

Mother Nature's Jewel Box

Deep below the surface of an isolated mountain range in Mexico sit two rooms of splendour : translucent crystals the size of mature pine trees. Lying atop one another, as though moon-beams suddenly took on weight and substance, the crystals are believed to be the largest in the world.

In April 2000, brothers Eloy and Javier Delgado found the structures while blasting a new tunnel in a silver and lead mine. Eloy climbed through a small opening into a 9-by-18-metre cavern choked with the immense crystals. "It was beautiful, like light reflecting off a broken mirror," he says. The cavern contained row upon row of shark-tooth-shaped formations up to a metre high, set at odd angles throughout.

A month later, the miners found an even larger cavern nearby with even larger crystals - some over 15 metres in length. The owners of the mine kept the discoveries secret, concerned about potential vandalism. Few people, however, would venture inside casually: The temperature hovers at 66 degrees C, with over 85 percent humidity.

"Stepping into the cavern is like entering a blast furnace," says explorer Richard Fisher. "In seconds, you're saturated with sweat."

Fisher's emotions raced from awe to near panic. He says a person can stay inside the cave for only six to ten minutes before becoming disoriented. After taking a few photographs, he had to concentrate intensely on getting back out of the door, even though it was only 10 to 12 metres away.

Geologists conjecture that a chamber of magma, or superheated molten rock, lying three to five kilometres underneath the mountain, forced mineral-rich fluids up through a fault. Over time, this hydrothermal liquid deposited gold, silver, lead and zinc near the surface. But in a few caves, the conditions were ideal for the formation of a different kind of treasure. Ground water in these caves, rich with sulphur from the adjacent metal deposits, combined with calcium to form crystals on a scale never before seen by humans. This crystal form of the mineral gypsum - known for its pale translucence - is called selenite.

How long did it take the crystals to grow? Under perfect conditions: only about 30 to 50 years.

“You can hold most of the crystals on earth in the palm of your hand,” says Jeffrey Post, a curator of minerals. “To see crystals that are so huge and perfect is truly mine-expanding.”

- John F. Ross

Source: *Reader's Digest*, Jan., 2003

Optimisation of Cable Bolt Ground Support Using SMART Instrumentation

Cable bolting has been used as a primary means of ground support in underground mining for several decades. During that time, much work has been done to understand how cable bolts work, and many improvements have been made to their application in mining. The cable bolting process has three components: design, implementation, and verification. Verification of a cable bolt design should involve an evaluation of the effects of the cable bolts on the stability of the rockmass, and should comprise a combination of direct observation and instrumentation.

Quantitative verification is based on the ability to directly measure the performance of the support element in question. Previous attempts to directly instrument cable bolts have met with limited success, largely because the measuring elements were mounted external to the cable, interfering with the cable-grout bond. Mine Design Technologies has developed the SMART (Stretch Measurements to Assess Reinforcement Tension) cable bolt. By incorporating an instrument internal to the cable, they have overcome the limitations experienced by earlier cable bolt instrumentation attempts.

The SMART cable permits accurate assessment of the deformations and corresponding loads to which long cable bolts are subjected during the excavation process. Companion instruments, the SMART multipoint borehole extensometer (MPBX) and the SMART Contractometer are used to complement the SMART cables with the measurement of rockmass dilation (MPBX) and closure of mined openings or the compression of pillars (Contractometer).

The instrumentation has been helpful in optimising cable bolt support at a number of operations.

- *Extracted from an Article by W.F. Bawden and J.D. Tod*

Source: *ISRM News Journal*, Vol.7, No.3, Jan., 2003

Himalayan Rock Salt Good for Health

Dr. Wilhelm Hoefler of the Institute of Biophysical Research, Las Vegas, USA points out that only Himalayan salt contains “minerals and trace elements essential for the human body in a biophysical form that allows their easy

absorption”. Prof. Manfred Kage of the University of Mannheim and Dr. E Scherwitz-Josenhans of Germany conclude that Himalayan salt promotes the elimination of animal protein from the body.

The Sushrut Samhita emphasises that Saindhav salt is beneficial to the eyes, palatable, an aphrodisiac and cooling in its potency. Since this 2000-year-old endorsement is not enough, Mr. Gupta has modern researchers at Madras University studying the salt and coming up with the best news: This salt controls body weight, removes obesity and improves skin gloss too. Maybe that’s why they coined the phrase “worth your salt”.

Source: Indian Express, March 2, 2003

Oil Bonanza

The discovery of a major offshore oilfield with a reserve of 48 million tonnes of crude oil and natural gas has been announced by the Oil and Natural Gas Corporation (ONGC) – a pioneer organisation in India, responsible for oil and natural gas exploration.

The oil find - near ONGC’s gigantic Bassein gas field off Mumbai - comes within days of Scottish exploration group, Cairn Energy, striking oil reserves in Rajasthan, India.

“The two well-drilling campaigns west of Mumbai coast shows the presence of several hydrocarbon-bearing zones that are estimated to hold around 48 million tonnes of oil and oil equivalent of gas,” senior ONGC officials said.

The latest discovery, which comes not too long after the discovery of 97 million tonnes of oil and oil equivalent gas in East Bassein, will supplement the feared decline in Bassein output.

The ONGC would integrate the new finds and pump the yields through a 10 km submarine pipeline for processing before selling to domestic customers.

Recently, the Reliance Industries had struck oil and gas off western Indian state Gujarat coast with a yield of a million cubic metres a day. Last year, it made one of the biggest gas hits with the discovery of seven trillion cubic feet in the Krishna Godavari Basin in southern India.

The sting of discoveries will boost the country’s oil and gas sector where local production accounts for only 30 percent of the nation’s total consumption.

India has drawn up plans to boost its crude oil reserve to 45 days to meet contingencies from the current storage capacity of 19 days.

Source: Hindustan Times, Feb. 2, 2003

Tunnel Vision Creates Fast Food Growth

A revolutionary growing process that can produce crops all year round has great potential for countries anywhere without enough land or water. A full-scale prototype of Greengro - an innovative, pesticide-free farming system, developed in the United Kingdom - that yields a variety of fruits, vegetables and herbs can produce a single crop to order in 40 days. The remarkable growing method involves a computer controlled atmosphere with enhanced carbon dioxide to promote maximum growth all year round. Greengro has demonstrated that vagaries of the weather, soil quality and water scarcity should no longer be an impediment to food production.

Mike Dufton, a director of the company and who developed the system over 28 years, believes it is the most environment friendly farming method available. The Greengro system operates in 42 metre long polycarbonate tunnels - looking much like plastic green houses and can grow as much crops as on an acre of ground. The tunnels are expected to last 20 years and can be dismantled and moved to new locations. The innovative growing process involves using small 'grow bags' filled with coir - waste matter from coconut husks from Sri Lanka and placing them on large numbers of shelving systems to use as much of the greenhouse as possible. The coir is put through a patented sterilising machine that will automatically plant the seeds in the soil. A microchip in the bag wired to a watering system automatically registers and changes nutrient and water levels in the bags to provide maximum growing capacity.

The tunnels, each costing 175,000 pound, are double skinned and sealed to prevent water and heat loss. They can produce up to 10 times the crop that could be grown in a similar size field. And no pesticides are needed because the growing compost and the tunnels are sterilised. Excess heat gathered in the tunnels in the day is recirculated at night to keep the crop warm. For the whole of last winter in the UK, extra heating was needed for only seven hours. Crops can grow to harvest in 35 days partly aided by increasing carbon dioxide in the greenhouse atmosphere from the current 340 parts per million (ppm) to 900 ppm.

Peter Wilkinson, former Director of the charity Greenpeace UK, and internationally renowned botanist David Bellamy are both involved in Greengro and have carried out environment-impact assessments. Mr. Wilkinson said: 'We have spent a year operating the prototype and making improvements and I am convinced this is an environmentally well proven system. The beauty of it is that it can be adapted to any conditions and does not use excess water, energy or pesticides.' Ben Gill, president of the National Farmers' Union, was also impressed. He said: 'I am still looking at the details, but in a country short of land, this system has a lot going for it. Land can be freed up for building and other non-food purposes like forestry. It also has

energy and water efficiency which will be good for exports of the system, especially, at a time when we are talking about sustainable development.'

Source: IEI News, Vol.52, No.12, March 2003

Industry, Academia and Innovation

Innovation is the outcome of two distinct steps - firstly, the generation of an idea or invention; and secondly, the conversion of that invention into business. Mathematically, it is possible to represent innovation as follows:

$$\text{Innovation} = \text{Invention} + \text{Exploitation}$$

Invention encompasses all steps aimed at creating new ideas and getting them to work. Exploitation includes all stages of commercial development including focusing of ideas generated towards specific objectives, followed by evaluation of those objectives. Thus, while invention, though extremely difficult, is the outcome of a brief moment of inspiration and magic, exploitation is more involved and needs time. The overall management of technological innovation is a science by itself. It includes the organisation and direction of human and capital resources effectively towards: (I) creating new knowledge (ii) generating technical ideas aimed at new and enhanced products, manufacturing processes, as well as services (iii) developing those ideas into working prototypes and finally (iv) transferring them into manufacturing, distribution and use by mankind at large.

In today's globalized world, competition is unavoidable. The customer cannot be taken for granted; each customer has a very wide choice of goods and services. To exist in this situation, we need to work together and form clubs, or else we will perish. These clubs must have dedicated members from academia, research institutes and industry to provide the basics of innovation. Whether these innovations have long-term impact on society at large may not be under the direct control of the participating agencies. Nonetheless, there are examples in countries overseas and in some pockets in India that it is possible to leave footprints on society.

*Extracted from an article by Dr. Amit Chatterjee,
Tata Steel, Jamshedpur*

Source: Technorama, March 2003

Survivor

After I conquered Mt. Everest in 1965, I felt an ultimate high. I had overcome the most difficult barrier of human endurance. On reaching the highest point on Earth, I thought, it was purely a victory of mind over body. Because there were times, when I had given up. As I came closer to the peak, my mind commanded my legs to move, as my body had given up.

Later the same year, during the Indo-Pakistan war, a gunshot in my leg disabled me for life. I thought there was no point living in a wheelchair. But looking back, I realise that climbing Mt. Everest had trained me to face the biggest hurdle of my life. Once again, my mind took over. I had a new religion - fighting disability.

My mother motivated me never to give up. Even in that hopeless situation, I counted every blessing. Slowly, I made progress. The positive results encouraged me. Every step during my treatment was like climbing the highest peak all over again.

But I achieved the impossible again. In 1994, I lead an expedition, the only one till now, to retrace Marco Polo's Silk route. And today, as chairman of the Indian Spinal Injuries Centre (ISIC), I head an organisation that helps disabled people.

I aim high. I try to achieve the impossible. I believe the mind can empower one to survive any hurdle.

- *H.P.S. Ahluwalia*

Source: The Times of India, June 1, 2003

Be Happy and You'll Never Catch a Cold

Stay happy and stay away from the common cold new study, published in the July issue of Psychosomatic Medicine, has found that people who are energetic, happy and relaxed are less likely to catch a cold than those who are depressed, nervous or angry.

Study participants who had a positive emotional style were not infected as often and experienced fewer symptoms compared to people with a negative emotional style, says Sheldon Cohen, a Carnegie Mellon University Professor: "We found that experiencing positive emotions was associated with greater resistance to developing a common cold. Increases in positive emotional styles were linked with decreases in the rate of colds," he said.

Source: The Times of India, July 24, 2003

Garlic may Cure Headache

Garlic may have properties to help headache sufferers. It contains antioxidants and other active compounds that may inhibit some of the causes of migraines, according to a new German report in the journal Trends in Pharmacological Sciences.

According to ABC online, many ancient headache treatments, recorded by Persian physicians, have been proven in modern-day studies to be effective pain relievers.

“Despite progress in the development of therapy in recent years, effective and potent drugs are still required for the treatment of headache”, said Dr. Ali Gorji, of the Institute of Physiology, Munster University, in Germany.

“The search for new pharmacologically active analgesics obtained from plants has led to the discovery of some clinically useful drugs that, during the past two centuries, have played a major role in the treatment of human diseases. However, most medicinal plants prescribed by Persian physicians remain largely unexamined,” he added.

Souce: The Times of India, July 24, 2003

Life Itself is Your Prayer...

Prayer is the most important part of the human experience. It is the most important part of our daily activities. The reason it is the most important part of our experience and our activities is because it is the process by which we create our lives. It should be understood by anyone examining the subject of prayer that everything we think, see, and do is a prayer. Life is a prayer in the sense that it is a continuous request to the universe and God to present us with what we choose and desire.

God understands our desires not just through the occasional utterances that we call ‘prayers’ in the traditional sense, but through every thought we think, every word we speak, and every thing we do. Our thoughts, our words and our actions are our prayers. Most people do not think of life as a constant prayer; most people believe they are praying only when involved in that deliberate, peculiar activity we know as prayer. Thus, many people feel that their prayers either go unanswered or are answered sporadically and only in the affirmative. But the truth is, prayer does not begin with kneeling down, or lighting a votive candle, or sitting in meditation, or picking up our prayer beads, or performing some outward or inner ritual.

Prayer begins at the moment of our birth and ends with our death, if we speak in the classic terms of most human understanding. Of course, if we move beyond the notions of birth and death to reach higher understandings, we learn that birth and death are merely the beginning and the end of an ongoing, cyclical experience through which we move throughout the ages and for all time.

We pray for one thing and we go out and do another. Or we pray for one thing and we go out and think another. Let me give you a typical example. We may pray for greater abundance in our life, or for help with a financial problem.

Those prayers are earnestly offered, earnestly said, and earnestly sent to God during our formal, ritualised time for prayer. Then for the rest of the week we go around harbouring thoughts of insufficiency, saving words of insufficiency, and demonstrating insufficiency in the everyday actions of our lives. So, 95% of the time we send prayers that affirm we don't have enough and 5% of the time we ask God to bring us enough. It is very difficult for the universe to grant us our wishes when 95% of the time we are, in fact, asking for something else.

This is the single most misunderstood aspect of prayer in our human experience. This truth is that the universe is a giant xerox, sending us, all the time the answer to our prayers. And we are, in fact, sending prayers to the universe all the time, from morning till night, from birth till death. Only when we are willing to accept that our words are creative, our thoughts are creative, and our actions are creative, can this be attractive. We are unwilling to accept this as truth because they are not very proud of the majority of their thoughts, words, and actions and don't want them to be considered as actual requests to God. And yet they are.

The injunction then is to speak, think, and act in a way of which we can be proud - in a way that sends to God our grandest thoughts and produces our highest visions and thus creates Heaven on Earth for all of us.

I have had the beautiful gift of experiencing my own conversation with God, and the most urgent prayer of my life has been answered through that conversation. Every question I ever had in my life was answered in that conversation, including how best to pray. Two important points about prayer were made in that conversation. The first point is that the most powerful prayer is the prayer of gratitude. When we thank God in advance for what we wish to use and experience in our lives, we affirm that we have already received it and all that is awaiting is our perception of receiving it. Therefore, the power of a prayer exists in direct proportion to the degree of gratitude contained within the prayer.

Pray. Then see the miracle.

*- Motivation Guru Neale Donald Walsch
Source: The Times of India, June 29, 2003*

A Physicist's Faith in Science & God

No one can deny that the universe is the outcome of intelligent placing. It is unusual. We, too, are unusual. To make it possible for life to exist, special physical laws are required. So I would say that this is a very special universe. It has been intelligently planned. How can anyone confute that?

So there is indeed a spiritual world; a Creator.

Most people do not realise that science, like religion requires faith. We make so many assumptions. We believe that the laws of physics are reliable - that's a kind of faith. We create experiments that can test and verify these laws.

God initiated the universe, He created it. But we change the world too. Therefore, we have a responsibility; we have to ensure that we change it for the better. Take cloning, for instance. We humans are co-creators. How we go about cloning depends on whether we're doing it for the common good. It raises many complex and difficult questions. We are changing all the time. So instead of imposing a total ban on creative research, it is better to regulate it carefully.

What does technology do? It enhances our ability to do newer and bigger things - for good or bad. Then again, we can harm one another even without the help of technology. So the potential to hurt each other predates any technology. Science and technology merely enlarge the scope, the possibilities. The choice remains with us as it did even before we invented technology.

Science attempts to understand how the universe works. Religion attempts to understand the purpose and meaning of the universe. If there is purpose and meaning, it will affect the nature of the universe. Once we understand the meaning, we can get to know the purpose. Science is said to be objective while religion is subjective.

Science has its inconsistencies. Religion has its puzzles, too. Science doesn't allow free will; yet, we think we have free will. We have to learn to accept inconsistencies in both science and religion. The more we understand about the two, the greater the possibility of bringing the two streams of thought closer together. To make this possible, science and religion will have to change in many ways.

True, science has many inconsistencies. Even general relativity and quantum mechanics are not consistent with each other. Yet, we think each one of them is correct. So too in religion. Now take the subject of revelations. It is part of the history of religion. But revelations happen in science, too, except that a revelation is not called a revelation - it's an idea, a flash of genius, a new creation.

When the idea for the laser came to me, I was sitting on a park bench, thinking.... Why haven't I been able to do this? Suddenly, I got this new idea. Who gave me this idea? God? Who Knows? In science, we don't usually talk about it. You could say I had an *idea*.

I do believe there is a spiritual presence in the universe. It is difficult to define God, but I can feel an omnipresence every-where. People ask, if God created the universe, who created God? So there's always a problem with a beginning.

Many of us create a spiritual universe that is not visible. This will evidently not be included in the domain of science. So too, free will. It is said that because we don't know, it can't be. I would say that because we don't know, we don't know.

- Charles H. Townes, Nobel Laureate

(Invented the maser and co-invented the laser)

Source: *Speaking Tree, Times of India, June 2003*