

*From the Desk of Chairman*

Innovation :

Part 3 - 52

Over the last decade and a half, OECD countries have been experiencing a decline in the proportion of students pursuing S&T in higher education. The most worrying trend has been in disciplines like physical sciences and mathematics. Perturbed by the decreasing interest in S&T, the OECD Global Science Forum in July 2004 constituted a working group comprising representatives from 16 countries, EC and OECD Secretariat, to analyse quantitative trends in enrolments in S&T during recent years, to identify the underlying factors affecting students' choices, and to explore possible solution. The preliminary findings of the group were debated at an international conference co-organised by OECD and the Netherlands in Amsterdam in November 2005.

The Special Feature in the present issue of the **WISTA : Innovation** summaries some of the significant recommendations of the working group, based on the analysis of statistical data made available by 19 countries.

The Japanese Minister of S&T, Iwao Matsuda, in his lecture on May 3 at the AAAS headquarters in Washington, outlined his country's S&T priorities to face intense international competition, advocating cohesive and effective R&D spending and accelerated innovation. The 'Perspective' gives a gist of Phase 3 of Japan's S&T policy for ensuring Japan's competitiveness in the world market.

China, on July 1 inaugurated the world's most elevated railway, stretching 1956 km from Xining, the capital of Qinghai Province, to Lhasa, the capital of Tibet, with 960 km of track located 4000 metres above sea level. "In Focus" outlines the main features of this engineering marvel that is expected to drastically cut transportation costs, boost Tibet's economy, and bolster its prosperity.

Other features covered are: Scan Around Us, Frontier S&T, S&T for Basic Needs, Technology Development, Experts Converge, Knowledge Spreads, and Scan Around the Globe.

Comments and suggestions, as always, are welcome.

*Dr K V Swaminathan***CONTENTS**

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## SCAN AROUND US

### Akshaya e-Centres

The Government of Kerala has launched an innovative e-literacy program of setting up Akshaya e-Centres throughout the state. These centres are to provide e-literacy to one member from every household and act as ICT dissemination nodes and its delivery points in every village.

All Akshaya e-Centres will have internet connectivity and will be networked with a centralized operating centre. As part of the project, over 6000 e-centres are to be established in all the districts of the state.

The motivation for the Akshaya initiative came from the State Government's e-governance initiative FRIENDS (Fast, Reliable, Instant, Efficient, Network for the Disbursement of Services) which was launched some time back with the objective of providing a combination of over 1000 services, including computerized payment systems for citizens at each of the district headquarters in the state. Akshaya seeks to replicate FRIENDS in the rural areas of Kerala.

Akshaya is operated by the panchayats based on a public-private model. The Akshaya infokiosks offer computer education, e-learning modules designed on school curriculum, local content, internet services, and e-governance services like utility bill payment etc.

*(Invention Intelligence May-June 2006)*

### Call Centre for Farmers

A toll-free Kisan Call Centre run by Cartel is proving a boon to farmers in and around Haryana as they have only to dial 1551 with their questions and these would be answered by agricultural experts.

Whether it is a caller wanting to know how to treat his cow suffering from foot and mouth disease, or a group of women farmers keen to know about any new loan schemes, the query is sure to be answered, often in the regional dialect of the caller to put him or her at ease.

Nearly half the calls are from women, and interestingly enough, even city dwellers are using this call centre to get answers to problems of their kitchen gardens.

Each call to 1551 is initially attended by agricultural scientists at local level and in the event the query cannot be satisfactorily answered by the scientists present at the

call centre, the query is referred to the Agricultural University at Hissar or to Chandigarh or even to the experts at the Agricultural Institute at Pusa in Delhi.

*(Hindustan Times, June 26, 2006)*

### Innovations in Agriculture

To hundreds of farmers in the tribal belt of Kalwan Tehsil in Nashik district of Maharashtra, the Dalvi family is a source of inspiration.

On their 20-acre farm where initially only onions were grown, the Dalvi family branched out into bajra, and since then have grown a variety of fruits with great success. Realising that it was risky to mortgage their future to only one or two crops, they began to grow straw berries and then grapes, and alongside as their latest innovative venture, to grow watermelons. Below their grape creepers and next to their regular bajra crop, the earth is covered with watermelon tendrils. By May this year, they had already harvested 5 tons of watermelons and sold these at Rs 3000 per tonne.

The fact that Dalvi works as a senior clerk in the tribal welfare department has certainly been of help as it assured him of a steady income. He could, therefore, afford to take risk, but that does not detract from the fact that it is the energy and innovative flair displayed by Dalvi and his wife Dhaulibai that have made them a role model by showing to others how things can be different, and encouraging their co-villagers to grow crops that they had never even heard of before.

*(Indian Express, May 12, 2006)*

### Knockout Genes

Biologists at the Centre for Cellular and Molecular Biology, Hyderabad have succeeded in producing the first 'gene knockout mouse', which till now was the preserve of only a few advanced laboratories in the West.

The process involves removing or modifying a gene in the cells of the mouse and then reconstructing a new animal from the genetically modified cells. The team of biologists genetically engineered a mutant mouse strain that lacked one of the milk protein genes, known as kappa-casein. In the absence of this gene, females were healthy and could reproduce but they were unable to produce milk for their young. The technology has tremendous applications not only in the field of basic biology but also for creation of human disease models and in the drug discovery process.

Furthermore, the new mouse strain will be useful for animal models for the creation of novel dairy animals with modified milk properties and also in the efforts to produce genetically modified farm animals producing pharmaceutical proteins in their milk.

*(The Tribune, May 5, 2006)*

### **New Cancer Drug**

Bangalore based biotechnology company Biocon has developed India's first indigenously produced drug for treatment of head and neck cancer, which was dedicated to the nation by President APJ Abdul Kalam.

The monoclonal antibody named BioMab EGFR (epidermal growth factor receptor) treats the cancer by binding to cancer cell-specific antigens and inducing immunological response to the target cell.

Though a large number of monoclonal antibodies have been launched in India, they have been prohibitively expensive. But the new drug which is expected to be launched in the market very shortly, will be priced much more moderately, and in combination with radiation therapy or chemotherapy, is expected to be effective in several types of cancers that express EGFR including colorectal, pancreatic, metastatic, breast, non-small cell lung and brain cancer.

*(PTI Science Service, June 16-30, 2006)*

### **Online Case Tracking**

Tracking of legal cases by lawyers, chartered accountants and company secretaries has become much easier with the development of 'eJurix' by Spectrum Business Support, a provider of computerised law information solutions.

This innovative web and PDA-enabled law information service allows legal professionals to search electronically through 2,50,000 judgements of the Supreme Court, High Courts and Tribunals. The service offers a comprehensive database of the full text of these judgements from 1950 onwards, as well as Acts, Rules, Regulations, notifications and circulars issued.

*(Financial Express, May 8, 2006)*

### **Research Fund for Science**

The Union Science and Technology Minister Kapil Sibal has proposed the setting up of a National Science

Research Fund for promoting science research in the country.

"It is difficult to fund research activities from the low budget of the Science and Technology Ministry. Almost every ministry of the government which administers areas of public interest is in need of support from scientific innovations and technologies. Hence, every ministry can allocate a portion of the budget for creating this fund" he observed.

It is a matter of concern that India's contribution to global scientific research has slipped down to mere 2.87% from about 10% thirty years ago, and China which was lagging behind us till 1994 has now overtaken us.

*(Chemical Weekly, August 1, 2006)*

### **Tackling Woolly Aphid Menace**

Sugar cane is one of the major crops grown in India but it is highly susceptible to a variety of pests, of which the sugarcane woolly aphid (SWA) is the most serious.

While spraying of the SWA colony with a sephate insecticide diluted with water is the accepted method of treatment, in case of high SWA infection such spraying alone is not very effective.

Now the Sugarcane Research Institute, Coimbatore recommends an innovative method of tackling the SWA menace. It advises that before spraying the sugarcane crop with insecticide, predators such as Diphia Aphidvora which are present in the field, should be carefully conserved by manually collecting the leaves on which these predators have settled. The leaves thus collected should then be placed in four or five spots in the sugar cane field to help control the SWA infestation. Care should be taken not to spray these spots with insecticide when the field is being sprayed.

The Institute has also developed a method of rearing the Diphia predator in plastic trays. About 350 Diphia cocoons can be reared in 18 days in a single tray, and if the SWA population reappears even after spraying with insecticide, the tray reared Diphia cocoons can be released at the rate of 1000 larvae/cocoons per hectare at different spots in the field to control the infestation.

*(The Hindu, Aug 3, 2006)*

<b>FRONTIER S&amp;T</b>
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**AEROSPACE/SPACE****India, Seventh to Launch Satellite**

Since the first man made satellite, Sputnik I was hurled into space less than 50 years ago, only seven countries have launched a satellite, and India has the proud privilege of being one of them.

India's first satellite launch vehicle was the SLV-3 which successfully flew in 1980 and it was followed by the Augmented Satellite Launch Vehicle (ASLV), both of which were able to put small satellites into orbit.

These were followed by the more powerful Polar Satellite Launch Vehicle (PSLV) which puts earth observation satellites into space, and the Geosynchronous Satellite Launch Vehicle (GSLV) which carries India's communications and broadcasting satellites into space.

In 2008, the PSLV will launch Chandrayan I, an unmanned spacecraft with scientific instruments to the moon.

*(Young World, Aug 4, 2006)*

**Russian Satellite Rocket Crashes**

A Russian rocket carrying 18 satellites crashed soon after lift-off from Baikonur cosmodrome in Kazakhstan in the last week of July this year. According to the mission control authorities, the engines of the Dnepr rocket shut down 86 seconds after flight.

The rocket crashed some 25 kilometres from the launch site, without causing any damage to the vicinity, but all the 18 satellites on board were destroyed.

17 of these satellites were being launched for foreign customers, including the US and Italy. One of the satellites was to have been the first to be operated by Belarus whose President, Alexander Lukashenko had gone to Baikonur to witness the launch personally.

A detailed investigation has been initiated to ascertain the actual reasons for the crash.

*(BBC News, July 31, 2006)*

**BIOTECHNOLOGY****Carbon Nanotubes**

Carbon nanotubes or CNTs are hollow wires of pure carbon, nearly 50,000 times narrower than the finest human hair, but stronger than steel. They have great potential in a variety of biological applications including medical diagnostics and treatment. However, as they were cytotoxic - contact with them killed cells - their use was limited.

A team of US scientists have now succeeded in making these CNTs biocompatible. By coating them with a synthetic polymer that mimics mucin, the substance on cell surfaces that serves as a lubricant, the researchers have been able to render them non-toxic and attach them safely to biological cells.

The polymer coating can also be customized to bind a particular type of cell.

*(Science @ Berkeley Lab, Aug 1, 2006)*

**Unlocking Mysteries of Protein Cells**

The mysteries of protein cells in baker's yeast have been unlocked to reveal exciting new information.

Researchers at the European Molecular Biology Laboratory in Heidelberg, in partnership with Cellzome extracted complete proteins from yeast cells using a process called tandem affinity purification, which were then studied using mass spectrometry, and bioinformatics. Computational solutions were supplied to the Laboratory to help gain insights into the protein complexes. The study revealed 257 new molecular machines arranged in modular form in these cells in addition to more detailed information about the molecules already known.

The molecular machines are not stable entities but continually change by dismantling and reassembling themselves into new configurations depending on the task. The researchers found that the cell did not need to build every machine from scratch any time it was required to do something, and instead it used a mixed strategy of prefabricating core elements of machines and then synthesizing additional snap-on molecules to give each machine a precise function.

*(CORDIS Technology Marketplace, Feb 5, 2006)*

**DRUGS/PHARMACEUTICALS****HIV Hiding in Gut**

At the end of a three-year study, UC Davis researchers led by Dr Satya Dandekar, Professor and Chair of the Department of Medical Microbiology and Immunology at UC Davis Health System, have discovered that the HIV virus, which causes AIDS, can survive anti-retroviral treatment, by hiding in the mucosal tissues of the patient's intestine even when blood samples indicate that the treatment is working.

The researchers have found that while current HIV drug therapy is quite successful in reducing viral loads and increasing T-cells in peripheral blood, it is not so effective in intestinal mucosa, where massive destruction of the immune cells keeps occurring. According to these researcher intestine associated lymphoid tissue accounts for 70% of the body's immune system, and restoring its function is crucial to ridding the body of the virus. For this purpose, a treatment composed of regular intestinal biopsies and the use of anti-inflammatory medications is essential.

*(UC Davis Public Release, July 31, 2006)*

**Vaccine for Alzheimer's**

Alzheimer's disease is believed to be caused by the overproduction of amyloid proteins which form clumps or plaques that litter the brain.

Scientists have now developed a potential DNA vaccine which has been tried out on mice with promising results. With the administration of this vaccine, the levels of key amyloid proteins were cut by up to 50 percent in some parts of the brains of mice without any side effects.

This approach has been tested in preliminary trials on humans but early results have shown that the immune response was too strong, leading to swelling of the brain. New studies are currently underway to ensure that the immune response is less aggressive, so that the swelling of the brain is avoided.

According to Dr Clive Holmes of the Alzheimer's Research Trust, this work represents a promising new line of vaccine development but more research would be needed to see if it could be replicated in humans.

*(PTI Science Service, June 16-30, 2006)*

**ELECTRONICS/COMMUNICATIONS****Online Baby-Sitters**

Endless are the innovations to which the internet lends itself. If dating and match-making services are flourishing on the internet, could baby-sitting be far behind?

Baby-sitting is big business in USA and now Genevieve Theirs CEO and founder of SitterCity.com has developed an Internet based baby-sitting and nanny services with thousands of names, numbers and background material from which to choose a baby sitter.

Like other sites, it gives parents access to a directory of childcare providers in all American cities. For \$7.99 a month annually or \$9.99 monthly plus a \$39.99 registration fee, parents can tap the site's vast database. Prospective sitters are not required to pay any money to post their information on the site. SitterCity also provides parents with some tools to ensure that the sitter they choose is the right one for them.

*(abc News, Aug 1, 2006)*

**Video Games Turn Serious**

Video games have been seen as an enjoyable way of spending time, but now a new generation of video games are being developed which have a more serious agenda.

A video game, called Cyber-Budget, has been developed for the French Ministry of Finance, where people themselves can attempt at doing the minister's job of framing the country's budget. The members of the public get more to do than just wander through the corridors of power; they also get a chance to play with the controls.

As the French Budget Minister put it, "The principle of the game is to become the French Minister of Budget. For instance, you learn about the price of oil, a new war and so on, and of course there are consequences on the economic situation. You have to make your own decision as to whether you invest more, or increase public spending, or increase public debt, and then what happens."

Similarly, while the company Kynogon has inserted artificial intelligence into security games, the online game America's Army is being used as a recruitment tool. Although it has been criticized for trivialising conflict, it does provide some useful insights.

*(BBC News, July 31, 2006)*

## S&T FOR BASIC NEEDS

### BUILDINGS

#### Homes for the Future

UK has the oldest housing stock in the developed world, and much of it is represented by the Victorian terraced housing that is found in the centre of its urban areas. It is estimated that over 1 million of those housing units would have to be demolished by 2050 and replaced with new energy efficient homes to meet future carbon emission targets. At current demolition rates, the houses would have to last for 1000 years before they are replaced.

Now the Prince of Wales' Foundation for the Built Environment has teamed up with BRE - the UK's leading centre of expertise for construction, the built environment, energy, fire, security and associated issues - to upgrade the existing stock whilst avoiding the waste associated with demolition. Thus sound economics, technologies, and environmental demands will mutually reinforce each other.

The project will be initiated from the east of England region where more than 50 % of ongoing construction output will be connected with existing building stock rather than new build.

*(BRE News, June 22, 2006)*

#### Strengthening Concrete

Thermal power plants in India generate a great deal of fly-ash waste, which gets mixed up with the burnt ashes in the storage compounds around the thermal plants.

It has now been observed that micronised fly-ash particles can be used to reduce the capillary pores of set mortars and concrete, and thereby add to the strength and durability of the building material. A micronised fly-ash material has been developed using a mix of 1 % gypsum and 99% crude fly-ash which is then micronised in an air jet mill upto fineness of 5 microns to 0.05 microns. Tests reveal that there is a 20% improvement in all performance parameters without change of other materials and systems.

*(Invention & Intelligence, May-June 2006)*

### CLOTHING/TEXTILES

#### An Adhesive Textile

Scientists at the UK - based BAE Systems have developed a new textile which they claim acts like velcro and gives it the adhesive capabilities of the lizard, which can run up walls and over windows. A lizard is able to do this because of the thousands of microscopic hairs which cover its feet and open out umbrella fashion, bringing the feet so close to the surface that it is able to harness molecular levels of attraction.

Based on that principle the material which has been labelled Synthetic Gecko, imitates the lizard's feet and uses several layers of fabric, each consisting of thousands of polymer strands which measure just two-millionth of a metre across and enable the material to hold onto the surface.

If developed on a commercial scale, this product has a wide array of uses, including emergency 'sticking plaster' for aircraft or other vehicles, as well as building materials, safety harnesses, tyres and even shoes.

*(The Guardian, Aug 5, 2006)*

#### Intelligent Carpets

Beware the next time you step onto a carpet! It might tell you not only your age but also your gender simply by the way you walk.

Researchers at the Japanese National Institute of Advanced Industrial Science and Technology have developed carpeting material that can tell just that. The material contains a layer of silicon rubber filled with tiny sensors which are so sensitive that they can pick up differences in the way people walk.

The researchers at the Institute have found that these sensors can determine the age of a person by the size of that person's foot and walking speed, while the gender can be determined by the differences in centres of balance that men and women have in relation to their shoe size. During tests, the material was able to distinguish persons in their twenties from those in their sixties with near total accuracy, and between genders with an accurate degree of 70-80 %.

Such carpeting material may be found useful for security purposes as a biometric as well as for advertising.

*(Economic Times, Aug 3, 2006)*

**ENERGY****Energy Systems**

In these days of galloping demand for energy, understanding the dynamics of energy resource utilization is vital for framing long term energy policies. In this context, investment in energy technology innovations can be effected greatly by changes in energy policies and can thus have a wide ranging impact.

The EU funded SAPIENT project has dealt with the development of appropriate tools for the long term analysis of energy systems on a global and regional scale. Project partner, Swiss-based Paul Scherer Institute (PSI) is focused on the revamping of the Energy Research and Investment Strategy (ERIS), a global energy model prototype to make it multi-regional and take into account different technologies. According to the principle behind the new ERIS model, a global R&D expenditure is provided as a starting point and the model then calls for optimal allocation towards a number of innovative learning technologies, thus ensuring a more balanced spread.

*(CORDIS, Aug 1, 2006)*

**Motor Fuel from Cattle Dung**

Japanese scientists have extracted motor fuel from cattle dung.

Professor Shibusawa, Professor of Agriculture Engineering at Tokyo University of Agriculture and Technology said that his research team had extracted 1.4 ml of a petrol-like liquid fuel from every 100g of cow dung by applying high pressure and heat. The fuel was produced by adding some unspecified metal catalysts to the dung inside the container and applying a 30 atm pressure and heat of upto 300 degrees C. The team hopes to improve the technique and make the technology commercially viable within five years.

Meanwhile another set of Japanese scientists at the National Institute of Advanced Industrial Science and Technology, have succeeded at laboratory level in continuously synthesising diesel fuel from wood biomass through gasification at high temperature (800-900 degrees C) and high pressure and purification using activated carbon.

*(VATIS Update, May - June 2006)*

**FOOD****Ghee Without Cholesterol**

Ghee (clarified butter) is known for its high cholesterol content and is absolutely forbidden for those suffering from a weak heart as it is believed to double the chances of a heart attack. Indeed nearly 30% of all deaths in our country are said to be caused by cardio-vascular diseases, whose root cause is cholesterol.

A team of scientists from the National Dairy Research Institute have recently devised a process whereby 85% of the cholesterol content is removed from the ghee while keeping its original flavour and fat content intact.

A patent for this process has been filed through the National Research Development Corporation, and talks are on with some companies to produce India's first cholesterol-free desi ghee.

*(Indian Express, May 16, 2006)*

**Health & Agriculture**

If innovation is basically the development of new ideas and methods, the initiative launched by the International Food Policy Research Institute (IFPRI) to pursue agriculture and public health policies through coherent, joint action instead of unconnectedly as in the past, is certainly an innovative measure that could have large potential benefits for the poor.

Among development professionals, there is growing realisation that agriculture, and particularly food production, influences health, and health influences agriculture, and both in turn have profound implications for poverty reduction. This recognition emphasises that each has much to contribute to the other, but to take advantage of the opportunities, it is crucial to know the precise linkages between the two sectors.

To help increase the synergies, IFPRI and its sister centers in the Consultative Group on International Agricultural Research (CGIAR) have begun an initiative on agriculture and health, to promote increased coordination between the two sectors and better understanding of the dynamic and complex linkages that bind the two.

*(IFPRI, May 19, 2006)*

**HEALTH****Suffer Stroke and Forget Smoking**

Researchers in USA have found that damage to the brain's insular cortex through suffering a stroke, can wipe out addiction to smoking.

The insular cortex is that part of the brain which provides the emotional context for experiences, besides higher level decision making functions such as forming of memories. When it is damaged by a stroke, the emotion associated with the last puff gets cut off thus eliminating the craving to smoke. This finding has important implications for the treatment of drug addicts.

*(PTI Science Service, July 16-31, 2006)*

**Tackling Obesity**

According to the WHO, one billion people world wide or one-sixth of the human race, the bulk of them residing in the developed countries, are obese, and they invite upon themselves a multitude of illnesses, including high blood pressure, strokes, diabetes, and heart disease. Indeed obesity is emerging as a major killer, and a global battle is being fought against it.

Now scientists in Scrips-Howard Research Institute, California, USA, have claimed to have tested a new anti-obesity vaccine on rats which slows down the weight gain and reduces fat. The new vaccine is directed against the peptide hormone 'ghrelin' which regulates the body's energy balance, and which is involved in appetite signalling between the stomach and the brain. Studies indicate that upon injection of the vaccine into the rats, reduction in weight occurred despite the rodents eating and drinking, which indicated that inhibiting ghrelin affected the metabolism of the rats.

Whether the vaccine will work with equal efficacy in the case of humans is still to be seen. Meanwhile, Danish scientists have separately found that merely by getting enough sleep, appetite can be curbed and weight regulated, thus reducing the risks of Type II diabetes. Also scientists hypothesise that it is hormones, such as ghrelin, which are altered by lack of sleep, thus contributing to weight gain and obesity.

*(Economic Times, Aug 7, 2006)*

**TRANSPORTATION****Biodiesel for Vehicles**

To reduce oil imports and air pollution, South Korea is releasing biodiesel for sale for private vehicles.

In accordance with a voluntary pact among local refiners to supply more eco-friendly fuel, biodiesel - a mixture of diesel and five percent rapeseed oil - is being sold through petrol stations.

Since the proportion of rapeseed oil is low, consumers are not likely to find any difference in the performance of their vehicles, and although the cost of producing this eco-friendly fuel is higher than the cost of refining crude oil, the benefits in terms of reduction in oil imports and less pollution would outweigh the costs.

By 2011 it is expected that five percent of all energy used would be from reusable eco-friendly sources.

*(VATIS Update, May-June 2006)*

**Ensuring Road Safety**

South Africa's Council for Scientific and Industrial Research (CSIR) is promoting road safety, particularly during the holiday season when drinking and driving leads to real carnage on the roads.

The National Metrology Laboratory (NML) of the CSIR, which is one of the two accredited institutions in the country, plays a significant role in protecting law abiding people while helping to prosecute the offenders.

Prosecuting guidelines require breathalysers to be calibrated and adjusted every six months. The two peak periods for casualties are the December and April holidays. Well before these dates, the gas metrology laboratory of the NML calibrates the breathalysers, through a semi-automated process that takes 30 to 45 minutes per breathalyser.

The breathalyser uses the researched relation between the blood alcohol concentration and the breath alcohol concentration of the person concerned. In South Africa, the % blood alcohol concentration limit is 0.05% for general drivers and 0.02% for professional drivers.

*(CSIR, Mar 9, 2006)*

## SPECIAL FEATURE

### ENTHUSING STUDENTS IN S&T

#### Introduction

There can be little doubt that science and technology (S&T) have been the prime movers in the tremendous increases in wealth creation, economic development and human betterment that the world has seen in the last two centuries. Yet paradoxically, throughout the world for some time past, interest among youth to pursue S&T as a profession has declined. Many of today's bright youth appear loathe to spend long hours bending over retorts and beakers, or handling equipment where they perceive low emoluments, uncertain rewards, and little or no recognition, when glittering opportunities for professional advancement, fat pay packets with perks, travel to exotic destinations and rapid recognition are available in other professions such as management, business, banking, marketing and sales, corporate law, financial analysis etc.

#### OECD-Wide Study

Indeed so serious has the problem become that based on a proposal mooted by France and the Netherlands, a special working group was recently set up in the Ninth Meeting of the Global Science Forum to make an OECD-wide analysis of the matter to:

- analyse quantitative trends in enrolments in S&T studies during recent years, and in particular to quantify the extent of decline, if possible.
- identify the underlying factors that affect student's choices.
- explore solutions that can be implemented to influence such choices.

#### Data Collection and Analysis

Statistical data for the study was collected from Australia, Belgium, Canada, Denmark, Finland, France, Germany, Israel, Italy, Japan, Korea, the Netherlands, Norway, Poland, Portugal, Sweden, Turkey, UK and USA in five areas, namely, life sciences; mathematics and statistics; physical sciences; computing sciences;

and engineering. Data were compiled in four categories: secondary level/high school diplomas, entrants in tertiary education, tertiary graduates, and doctorates. Academic and vocational studies data were aggregated. When available, data were also analysed by gender and by national/foreign origin. The time span was 1993-2003 for most data categories, and 1985-2003 for some others.

The analysis of trends in students' choice for S&T studies took into account demographic trends as well as better access to higher education. It was found that most countries had experienced a significant decline in their 15-19 year old population, which however was counterbalanced by better access to upper secondary education. Similarly, enrolment rates in tertiary education increased significantly over this period, which overcame the stable or declining demographic trends.

At the outset, the study recognised the limits of quantitative analysis in view of the lack of homogeneity in the national data sets on which reliance was placed. It sounded a note of caution in extrapolating student interest in specific disciplines from numbers of students in S&T studies as the relationships among numbers, choices, and degree of interest in S&T studies were complex and indirect. Subject to these caveats, the study has come out with certain definite findings and has made some far reaching recommendations.

#### Findings

In regard to *Quantitative Trends in Enrolment*, the study found that as a consequence of the growing enrolment rates in higher education, absolute numbers of students in S&T increased in most countries over this period, but the relative share of S&T students among the overall student population had fallen. This was true not only in tertiary education, but also for upper secondary education in many countries. Coupled with unfavorable demographics, and a stabilisation of the number of students accessing tertiary education, several of these countries could expect this general trend to affect the absolute number of S&T students in future years.

Furthermore, the study noted that the data contained important disparities between countries and even more between different fields of study. For instance, engineering students accounted for 40-60% of S&T

students in most countries, and this situation had generally remained stable for several years, but the enrolment in the sciences and mathematics in some countries had halved during 1995-2003. On the other hand, the proportion of students in the life sciences and engineering had remained mostly stable due largely to an increase in the number of female students in the life sciences, and to a growing interest in studies such as engineering which had good job prospects. Similarly, the number of computer science students had increased dramatically, probably because of a shift in student choice within the overall domain of S&T eg from physics to computer studies.

The study notes that women are strongly under-represented in S&T enrolments, and although their share in S&T studies is increasing, it has yet to catch up with men. In most countries, women constitute less than 25% of computing and engineering students, while in contrast, they are more numerous in the life sciences, pointing to the fact that the choice of discipline is highly gender-dependent.

Coming to the second aspect of the study, namely *the underlying factors affecting students' choices*, the study states that although the perception of S&T remains positive among the students despite concerns in specific areas often linked to its negative environmental and societal consequences, it is far less attractive as a career option particularly in the industrialised world. The prestige of scientists has declined as higher management or government positions are rarely held by them and the media rarely mentions them by name, even while recounting their scientific achievements. Many young people perceive careers in S&T negatively, and this distaste is even more marked in the case of girls, except perhaps for health related professions. Furthermore, incomes are seen to be low relative to the amount of work involved and the difficulty of the required studies. A few pupils have a full or accurate understanding of science-related professions, and the range of career opportunities available therein.

As regards the third aspect, namely *solutions that can be implemented to influence the choice* of a career in S&T, the study makes several recommendations. Firstly, it suggests that the future demand for S&T graduates be assessed at all levels to determine the urgency of the efforts required to change enrolment numbers.

Secondly, it recommends that accurate, credible and realistic information about S&T careers be disseminated among students and a network of stakeholders be established to share information on best practices between countries and the various communities involved.

Thirdly, it recommends reformation of the S&T education curricula. As poor opinions of S&T studies are often linked to negative educational experiences, positive contacts with S&T at an early stage are essential. The S&T curricula should be made more flexible and attractive to reflect recent developments as it has to compete with newer, more fashionable subjects. Professional skills and cross-disciplinary studies should be promoted. Teachers training and qualifications require greater attention through improved resource allocation and a proper system of incentives.

Lastly, the study makes a strong plea for improving women's representation in S&T studies as they constitute a large reserve. It points out that girls (and minority students) suffer from stereotypes in relation to external expectations, as well as negative pressures. They are also handicapped by the absence of inspiring role models. It recommends that female students should benefit from priority measures, but this should not be achieved via programmes that are targeted at "girls only" as such labelling would reduce their credibility. While stating that reforms are needed in teacher training, curriculum and role model development, the study emphasises that the learning context and approach should be modified to make them more attractive to female students, by promoting multidisciplinary and student interactions, and encouraging monitoring projects.

### **Indian Relevance**

Although the study was conducted in the context of the developed countries, the findings and recommendations have great relevance for us, as we too are facing the problem of declining interest in pursuing S&T as a career option among our best and brightest students. This is borne out by the annual drift of IIT graduates to institutes of management learning in India and abroad.

## IN FOCUS

### TRAIN ACROSS ROOF OF THE WORLD

#### Creating History

History was made the other day as two inaugural trains named **Qing1** and **Tibet2** set out at approximately the same time in opposite directions across the roof of the world.

Qing1 was inaugurated by Chinese President Hu Jintao at Golmud in Qinghai Province on a bright Saturday morning. A train carrying around 600 passengers which included railway workmen, government representatives, journalists, and others then pulled out of Golmud railway station at 11.05 am on its 1142 km long journey to Lhasa, capital of the Tibet Autonomous Region. At about the same time Lhasa saw off a train carrying 700 passengers in 16 compartments bound for Lanzhou, capital of northwest China's Gansu Province which they were expected to cover in approximately 30 hours.

#### Engineering Marvel

Indeed the 1956 km long Qinghai-Tibet railway stretching from Xining, capital of Qinghai Province to Lhasa, which has been built at a cost of 33 billion yuan (4.1 billion US dollars) is a triumph of engineering. It is the world's highest and longest plateau railway and also the first connecting Tibet with the rest of China. The stretch from Xining to Golmud measures 814 km and became operational in 1984, while construction of the 1142 km long section from Golmud to Lhasa commenced in June 2001, and has been completed in record time. Some 960 km of the railway tracks run 4000 metres above sea level where the oxygen content is only half that at sea level, and the highest point, the Tanggula Mountain Pass at 5072 metres, is at least 200 metres higher than the Peruvian railway in the Andes, which was formerly the world's highest railway track.

#### Laying Tracks on Permafrost

So harsh are the climatic conditions prevailing on the Qinghai-Tibet plateau that the average annual temperature is below zero degree Celsius with the minimum temperature at 45 degrees below zero. About 550 km of track run on permanently frozen earth or 'permafrost' which at places is 20 metres thick and posed

great challenges for designing and engineering. The key of railway construction in a permafrost area is to prevent the earth under the track bed from melting so as to provide firm foundations. Traditionally, this is done by raising the height of the embankments and laying insulation materials to reduce the external heat entering the foundations. But in the present case, the Chinese railway authorities have used highly innovative techniques based on the design principle of "initiating temperature fall, cooling the foundations, protecting the permafrost" with remarkably successful results.

Another achievement for the authorities is that this project was completed without losing a single life through altitude sickness although hundreds of thousands of workers participated. Over 600 doctors and nurses were employed on the project, with one clinic every 10km along the line to ensure that medical attention was available to a sick worker within 30 minutes.

#### Environmental Protection

The high altitude and harsh climate, have made the environment very fragile all along the railway line, and China has put environmental protection high on the agenda. In his inaugural address, President Hu Jintao emphasised the importance of environmental protection of the Qinghai-Tibet plateau and exhorted the railway workers and others who would be using the line, to protect the region's flora and fauna and help conserve its eco-system. In this connection 33 passages have been built for migrating animals, and already as many as 1000 antelopes, including pregnant ones, have crossed the railway line using these special passages.

#### Looking Ahead

Over 1300 years ago, Tibetan ruler Songzan Gambo had to wait for three years for his bride Princess Wencheng to reach Lhasa from the interior. Today Beijing is barely 48 hours away. The railway will link Lhasa with other major Chinese cities too, and will carry 75 percent of all inbound cargo into Tibet thereby cutting transportation costs and developing the local economy, besides giving a tremendous boost to tourism. With the railway providing easy access, Tibet can look forward to a bright and prosperous future.

*(News From China, July 2006).*

<b>PERSPECTIVE</b>
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## **JAPAN'S PHASE - 3 S&T POLICY**

### **Background**

Japan's post World War II history can serve as an object lesson for the world. It was the only country to face the horrors of atomic bombing, its industries smashed beyond recognition. Its great cities reduced to smouldering ruins, its people by a supreme act of will which has few parallels, set out to restore the nation to its lost position. By concentrating on selected high value economic activities where innovation and miniaturisation could translate the fruits of S&T research into marketable products, Japan was able to grow into the world's second largest economy within a single generation, with many of its products sold the world over and its companies becoming household names.

However, in certain sunrise technologies of the last two decades of the twentieth century, such as information technology and telecommunications, Japan found other Asian tigers, such as South Korea and Taiwan, surging forward, and also during this period Japan suffered economic stagnation. All this prompted considerable soul-searching, leading to the outlining of a S&T policy in 1995.

### **Main Features**

The 1995 policy required the Japanese government to formulate a basic S&T plan. The plan so prepared was spread over three five-year phases with targeted measures for meeting the policy needs of each of the phases.

The first phase was from 1996 to 2000 and included a major expansion in support for post doctoral fellows which cost the government over \$150 billion over five years.

In the second phase which ran from 2001 to 2005, government R&D investment was concentrated into eight areas, with four given special priority: life sciences; information and communication technology; environmental sciences; and nanotechnology and materials. The second phase which cost the government \$186 billion, also called for doubling the funding for competitive research.

Both these phases of S&T policy rested on the two main pillars of (i) emphasis on basic research in a diversity of scientific areas, and (ii) policy-goal-oriented R&D. For this purpose, 62 strategic S&T priority areas were identified by Japan's Council for S&T Policy in consultation with eminent experts, to fulfil the requirements of the people, and to be able potentially to overcome the increasingly intense international competition that Japan was bound to face in the coming years.

Meanwhile, Japan has been facing two major constraints. Firstly, it is excessively dependent on oil imports. Currently Japan imports 90 percent of its oil from the Middle East, making it the country most vulnerable to developments in one of the most politically volatile regions of the earth. Secondly, Japan's population is aging more rapidly than that of any other country and last year its population actually reduced. There is therefore vital need to develop technologies for new energy sources to replace oil, and to ensure Japan's competitiveness in the world market where competition was rapidly growing.

### **Phase Three of S&T Policy**

The ambitious third phase of Japan's S&T policy announced by Japanese S&T Minister Iwao Matsuda recently involves an outlay of \$221 billion, and seeks to address these very issues. While emphasising human resource development, it focuses on innovations in global environment observation technology, medical technology for the early detection of microscopic cancers, and the development of automobiles that do not use petroleum.

Indeed according to Matsuda, the sole determining factor for the future growth of the Japanese economy will be innovation. For this purpose, 30 world level centres of excellence in research are proposed to be set up and a drastic shift to a merit based system is proposed to be put into place, to encourage innovation by young researchers. Furthermore, Japan's present R&D budget system which is currently dispersed among different ministries and funding agencies will be made more cohesive with the active participation of the public and the private sector.

## TECHNOLOGY DEVELOPMENT

### R&D COMMERCIALIZATION

#### DNA in Crime Detection

UK Government's Defence Science & Technology Laboratory (DSTL) is charged with ensuring that its leading innovative ideas and technologies are translated into wealth creating enterprises that benefit the economy and wider society and bring useful income to the Ministry of Defence/DSTL.

One such product which is built around DSTL's ultra-rapid-real time Polymerase Chain Reaction technology for the detection of DNA and RNA is called Enigma and it provides a rapid diagnostic platform for furnishing genetic data to anyone at any location.

Potential applications include crime scene analysis of forensic DNA samples; detection of genetic modifications and bacterial contaminations at the point of sampling; and rapid field- testing for animal diseases such as foot-and-mouth disease in cattle.

*(DSTL Press Release, Aug 1, 2006)*

#### Haemophilia Therapy

Baxter AG and Jerini A G have announced progress in their collaborative research program to develop a non-intravenous therapy for the treatment of haemophilia.

Extensive in vitro and in vivo analysis has identified several synthetic lead molecules with promising pharmacological properties.

Because blood-clotting proteins are large, relatively unstable molecules, current haemophilia therapies can only be administered intravenously, which is an invasive and technically demanding procedure. Scientists from Baxter and Jerini used proprietary tailored screening and analysis methods to design molecules which can be administered non-intravenously and which can reach the target site quickly and effectively without being inactivated in the process.

*(Santa Communication, June 21, 2006)*

### Technology Development Board

The Technology Development Board of the Ministry of Science and Technology is a unique institution, the first of its kind which was established in 1996 within the government framework, with the objective of ensuring that the fruits of indigenous research are commercialized into marketable products and services.

The objective of the Board is to encourage industry to enter into hi-tech, high risk areas, and to firm up their links with R&D. Technology driven projects in any sector are welcome and the procedure for evaluation of these projects through recognised experts is unique. Complete confidentiality is maintained with respect to project documents and processes and total transparency is maintained while processing project proposals.

The total number of project agreements signed by the Board till now is 160, involving a total cost of Rs 2515 crores, of which the Board's commitment is Rs 735 crores.

*(TDB Release, July 2006)*

### Vaccine Maker Offers Shares

Novavax, a Pennsylvania (USA) based vaccine maker, has offered over 4.5 million of its shares priced at \$4.35 per share for general corporate purposes, including but not limited to (i) clinical development of virus like particles-based avian and seasonal influenza vaccines including the development of appropriate adjuvants, and demonstration of large scale production capabilities for such vaccines, and (ii) expansion and investment in the company's R&D facilities.

This was announced recently by its President and CEO Rahul Singhvi.

Of these shares, worth \$20 million, Kleiner Perkins Caufield & Byers based in California, has agreed to acquire \$12.5 million or 62.5% while Prospect Ventures Partners, another California based company, has agreed to lift the balance \$7.5 million or 37.5% offering in addition to its \$5.5 million previously accumulated equity ownership position in Novavax acquired through open market purchases.

All three parties expressed themselves in favour of the deal.

*(Biospace.com March 4, 2006)*

## INTELLECTUAL PROPERTY

### India Gets IPR Savvy

Patents and the protection of intellectual property is no more confined to big business or large scale innovations. India's global commitment, the presence of MNCs and awareness that money can be made through the protection of intellectual property rights (IPR), have prompted the most unlikely people in the most unusual places to file for protection of these rights.

Although the cost of filing a patent case is anything from Rs 10,000 to Rs 15,000, school teachers, students, fashion designers, small time farmers, and architects are knocking at the doors of patent attorneys seeking protection of their IPR. According to an architect, his designs are unique and therefore he has taken a copyright for some of his product designs which he sees as an extension of architecture. Similarly, an onion trader in the small town of Jalgaon has secured a trademark for his logo, which till now has been anonymous, but with good quality. Indeed intellectual property seems to have become an idea whose time has come in India, and our people are getting increasingly IPR savvy.

*(Economic Times, May 8, 2006)*

### Innovation in Fashion Design

In a paper published recently titled 'The Piracy Paradox: Innovation and Intellectual Property (IP) in Fashion Design' the author, Chris Sprigman of the University of Virginia, School of Law, analyses the interesting paradox that obtains in the fashion industry.

While the orthodox justification for IP is utilitarian and advocates of strong IP rights argue that absence of such rights devalue the efforts of creators and stifle innovation, the global fashion industry produces a huge amount of creative goods without strong IP protection. Copying is rampant in the industry, but despite that innovation and investment remain vibrant and the fashion industry itself remains remarkably quiescent about copying. Fashion design remains mostly unprotected and yet it is economically successful and continues to remain a puzzle for the orthodox justification of intellectual property rights.

*(scholarship, Aug 1, 2006)*

## Philosophy of Patents Law

Innovation can truly flourish only where intellectual property rights (IPR) are given legal protection through patents law and other such enactments. The basic philosophy of the patents law in India as contained in the Patents Act of 1970 read with the Patents (Amendment) Act 2005 is:

- Patents are granted to encourage inventions and their commercial working in the country to the fullest extent.
- Patents are not granted merely to enjoy monopoly rights by the patent owners by importation of the patented products.
- Patents protection and their enforcement must contribute to promoting technological innovations by disseminating knowledge and encourage socio-economic welfare and balancing of rights and obligations of all sections.
- Patents are granted not to impede public health and nutrition. But for promoting public interest especially in those sectors which are vital to the socio-economic and technological advancement.
- Patent rights should not be abused by the patent owner or his licensee by resorting to resistivity trade practices.
- Patents are granted so that the benefits of patented inventions are available to the public at affordable prices.

Accordingly, the patent owners and their licensees are required to be more socially responsive and in the event of their failure to do so, the regulatory clauses can be invoked, which include among others.

- Compulsory licensing for not ensuring public requirement in reasonable time, at affordable prices u/s84
- Revocation of patents for non-working u/s85
- Compulsory licensing for export of pharma products to least developed countries under conditions u/s9(A)
- Power of Central Govt to use patented inventions for non-commercial govt purposes U/ss47 and I00.

*(Chemical Weekly Aug, 2006)*

## TECHNOLOGY FUNDING

### Collective Research

Innovative small and medium enterprises (SMEs) are and will continue to be among the main drivers of European economic growth. Traditional industries will always play their role but it is the smaller companies that provide the innovation and entrepreneurial spirit required to keep abreast of globalisation.

However, small companies wishing to develop a new technology are generally handicapped by the lack of financial, technological, and human resources to proceed by themselves. The European Union (EU) has tried to tackle this problem by giving financial incentives to encourage such firms to join consortia so as to share research costs and the benefits of the subsequent results, as well as the expertise of larger partner firms.

The strategy has led to a number of different initiatives, targeting various subject areas, two of which involve 'Collective Research' and 'Economic and Technological Intelligence' Projects. While the former aims to improve the competitiveness of large groupings of SMEs, the latter focuses on gathering, analysing and disseminating information. Both projects last typically for about 3 years.

*(CORDIS, Aug 21, 2006)*

### Innovative Housing

The recent introduction in UK of an innovative housing certification standard - LPS 2020 - is bound to encourage manufacturers of innovative systems, elements and components for constructing residential buildings in that country. This in turn will attract funds and spur the growth of a market previously hampered by the absence of a widely recognised formal certification standard.

The LPS 2020 standard has been developed by BRE Certification, with support from the Association of British Insurers and the Council of Mortgage Lenders to enable the assessment of innovative systems that have yet to gain a performance track record in UK. It is expected to increase the confidence of insurers, mortgage lenders and regulators in innovative systems and help the UK house-building industry to adopt innovative systems in order to contribute accelerated delivery in the UK house building sector.

There is a growing demand for innovative building systems in the UK and yet funding for its growth is

hampered by the fact that many innovative systems are unproven. These certification standards which will cover all innovative systems, regardless of type, material or form of construction, will require the manufacturer to demonstrate that the system meets building regulations, besides addressing some additional performance characteristics, including durability, resilience, ease of repair, etc.

*(bre, May 19, 2006)*

### Promoting Venture Capital

Venture capital, which was booming in the 1990s, riding on the back of the surge in the valuation of Internet stocks, slumped in 2001, as share values fell precipitously and a negative trend was witnessed the world over for startup investments, with a large number of buy-outs.

In the European Union, a project called the 'Risk Capital for Enterprises in the Startup Phase' was initiated to support venture capital seed funds, and it helped to create some 2500 jobs at a cost of 17000 Euros per job. But a recent evaluation of its performance has revealed that its objective of creating a community-wide network for seed capital funds has not been realised so far, because of rigidities in implementation, high management costs, administrative inflexibility and early misunderstandings about its role. Steps to remove these deficiencies are underway.

*(Euroabstracts, Aug 21, 2006)*

### Technology Funding in Agriculture

The winds of improved technology are blowing strongly even in the interior of rural Bengal. Fritolay, a snack food arm of Pepsico is a well known name in dozens of villages in Howrah district. The company has been actively engaged in technology funding through provision of improved potato seeds, innovative know how and related wherewithal to several cooperative societies in the area on the assurance that the potato crop grown would be bought back at an attractive price, and the farmers would be growing potatoes for the company, which go into the manufacture of chips.

While the cultivators are assured of a definite return on their produce, the technology for improved methods of potato cultivation is spreading deeper into the rural areas, leading to significant increases in the area under potato cultivation and the economic betterment of the farmers.

*(Business Standard, May 1, 2006)*

## EXPERTS CONVERGE

### Innovation Study Tour

Under the auspices of the Asian Productivity Council, 32 Malaysian delegates drawn from various streams proceeded on an observational study mission to Japan during 8-13 May 2006 to examine innovation in that country.

In Tokyo, Panasonic's brand management team gave a presentation to the participants on its strategy for global competitiveness and hosted a visit to the Panasonic center to showcase the company's "ubiquitous" digital solutions. Participants also visited the Palace Hotel to observe innovative practices of Green Productivity, such as biological composting equipment that converts kitchen waste into organic fertilizer.

In Nagoya they visited the Toyota Motor Co plant, besides companies that manufactured automotive parts and their components for internal combustion engines as well as plants dealing with ceramics and applicable products.

*(APO News, June 2006)*

### 9th India Power Forum

The Ninth Power Forum Non-Fossil Energy Summit will be held in New Delhi on 15-16 September 2006.

Power is key to development of any country, especially fast developing countries like India, and of late the erratic supply and non-availability of fuel has assumed critical dimensions. In the context of the challenges in the securing of fossil fuels, the development of alternative sources such as renewable energy is vital, and the forum will focus on ways and means of ensuring that the country achieves its ambitious target of meeting 10% of its total electricity generation capacity through renewable energy.

The Summit which will be the largest annual interactive meet of energy professionals, will concentrate on four viable energy sources viz, wind, biomass, biofuels and solar energy besides nuclear and hydro power. The target audience includes project developers, state electricity organisations, government policy regulators, equipment manufacturers and contractors, legal and management consultants and other intellectuals.

*(India Energy Forum, Aug 2006)*

## KNOWLEDGE SPREADS

### Bane of Plagiarism

While the computer and the Internet have contributed immensely to the spread of knowledge worldwide, it has brought with it the problem of plagiarism, particularly in colleges and universities. Now it has become easy to lift material from the Internet and pass it off as one's own.

Now technology has been harnessed to prevent plagiarism. Software known as Turnitin has been developed which is being used by lecturers to compare an assignment against billions of published papers to spot suspicious similarities, a task that would have been impossibly laborious in the past.

However, there is a school of thought that is of the view that promulgating the Turnitin culture in which ideas and writings are treated as commodities, needs to be challenged and the basic failure lies in the teachers themselves who are not teaching how to write essays and assignments. According to this school, learning would be, as it should, a matter of gaining, assimilating and building on knowledge, and ideas from any source. If teachers went back to teaching, plagiarism would go out of business.

Be that as it may, Turnitin is an innovative, efficacious way of checking plagiarism.

*(Agricultural News, May-June 2006)*

### Spreading Knowledge Innovatively

In the Microsoft Corp 'Imagine Cup' competition which is now in its fourth year, students working in teams get an opportunity to develop innovative projects in software and computing that offer practical solutions to real world problems through their own energy and creative genius.

The 'Imagine Cup 2006' competition was held in Agra recently and after a week of intense activity among world finalists drawn from over 65000 students from more than 100 countries, the team from Italy won the cup. The Indian team won the third prize in the Interface Design category.

Union S&T Minister Shri Kapil Sibal gave away the prizes.

*(The Hindu, August 13, 2006)*

## SCAN AROUND THE GLOBE

### A Global Seed Bank

In one of the most innovative steps taken in recent times for the preservation of the earth's amazing agricultural diversity, work began on a small island in the Arctic region on building a global bank of crop seeds, that scientists hope will prevent the extinction of unique species, such as those lost in recent wars.

The underground vault on the island can store 1.5 billion seeds and 3 million varieties in a reinforced concrete vault drilled 70 metres into a mountain and guarded by blast proof steel doors. The vault's temperature would be maintained at minus 18 degrees C and if the power failed, the natural permafrost would keep the temperature below freezing.

The island, named Svalbard, lies approximately 1000 kms from the North Pole and is desolate and treeless, where farming is not possible. Norway controls the island and has agreed to foot the \$3 million construction costs.

The Rome based Global Crop Diversity Trust which is a joint initiative of the International Plant Genetic Resources Institute and the UN Food and Agricultural Organisation, will manage the site when it opens next year.

(Arctic - Reuters, June 21, 2006)

### Turning Dust into Gold

Researchers in Australia have discovered a tiny microbe, known as *Ralstonia Metallidurans*, which they claim has a key role to play in turning dust into gold.

They aver that the bacteria was present on 80% of the gold grains mined from places in Australia which were 3000 km apart, and claim that the microbes acted as microscopic soil scrubbers, soaking up heavy metals in their dissolved form and converting them into their less toxic form.

However, many scientists have questioned the possible microbial role in forming gold, maintaining instead that the gold grains were remnants of larger pieces formed through chemical processes.

(Australia - PTI Science Service, Aug 1-15, 2006)

### Body's Immune System

Scientists in Canada's McGill University Health Centre have reported that there is a gene present in roughly 20 percent of Africans that shuts down the immune system of the body, thereby leaving them susceptible to lethal infections. The results of the study were published in *Nature* issue of April 20, 2006.

The study was based on blood samples taken from around 1000 Africans living in Montreal. The gene contained in a protein called capase-12 reportedly blocks the body's protective inflammatory response by stopping the action of the capase-1 enzyme.

This gene which might have once guarded against parasites and auto immune disorders, is believed to have been lost by all other populations except Africans some 60,000 years back. The presence of this gene is believed to increase the mortality rate by three times, as it makes the body prone to life threatening infections and sepsis. However, it is possible to boost the immune systems through appropriate treatment of those who are found to have the gene present in their systems after screening.

(Canada - Down To Earth, June 30, 2006)

### Coal into Environmentally Friendly Fuel

China has relatively abundant coal reserves, particularly in Inner-Mongolia, which is one of its poorest and most underdeveloped provinces. Now it is going ahead in a big way to convert the coal into dimethyl ether (DME), an environmentally friendly fuel that can be used for household cooking and heating or for replacing diesel as a fuel for transportation and power generation.

The burning of DME from coal in cooking applications emits upto 40% less carbon dioxide than the direct burning of coal. DME production also helps to reduce global warming as it does not produce black carbon, which contributes two to three thousand times more to the problem than carbon dioxide.

(China - Chemical Weekly, Aug 15, 2006)

### Digital Entertainment

Digital entertainment equipment is developing with bewildering rapidity and no sooner is a product brought

onto the market, it seems to become obsolete, being overtaken by a newer and more advanced product.

For instance, the giant electronics corporation Toshiba has announced its first HD-DVD players. There will be two models, a low-end player called the HD-A1 priced at \$500, and a second player the HD-XA1 which will cost \$800. Both products would output high definition signals via High Definition Multimedia Interface or HDMI to a compatible HDTV besides playing current DVDs.

Not to be outdone, Samsung Electronics was scheduled to launch its Blu-ray Disc player which would output high definition video on an HDMI while the high end video and audio products maker Pioneer has also announced its first high-definition video disc player which would support a much higher output than that provided by the Toshiba or Samsung products.

(Japan - *abc News*, Apr 7, 2006)

### **Tapping into Local Wealth**

This is the story of how an innovative, imaginative approach can help transform the lives of scores of persons living in an extremely poor area through increased incomes and gainful employment.

Aloe ferox, similar to aloe vera, grows abundantly in one of the poorest regions of South Africa, the Eastern Cape. It possesses unique properties for a healthy life style products, including drinks, tea, dietary supplements, medicinal applications and cosmetics.

Realising its developmental potential, the Geneva based International Trade Centre (ITC) launched an innovative project to export a range of products using the aloe harvest. Partnerships were cemented between African Aloe, an exporting firm; the Eastern Cape Development Corporation and cooperatives of aloe tappers to develop products using the aloe harvest. A factory was built in the area with basic facilities for collecting, sorting and simple processing operations and innovative aloe products, such as fillets were developed to serve as ingredients in developing aloe-based health drinks and cosmetics.

There has been no looking back since the project was launched, and now contracts have been signed with companies as far apart as Canada, and South Korea.

(South Africa - *ITC* 2006)

### **A \$400 Laptop**

Intel has just unveiled its notebook computer for schools in developing countries which it hopes to sell for less than \$400 making it within the reach of a much larger number of persons.

Called the Eduwise Notebook, it was displayed at the World Congress on Information Technology held recently.

The laptop is the result of design work done in Intel offices in Brazil, India and China and joins low cost PC projects such as the 'One Laptop per Child' program.

The computer uses flash memory instead of a hard drive, and runs Microsoft Windows XP. In addition, Intel has developed an application which enables teachers to monitor how and when students are using the internet. For example, the teacher could click a button on his console, that starts a presentation with video on the Eduwise laptop. Students could follow the presentation at their own pace and access the Internet if they wanted to learn something more about something contained in the presentation.

(USA - *efe* May 8, 2006)

### **Stress on Biotechnology**

Appreciating the importance of biotechnology in today's world, Vietnam has earmarked \$62.9 million for the development and application of biotechnology to agriculture in the next 15 years.

The funds are to be spent in a three-phase programme, which is designed to help scientists develop genetically modified species of plants, livestock, and microorganisms to bolster agricultural productivity. Funding will be provided for scientific research, trial productions, and specialized training. Upto 80 doctors and 1000 biotechnicians are to be trained for the project in the next five years.

According to the programme, by 2020 upto half of all cultivated land in Vietnam will be set aside for genetically modified crops, by which time it is expected that Vietnam's agricultural biotechnology industry will rank among the most advanced in South-East Asia.

(Vietnam - *VATIS Update*, Mar-Apr 2006)