known as PEI-DOCA, which is made from branched poly (ethyleneimine), or PEI, and deoxycholic acid, or DOCA. The fluorescent dye, known as Cy5.5-DEVD, is widely used in cell biology experiments to study apoptosis. This dye is unique in that it only fluoresces when it is activated by one of two enzymes, both of which are produced by cells during the earliest stages of apoptosis.

Experiments with the resulting nanoparticles, which are some 80 to 100 nanometers in diameter, found that the nanoparticles are taken up rapidly by cells. Those cells that are undergoing apoptosis, either during nanoparticle uptake or after uptake is complete, fluoresce brightly. In contrast, normally growing cells show no fluorescence.

The investigators note that these nanoparticles should prove useful in cell-based high-throughput screens for chemicals that trigger apoptosis. Because the dye used in these nanoparticles fluoresces in the near-infrared region of the spectrum, it may also be possible to use these nanoparticles for detecting apoptosis in live animals, perhaps even humans. Near-infrared radiation is not absorbed by the body, and thus, can be detected either through the skin or using fiber optic fluorescence detectors.This work is detailed in a paper titled, “Cell-permeable and biocompatible polymeric nanoparticles for apoptosis imaging.” Investigators from Kyungpook National University and Yonsei University, both in Korea, also participated in this study.

News prepared by: Mohammad Abul Farah, South Korea

A XII std student developed 32 bit operating system

Ramlal Bhagat, a XII std. student from Haryana, has developed a 32-bit operating system demonstrated to be far superior to any of the desktop operating systems in the market today. The program has been named "O-Yes".

O-Yes provides operating system services on any Pentium-based personal computer (PC) and does not require MS-DOS as a base operating system. The operating system's capabilities were demonstrated in a student convention at the Indian Institute of Technology, New Delhi.

HCL Ltd. conducted benchmarks on the system and published results, which are partly reported here: O-Yes is 34% faster than Microsoft's Windows 95 on similar hardware. It is 29% faster than IBM's OS/2. O-Yes loads 54% quicker than Windows 95 or OS/2. O-Yes has a customizable, user-friendly graphical User Interface(GUI),in which every program can be accessed with a maximum of two button clicks. The operating system provides plug n play capability with numerous hardware devices.

It has a superior memory management function. The operating system is compatible with Windows 95&WindowsNT 4.0. HCL, Ltd. has offered an unknown amount to Ramlal Bhagat for purchasing the rights to the software. Ramlal Bhagat, described as "quiet and philosophical" by his peers, was not available for comment. Suresh Reddy, spokesman for HCL Ltd.,said, "this is the operating system that the world has been waiting for". On HCL's move to purchase the rights to the software, he said. "We are here to ensure that Mr. Ramlal gets fair recognition and compensation for his innovation. HCL Ltd. can provide him a firm launch-pad to market software globally". Is this the beginning of the end of the Bill gates monopoly, Let us see.

BB Programs & Events

(From December 2005 to July 2006)

SciTechFest, 2005: Dec 24, 2005

Patna, Dec 24, 2005: *Dr.Anil Kumar, Honorable Minister of Science & Technology, Government of Bihar inaugurated two days science festival known as 'SciTechFest, 2005', organized by BiharBrains Scholastic Center at Auditorium, department of Geology Patna Science college. In the said festival around 200 young scientist and professors presented their papers in their own field and shown their project models. Best papers and project models were awarded. This function was of the first kind in Bihar.*

Sri Ram Raj Pandey, one of the founder members from USA was the coordinator of the event. The other dignitaries present were Dr. J. Thakur, EX-VC Patna University, Director, Planetarium, Patna, Dr. P. K. Sinha, Director, National Institute of Technology, Patna, Secretary, Department of Science & Technology, government of Bihar and other high officials of Science & Technology Department. The function was presided by Dr. B.K. Sharma, president, BiharBrains and HOD, Electronics NIT, Patna where as online vote of thanks was given by Sri Bibhuti Bikramaditya from Korea during the function. The chief guest of the concluding ceremony was Dr. K. K. Srivastava, EX-Chief Secretary, Government of Bihar.

साइंस कालेज में सेमिनार का उद्घाटन करते विज्ञान व प्रावैद्यिकी मंत्री जागरण

BB Pune members at Hotel Raviraj, Pune

Mr Ram Raj pandey, speaking in SciTechFest at Patna Science College, Patna

BiharBrains Pune local chapter meeting: Feb 1, 2003

Pune Feb 1, 2006: *BiharBrains Pune local chapter meet and get together were organized in the night, at Hotel Raviraj, Pune, on the arrival of Mr. Bibhuti Bikramaditya from Korea. The meeting was called by Sri Alok Jha, BB Representative, Pune. Many high officials from corporate sector attended the meet.*
To name a few, Mrs. Sweta Tarate, CMD, Infodynamics, Sri Sanjay Bhole, Regional Manager, RDG Micro Electronics, Ltd Mumbai, director, ITI Pune region etc. attended the meet and gave assurance to youngsters for all possible help.

BB Pune members at hotel Raviraj, Pune

Meeting with ITI regional manager, Pune

BiharBrains Patna local chapter meeting: February 3, 2006

Patna Feb 3, 2006: *BB Patna Office organized local chapter meeting with Office members and students Representatives at Patna BB Office about arrangement of the program and event which was scheduled to be held from Feb 5 to Feb 15.*

BB Patna members at BB Office:Dr. B. K. Sharma and Bibhuti Bikramaditya (Sitting from right)

Evening Orientation program on VLSI: Feb 5-12, 2006

***Patna Feb 5, 2006**: BiharBrains launched seven days Evening time Orientation program. Mr. Bibhuti Bikramaditya delivered 5 days lecture on various aspects of VLSI Systems and practices on VHDL, a programming language of VLSI. The Pune based company NI2LOGIC PVT LTD (www.nilogic.com) was called for the two days hands on training on tool and FPGA KITS.*

Total Number of Students participated: 47

VLSI Students with Mr. Bibhuti Bikramaditya (third from right in second row) and Representative of NI2 Logic, Pune based company at Computer lab, NIT, Patna

VLSI Theory classes at BiharBrains Scholastic Center, Patna

Workshop on Embedded systems: Feb 6, 2006

Patna Feb 6, 2006*: Workshop on Embedded systems was organized by BiharBrains Scholastic center at I.SC. Lecture theatre, Dept of Physics, Patna Science College, Patna. The famous author of books on Microprocessors and Microcontrollers, Prof B Ram EX-HOD, NIT, Patna was invited chief guest on this occasion.* ***Exclusive talk****: The exclusive talk on the mentioned topic was given by Mr. Bibhuti Bikramaditya, in the presence of students and dignitaries.*

Prof S.P. Verma, Prof B.Ram, Dr. J.Thakur, Mr.Bibhuti and Dr. B.K.Sharma at Embedded System Program

First Career Guidance and Counseling Program: Feb 9-10, 2006

***Patna, Feb 9-10**: BB organized its First Career guidance and Counseling Program at Patna in which Ten experts from different field from India and abroad (NRIs) spoke on their subject and guided students and youngsters. Five companies were called for the campus interview.*

- *Around 175 students and dignitaries were participated.*
- *Dr. J. Thakur was the chief guest for this occasion.*

Dr. J. Thakur, EX-VC Patna Univ, Inaugurating Career Guidance and Counseling Program at Patna Science College, Patna

Gatherings at Career Guidance and Counseling Program at Patna Science College, Patna

Dr. M.M Chaudhary, HOD Electrical Engg. NIT, Patna accepting flowers at Career Guidance and Counseling Program at Patna Science College, Patna

Gatherings at Career Guidance and Counseling Program at Patna Science College, Patna

Workshop on Embedded systems: Feb 11, 2006

Patna Feb 11, 2006: *The Patna based college named Magadh Mahila College organized workshop on Embedded System and invited Mr. Bibhuti Bikramaditya for the exclusive talk on the topic " Adventures of Embedded systems". Dr. A. K. Nayak, Director IIBM,Patna was the chief guest of the occasion. He spoke on many facets of embedded system to be used in the Electronics system designs and circuits. This program was convened by Dr. Dolly sinha HOD Physics and computer science Dept, Magadh Mahila College,Patna. More than 200 students of Magadh Mahila College, Patna Science College, NIT, Patna were participated. Electronic and print Media were also attended the workshop to give coverage in their news channels and news papers. They took interview of Mr. Bibhuti Bikramaditya about Embedded system and Mission of BiharBrains in Bihar.*

Dr. A. K. Nayak, Director IIBM Inaugurating workshop on Embedded system at Magadh mahila College, Patna

Gatherings at workshop on Embedded system at Magadh Mahila College, Patna

Mr. Bibhuti Bikramaditya and Dr. Dolly Sinha With Team of Students in Computer lab, Magadh Mahila College, Patna

Mr. Bibhuti Bikramaditya Deliering lecture on Adventures of Embedded system at Magadh Mahila College, Patna

Patna Resource Center Inaugural Function of and the Release of Manthan Feb15, 2006

Patna Feb 15, 2006*: BiharBrains inaugurated its second center at Dept of Physics, Patna Science College in association with Dept of Physics in the name of "Patna Resource Center", an extension branch of BB Scholastic center. In this occasion BiharBrains Released its first magazine "Manthan" and prizes and certificates were awarded to the participants of Career counseling program, workshops on Embedded systems and Evening course on VLSI. Following are the details of the program:*

- ***Chief Guest:*** *Sri K.K. Srivastava, Ex- Chief Secy Bihar was the chief guest on this occasion.*
- ***Inaugurated by****: Dr. J. Thakur, EX-VC, PU, Patna*
- ***Other dignitaries****: Dr. B.K. Srivastava famous Psychiatrists, Sri Amalendu Narayan Sinha EX- Editor Hindustan Times, Dr. S.N. Guha (Principal Science College).*
- ***Release of Manthan****: Sri K.K. Srivastava released the first issue on Manthan and*
- ***Ribbon cutting By*** *Sri K.K. Srivastava: Ribbon cutting ceremony was held to inaugurate BB resource center at Dept of Physics, Patna University in the presence of all dignitaries.*
- ***Organizer of the event****: Mr. Bibhuti Bikramaditya was the organizer of the event and Dr. B.K. Sharma presided over the function.*

Sri K.K. Srivastava, EX- Chief Secy, Bihar, Inaugural Function, Patna

Sri K.K. Srivastava, EX- Chief Secy, Bihar, Releasing Manthan

Ribbon Cutting ceremony: Sri K.K. Srivastava, Ex-Chief Secy, Govt of Bihar

Manthan Online Release by Sri K.K.Srivastava, Ex-Chief Secy, Govt Of Bihar

Ribbon Cutting ceremony: Sri J. Thakur

Gathering in the function with magazines of BB Patna Resource Center

BB Established its first Village chapter in the district of Sitamarhi called "Janipur" Feb 19, 2006

Patna Feb 19, 2006: *Mr. Bibhuti called meeting of youngsters and unemployed youth of Janipur Village and decided to establish BB Chapter.*

BB Establishes first Village chapter in the district of Sitamarhi called "Janipur". *Mr. Sanjay Kumar Mandal, Teacher in Govt middle school in the nearby village , elected as representative of Janipur BiharBrains Chapter.*

Sri Sanjay Mandal (left sit) , with his Janipur Team Members.

Inter School Level Competition at Madhya Vidyalaya, Janipur, Sitamarhi, Bihar, India

Inter school level competition: March 25, 2006

Janipur March 25, 2006*: Inter school level competition held at JANIPUR Middle school. Mukhiya of the Village Sri Ram Kumar Mishra inaugurated the function and Mr. Bibhuti Bikramaditya was the Chief Guest on the occasion. Five schools of the same village panchayat were attended and participated in the competition. Prizes were distributed among students who got first and second prize in the event of ganit daud, debate competition and singing. Mr. Bibhuti announced to appoint one teacher from BiharBrains because of the immediate need of the math teacher in the school.*

Patna local chapter Meet: March 29, 2006

Patna March 29, 2006: *Patna local chapter meet called on the following agenda:*

1. *BB Telecom courses*
2. *BB DISHA Project*
3. *CDAC authorized center Proposal*
4. *Formation of delegation to talk with minister Science & technology, Govt of Bihar for the demand of NISC/IISER in Bihar.*
5. *BB Center for GRE/GMAT/TOFEL*
6. *BB Scholastic center development and BB office structure*
7. *Republish of magazine Manthan*

Mr. Suresh N. Sandhwar, EX-AGM SBI was appointed as manager, operation of BiharBrains.

BiharBrains Meet with Dr. Anil Kumar in a delegation: March 29, 2006

Patna, March 30, 2006*: Meeting with Dr. Anil Kumar Minister S & T, Bihar in a team led by Mr. Bibhuti Bikramaditya comprising Prof BK Sharma, Prof RK SIhna, Prof UNL Mathur was organized on the invitation of hon'ble Minister of Science & Technology for the Demand of NISC /IISER in Bihar and role of NRIS in the development of Bihar. The memorandum was submitted in support of NISC /IISER in Bihar. In the meeting serious discussions were held on the various aspects of establishing NISC /IISER and other research institutes in Bihar.*

Resolution of the meeting:

a. BB will form core committee for the demand of NISC/IISER in Bihar. The committee will give its report in one month time.

b. BB will Organize seminar for creating environment in Bihar for the investors in the month of Nov,06 in association with the Dept of Science & Technology, Govt of Bihar BB will invite NRIs /CEOs of MNCs /Academicians in the same event and take ideas from them.

Delhi local chapter meeting and get together: Delhi April 2, 2006

New Delhi*, *April 2, 2006 : *Mr. Dhirendra Kumar (Left in the picture) called Delhi local chapter Meeting and get together at Cannaught place, Delhi, on the agenda of BB review of work during Mr. Bibhuti's India visit in the month of February-March.*

BiharBrains New Delhi Meet and Get Together at Cannought Place, New Delhi

DISHA Events: June 3-4, 2006

Patna 3-4 June, 2006: BiharBrains organized two days DISHA EVENT at Dept of Physics, Patna Science Patna. The two days event were inaugurated by Dr. Anil Kumar, Hon'ble Minister for Science & Technology, Govt of Bihar in presence of Many Bigwigs of Bihar like Famous IG of police Sri Abhayanand jee (who got credit to send super 30 students in IITs in a very unique style of his teaching), Dr. Jagganath Thakur, EX-VC Patna university. The meeting was presided by Dr. B, K Sharma, HOD Electronics, NIT Patna. Mr. Kumar Sajan was the coordinator of this event with his team of 20 young IT professionals of BIT Mesra and IITs. There were many session for mock interviews, exams and group discussion for the getting job into reputed Indian companies along with MNCs. Around 400 students enjoyed hectic two days session of DISHA that was very much successful in giving guidance to youngsters to acquaint themselves about recent industry trends and demands.

Bihar Science & Technology Minister Dr. Anil kumar Inaugurating DISHA event at Patna Science College

Sri Abhayanand (I. G. Patna) addressing audience in DISHA event at Patna Science College

Dr. J Thakur, Ex- VC, Patna University giving speech at DISHA

Dr. B. K. Sharma, NIT, giving speech at DISHA event

BB Events at DOOR

BIHARBRAINS IS CELEBRATING ITS SECOND ANNIVERSARY ON OCTOBER 4, 2006

Meeting at different places will be organized on this occasion

A. Global chat meeting: Sept 30, 2006 at 9:00 PM IST on Yahoo

B. Singapore chapter meeting: Oct 1, 2006

C. Pune chapter meeting: Oct 1, 2006

D. Ranchi Chapter meeting: Date not decided yet

E. Patna Chapter meeting: Date not decided yet

SciTechFest, DECEMBER, 2006

THE END

THE END