

The Underground Science City in Singapore

In 1998, the Urban Redevelopment Authority (URA) proposed the concept of housing a new science park, the Underground Science City, under the Kent Ridge Park. The facility is to provide space to house R&D community in addition to the existing science parks above ground on both sides of the Kent Ridge Park. The underground complex would also provide a link between the mature Science Park I and the developing Science Park II and the future Science Park III.

The feasibility study is subsequently conducted by the Nanyang Technological University, the Jurong Town Corporation and PWD Corporation Pvt. Ltd, funded by the National Science and Technology Board. The primary aim of the study is to explore the possibility of creating a floor area of 250,000 m² in underground caverns for uses similar to that of the existing science parks.

The rock mass consists of meta-siltstone, meta-sandstone, meta-conglomerate, meta-tuff, and meta-siltstone inter-bedded with marble. The metamorphosed rocks are folded into a symmetrical anticline and the beds generally dip 45 to 60 degrees.

The rock mass is cut by longitudinal faults, transverse faults, and joints. Three transverse faults cut across the anticline. Three joint sets exist, and the NE-SW trending set is significantly more prominent than the other two sets. The joints of the set generally dip steeply to the NW. The groundwater table lies around a few metres below the ground surface. The permeability of the rock mass ranges from 1.4×10^{-6} to 2.2×10^{-4} cm/s, with an average of 4×10^{-5} cm/s.

Evaluations of the rock mass quality and geological structures have helped define the boundary below which rock mass of fair and better-than-fair quality abundantly exists. The rock mass quality at the site suggested cavern development is technically feasible.

Several potential development schemes are being studied, with various combinations of deep/shallow mined caverns of different span sizes and access options. One of the schemes is illustrated. The scheme consists of deep mined room-and-pillar caverns with large spans and shaft accesses at both Science Park I and Science Park II. The scheme can be potentially expanded laterally to create more underground space for new Underground Science Cities at Kent Ridge area.

The large shaft at Science Park II provides both human and goods access, while the small shaft at Science Park I provides human access. Car parks may

be provided (underground and/or above ground) together with the large shaft. The main concourse (where a human mover may be installed) of the cavern complex provides direct underground access between Science Parks I and II. The central space provides a large open area where a variety of facilities such as cafeteria, restaurants, clubs and shops can be placed.

The caverns of approximately 20m span and 20m in height can be divided into 4 to 5 levels to provide spaces for office and laboratory for a research and development oriented activities.

Source: Tribune, ITA News Magazine, Vol. 16, Oct., 2000

National Testing Facility - Indian Geotechnical Centrifuge

Department of Science and Technology with co-operation from DRDO and MHRD has established a geotechnical centrifuge facility at IIT Bombay. It is a state-of-the art laboratory machine in India of radius 4.5 m upto the base of the basket with a maximum payload capacity 2.5 ton and maximum acceleration of 200g. Centrifuge techniques provide artificial gravity resulting from centripetal acceleration and by placing the model in it and subjecting it to increased acceleration it is possible to obtain prototype stress levels in the models. Similitude laws are used to scale the relationships of soils to predict prototype conditions and compare with the numerical results, where available. The Centrifuge is fabricated and erected indigenously with the following objectives:

- i) The facility will be made available to other research and educational institutions and user agencies for advanced research and prototype modelling.
- ii) To undertake basic and applied in-house research, time bound sponsored research and industrial consultancy.
- iii) To train manpower and enable transfer of technology.

Source : ISRM TT News, Vol.7, No.1, 2000

Indian State Himachal Pradesh to Speed up Exploitation of Hydel Power Potential

The Indian State Himachal Pradesh would speed up its drive to exploit the vast hydel potential, and signing of a memorandum of understanding (MoU) with the National Thermal Power Corporation (NTPC) for executing the 800 mw Kol Dam project is another step in this direction.

The Rs. 50/- billion project on the Satluj river in Bilaspur district would help the state to fetch an additional annual revenue of Rs. 1500/- million on 400 million units of free electricity it would get under the agreement.

This would be the first hydel project to be taken up by NTPC as all other projects in joint venture were with the National Hydel Power Corporation (NHPC).

Another interesting feature of the Kol Dam Project, 6 km up-stream of the Dehar power plant, was that it would enhance the life span of the Bhakara dam a main sources of irrigation facility in Punjab, Haryana and a part of Rajasthan.

On completion, it would contribute over 3,000 million units of electricity to the national pool and greatly help in supplementing the ever-increasing power demand of northern region.

The state government had decided to allocate eight small projects with a combined capacity of 255 mw to the private sector and tenders for them would be invited soon.

The state had so far been able to harness about 4,000 mw power out of the indentified potential of 21,000 mw in the basins of five rivers - Satluj, Beas, Chenab, Ravi and Yamuna - and projects of combined capacity of 3,660 mw were at different stages of execution.

Source: Times of India, Feb. 29, 2000

Cyclone can be Defused!

Can cyclones be defused at the incipient stage itself?

Yes, says freelance scientist Dr. Surya Prakash Kapoor, proposal has been examined by the National Institute of Oceanography, Goa and Center for Mathematical Modelling and Computer Simulation, Bangalore (C-MMACS). The C-MMACS in its report said that an experiment on these lines, if carried out “would yield a wealth of information even if it failed to suppress a cyclone.” The proposal of Mr. Kapoor is fairly simple.

Tropical cyclone is a huge package of surplus solar energy accumulated in the tropical seas during summer season. It can be defused at the formative stage when the Low Pressure Area is stationary or quasi-stationary at one spot in the ocean for the initial 36 to 48 hours, by resorting to the technique of “Artificial Upwelling”.

Chilled sea water at about 8 degree centigrade available at a depth of only 100 metres below the warm sea surface of 26.5 centigrade is extracted with the help of diesel fuelled heavy duty pump sets. It is sprinkled with jet sprinklers from big Naval ships on the warm core of the Low Pressure Area at the conceiving stage itself to cool it down when the maximum wind speed is merely 20 kilometres per hour.

The information regarding formation of the Low Pressure Area and also whether it is likely to turn into a “ferocious vortex” may be made available 144 hours in advance. In case a Low Pressure Area is likely to intensify into a ferocious “Super cyclone” the ships can march into its central core situated at its geometric centre and start cooling it down to 25.5 degree centigrade by resorting to “Artificial Upwelling”. The temperature of the warm sea surface of the central core has to be lowered marginally by one or two degree centigrade only and cooling is to be done in the central circle or 25 kilometre diameter only, according to the scientist.

Source : Hindustan Times, Dec., 19,2000

A Not-so-brief Victory of Mind over Matter

Does God play dice with the universe? No, was Albert Einstein’s emphatic answer. Stephen Hawking, however, feels not only does God play dice, but once in a while He throws it where it can’t be seen.

“Even God is bound by the Uncertainty Principle, and cannot know the position and velocity (of a particle), but only the wave function,” said the eminent British cosmologist, delivering the Albert Einstein lecture on ‘Predicting the Future: From Astrology to Black Holes’ in New Delhi on January 17, 2001.

“Around 90 percent of the people here, including me, could not make head or tail of his lecture. But it was very inspiring to see and hear him in person....mind does win over matter,” said an elderly gentleman.

The lecture delivered by Hawking was through a speech synthesiser and a portable computer attached to his motorised wheelchair. For normal conversation, Hawking selects words from a series of menus on his computer screen and then sends them to the speech synthesiser. But on January 17, he had the lecture ready beforehand. With the audience, especially youngsters and students, hanging on to every word, Hawking, who “uses God as a metaphor for the laws of nature”, said the “real reason most scientists don’t believe in astrology is not the scientific evidence, or lack of it, but because it’s not consistent with our other theories, which have been tested by experiment”.

Exhibiting his famed wit here and there, Hawking then launched into the evolution of theoretical physics. From Laplace’s determinism and Heisenberg’s Uncertainty Principle to quantum mechanics and relativity. “I feel if one takes Einstein’s General Theory of Relativity seriously, one must allow the possibility that space-time ties itself in a knot, and information gets lost in the folds,” he explained.

The message, loosely, was that the probabilities can be calculated but definite predictions are simply not possible. The laws of science cannot completely determine the future of the universe. After all, God may well turn out to be “an inveterate gambler”.

- *Excerpts, The Times of India, Jan. 19, 2001*

Golden Rule of Underground Construction

The first sound and the first sign of instability is noted initially by the foreman and the worker at the tunnel face, much before the big thud of collapse is felt in the designer’s office.

Source : THDC, Rishikesh, India

Vedic City Tucked away in US Midwest

Deep in the heart of the American Mid-west amongst the cornfields of rural Iowa is an entire city that draws life from ancient Hindu texts.

All homes in this city face the rising sun and are based on the principles of the Stapathya Veda, also called Vaastu. The design of Vedic City and its buildings conform to Stapathya Veda architectural principles which lay down that health, happiness and fortune are influenced by the orientation and structure of buildings.

This city has its own school, university, a health resort where patients are treated by Indian physicians and even an astrologer for those who want to know the effect of the planets on their health.

All houses in the Vedic City have a kalash (urn) on the roof. They have a quiet spot at the centre of the home called the Brahmasthan. It lets natural light into the middle of the home. Jonathan Lipman, chief architect of Maharishi Global Construction, who is an advisor for homes in the city, calls the Brahmasthan a “silent core at the very centre, a principle of nature.”

A small fountain is generally placed in the space to prevent people from walking through it and to preserve its stillness. Cross ventilation is another standard feature. Anyone standing next to the Brahmasthan can see through the windows in all four directions. Residents say the orientation of the homes according to the Stapathya Veda offers many benefits in terms of health, domestic harmony and prosperity. According to Chief Architect Mr Jonathan lipman, it is changing the quality of life in this town.

Source : Times of India, July 27,2001

Materialism Linked to Anger, Depression: An Australian Study

Designer labels and fast cars may be the dream of millions, but craving material possessions can cause depression and anger, research released recently showed. Australian academics found a correlation between materialism - or an "excessive concern" for material things - and negative psychological phenomena. Shaun Saunders, one of the authors of the report of the University of Newcastle said it came as no surprise to discover that money can't buy you love.

"While there is growing concern over environmental effects of materialism, little attention has been paid to psychological effects," he said. Saunders said one source of depression among dedicated consumers was the fact that the property they acquired tended to lose value quickly. "If your self-worth is invested in what you own, as can be the case in our market-driven society, then these things may not hold their value for very long," he said.

In most cases materialism is based on people using possessions to define their place in society. This applies both to "haves" and the "havenots", Saunders said. "People want to compare themselves to others. In our society the criterion tends to be what you own. "This is the 'Keeping up with the Jones's' idea. It can be a very frustrating experience trying to stay ahead of others, which can be a precursor to anger expression."

Source: Indian Express, July 3, 2001

Maharshi Mahesh Yogi

Due to God's abundant grace, a team of professors from civil engineering department, University of Roorkee met Maharshi Mahesh Yogi in 1991 in his ashram (building complex) at Noida, New Delhi. First he graced us with talk on telephone, then he very kindly invited us to talk to him face to face for about 25 minutes. His room was full of beautiful and fragrant flowers. The painting of his revered teacher was hanging on the wall in his front.

He enlightened us that our technical education system is faulty. Our education creates only specialisation in a narrow field. Gravity potential of our brain can be developed by transcendental meditation. After this training, young engineers can become experts of many fields of knowledge. A civil engineer should be a good architect, structural engineer, foundation engineer and good manager. Civil engineer should use building materials which make living conditions thermally comfortable, airy and sunny. The solar energy spectrum in each room of a residence should be ensured carefully according to their use. The solar energy spectrum should be different in reading room, bedroom, kitchen and worship room, etc. Further engineering education should be such

that in the crisis of total electricity failure in a mega city, engineers should be capable of bringing back the normal life of the city. No help of the computers, libraries and laboratories will then be available. So engineers should have extraordinary brain to succeed in mega crisis management.

We asked him whether vedic idea of cyclicity in national life is correct? Is it not fatalistic attitude? He enlightened us further that vedic idea of cyclicity is correct and not a fatalistic idea. The sunrise in India is about to occur and sunset of U.S.A. and Canada is about to happen. What happens in sunrise? He classified that whatever happens in sunshine will happen in India. What will happen in sunset? He replied that whatever happens in the night will happen in U.S.A. and Canada.

He added that India is going to get rid of poverty after 3 years. Why? He answered that his researches have decoded Atharveda and discovered principles of economics. This knowledge of economic principles can be purchased from his ashram by any country. (We realised importance of his words only when Dr. Man Mohan Singh, the then Finance Minister, Govt. of India announced his pioneering financial policy of globally organised but competitive privatisation which proved success 5 years later).

He emphasised that there is urgent need of decoding (understand symbolic meaning of) all the vedas. We will get lot of vital knowledge. His disciples have prepared videos on the decoded knowledge of Vedic Architecture. All interested are most welcome to visit his ashram and see these videos and discuss their doubts with his experts.

Ayurvedic medicines are better than other medicines for long, healthy and happy life (due to the law of bio-entropy).

A new word should be created carefully. Its letters should give clue to names of relevant medicines etc. The word should be a word of life for common people. This is how knowledge has been preserved for thousands of years inspite of many wars. Modern science does not yet know how to preserve knowledge for thousand of years.

He showed his deep appreciation of the work on vedic mathematics by Prof. N. Puri. Vedic mathematics develops brain also.

He heartily blessed the team.

*- Professors N.Puri, Swami Saran, Bhawani Singh
& M.N. Viladkar, University of Roorkee, India*

Secret of Happiness - A Point of View

Every one on this earth is in constant pursuit of happiness and trying to achieve it by all means. But most of us are not able to target the exact sources of happiness despite the fact that a large amount of money and time are being spent to achieve the real happiness. God has created the sources of happiness, which are easily available all-around us, provided we try to spend some time to harness them properly in our day-to-day life. To understand this easily, one needs to look into the childhood activities of Lord Krishna (Bal Leela).

If we observe the childhood pictures/ stories of Lord Krishna, we usually find Him in a dancing posture in Vrindavan (a place where He was brought-up; in Sanskrit 'Vrinda' stands for Tulsi- a unique and probably the best Herbal plant and 'Van' means forest) playing with His friends; drinking milk/butter milk, eating curd and butter (doodh, dahi, makhan), affectionately looking at cow and peacock (a very useful cattle and a beautiful bird) and playing flute cheering and hypnotising creatures all around.

Lord Krishna (a Supreme being having divine power) showed unprecedented courage, powerful and leadership qualities by eliminating many devils (viz. Pootna, Kesi, Vakasur, Kansa & Kali Mardna) and lifting a huge hillock (Goverdhan Parwat) during his childhood.

The lesson to be learnt from the above narration may be that Lord Krishna (an ultimate source of happiness, prosperity and peace) who could give so much to the society and could fight so much against evils, never ignored the necessary components of childhood. Through these stories and pictures of childhood (Bal Leela), He has probably demonstrated that every one should endeavour to pay attention on the following aspects in order to achieve sustainable development of mental and physical health, leadership qualities, peace of mind and happiness:

- Sports and physical activity
- Liking for nutritious vegetarian food
- Love for traditional music and dance
- Awareness of herbal plants and their utilization for medical purpose
- Respect for flora and fauna and living close to the nature
- Mutual respect and affection among the family members, friends and society

- *Dr. Subhash Mitra*
Centre for Continuing Education,
University of Roorkee, India

Excellent Benefits of Sports

Sport is blissful
 and the most beneficial
 Sports increase in open ground
 courage, stamina, energy,
 digestive power, immunity,
 adaptability, circulation of blood,
 deep sleep, health of body and mind,
 co-ordination between heart and mind,
 moral strength, cheerfulness,
 deep sleep, team spirit, competitiveness,
 intelligence, sincerity, tolerance,
 beauty, concentration, will power and confidence

Adventurous sports increase courage more
 and leadership abilities
 Sports reduce body stress,
 laziness, emotional stress,
 ageing without side effect
 Sports mend unhealthy habit
 of food, drink and sleep
 In persons different
 improvements are different
 Sport is best entertainment

Deep breathing in morning
 for nervous mind is good!
 Drinking a jug of water in morning
 for digestion is good! Regular sports lead to success in studies,
 examination, competition
 Sports train person as Spartan
 Reasons are:
 Oxygenation of blood and mind,
 exercise of muscles, heart and mind,
 diversion of attention,
 from distraction

Meditation is beneficial
 out door sport is the most beneficial
 God's Grace is gotten easily by sport
 For girls, dance is better than sport
 God is giver and great
 Sport is maker of fate
 play together
 stay together

Sport loving nations are on top
Sport hating nations are on flop
Education is producing without sports,
only generations of heart patients

Source : Faculty of University of Roorkee, Uttaranchal

Mind Survives even after Brain dies : Scientist

A British scientist studying heart attack patients says he is finding evidence that suggests that consciousness may continue after the brain has stopped functioning and a patient is clinically dead. The research, presented to scientists at the California Institute of Technology (Caltech), resurrects the debate over whether there is life after death and whether there is such a thing as the human soul.

“The studies are very significant in that we have a group of people with no brain function...who have well-structured, lucid thought processes with reasoning and memory formation at a time when their brains are shown not to function,” said Sam Parnia, one of two doctors from Southampton General Hospital in England who have been studying so-called near-death experiences (NDEs).

“We need to do much larger-scale studies, but the possibility is certainly there” to suggest that consciousness, or the soul, keeps thinking and reasoning even if a person’s heart has stopped, he is not breathing and his brain activity is nil, according to the scientist.

A group of scientists conducted an initial yearlong study, the results of which appeared in the February issue of the journal *Resuscitation*. The study was so promising that the doctors formed a foundation to fund further research and continue collecting data.

During the initial study, 63 heart attack patients who were deemed clinically dead but were later revived were interviewed within a week of their experiences.

Of those, 56 said they had no recollection of the time they were unconscious and seven reported having memories. Of those, four were labelled NDEs in that they reported lucid memories of thinking, reasoning, moving about and communicating with others after doctors determined their brains were not functioning.

Among other things, the patients reported remembering feelings of peace, joy and harmony. For some, time sped up, senses heightened and they lost awareness of their bodies.

The patients also reported seeing a bright light, entering another realm and communicating with dead relatives. One, who called himself a lapsed Catholic and Pagan, reported a close encounter with a mystical being.

Near-death experiences have been reported for centuries but in Parnia's study none of the patients were found to have received low oxygen levels, which some skeptics believe may contribute to the phenomenon.

When the brain is deprived of oxygen people become totally confused, thrash around and usually have no memories at all, Parnia said. "Here you have a severe insult to the brain but perfect memory."

Skeptics have also suggested that patients' memories occurred in the moments they were leaving or returning to consciousness. But Parnia said when a brain is traumatised by a seizure or car wreck a patient generally does not remember moments just before or after losing consciousness.

Rather, there is usually a memory lapse of hours or days. "Talk to them. They'll tell you something like: 'I just remember seeing the car and the next thing I knew I was in the hospital'," he said.

"With cardiac arrest, the insult to the brain is so severe it stops the brain completely. Therefore, I would expect profound memory loss before and after the incident," he added.

Since the initial experiment, Parnia and his colleagues have found more than 3,500 people with lucid memories that apparently occurred at times they were thought to be clinically dead. Many of the patients, he said, were reluctant to share their experiences fearing they would be thought crazy.

One patient was two and a half years old when he had a seizure and his heart stopped. His parents contacted Parnia after the boy "drew a picture of himself as if out of his body looking down at himself. It was drawn like there was a balloon stuck to him. When they asked what the balloon was he said, 'When you die you see a bright light and you are connected to a cord.' He wasn't even 3 when he had the experience," Parnia said.

"What his parents noticed was that after he had been discharged from hospital, six months after the incident, he kept drawing the same scene."

The brain function these patients were found to have while unconscious is commonly believed to be incapable of sustaining lucid thought processes or allowing lasting memories to form, Parnia said - pointing to the fact that nobody fully grasps how the brain generates thoughts.

He speculated that human consciousness may work independently of the brain, using the grey matter as a mechanism to manifest the thoughts, just as a television set translates waves in the air into picture and sound.

“When you damage the brain or lose some of the aspects of mind or personality, that doesn’t necessarily mean the mind is being produced by the brain. All it shows is that the apparatus is damaged,” Parnia said, adding that further research might reveal the existence of a soul.

“When these people are having experiences they say, ‘I had this intense pain in my chest and suddenly I was drifting in the corner of my room and I was happy, so comfortable. I looked down and realised I was seeing my body and doctors all around me trying to save me and I didn’t want to go back.’ The point is they are describing seeing this thing in the room, which is their body. Nobody ever says, ‘I had this pain and the next thing I knew my soul left me.’”

Source : Times of India, July 1, 2001

I.T. is not Enough

The correlation between education and industry has been well documented by Annalee Saxenian of the Department of City and Regional Planning at the University of California. The study compared the evolution of Route 128 and Silicon Valley as IT centres in the United States. Both areas, she argues, got a fillip from the presence of premier educational institutions - Massachusetts Institute of Technology and Harvard University in the former and Stanford University in the latter. The obvious lesson to learn from these examples is that we should foster the growth of top quality training centres to feed industry. The absence of quality education will trigger a spurt in garage courses which will not only erode the quality of IT professionals but also breed a swarm of software coolies. In the long run this can only result in industry closing its doors to all such fly-by-night production. The US job market has already wisened up to such 'instant' programmers. An erosion in credibility is the last thing India needs in these times. The problem of quality output in the education chain is complicated by the fact that there are not enough quality teachers. The Karnataka (one of Southern Indian States) government's strategy to train trainers is laudable but obviously a lot more needs to be done. Clearly, there is a role here for the NRIs, many of whom are where they are because of the high quality education they received in India.

*Source : Extract from Editorial
The Times of India, March 12, 2001*

Maturity

Maturity is the ability to control anger and settle differences without violence or destruction.

Maturity is patience, willingness to pass up immediate pleasure in favour of future gains.

Maturity is perseverance, ability to sweat out a project or a situation in spite of opposition and setbacks.

Maturity is capacity to face unpleasantness, frustration, discomfort, defeat without complaint or collapse.

Maturity is humility - being big enough to say "I was wrong" and knowing when not to say "I told ya so".

Maturity is the ability to make a decision, stand by it.

Maturity is dependability, keeping one's head high in times of crisis.

Maturity is the art of living in peace with oneself - with what we cannot change and courage to change that which should be changed and wisdom to know the difference.

*- Ottawa Citizen
IAEA Newsletter, Oct., 2000*

A New Temple of Healing

In a grand function held on 19th January, 2000, the Prime Minister of India, Mr. A.B. Vajpayee inaugurated Sri Sathya Sai Institute of Higher Medical Sciences at whitefield, Bangalore, India. This marvellous 'temple of healing' was built in a record time of about one year.

"I have seen many hospitals in India and abroad. However, I can honestly say that I have rarely seen a hospital so magnificent, grand and beautiful as this," observed Mr. Vajpayee while inaugurating the Institute.

Source: Sanatan Sarthy

PIONEERS

This issue of the Journal is dedicated to the following pioneers who have been a constant source of inspiration.

A man's worst difficulties begin when he is able to do what he likes.

- T H Huxley

The quality of a person's life is in direct proportion to their commitment to excellence, regardless of their chosen field of endeavour.

- Vince Lombardi

We are what we repeatedly do. Excellence, then, is not an act, but a habit.

- Aristotle

The only way to speak the truth is to speak it lovingly.

- Henry David Thoreau

Study of inspiring books is like communion with living deities. It gives instant gifts of light and bliss.

- Pandit Shriram Sharma Acharya

Man's values are in the few things he creates and not in the many possessions he amasses.

- Kahlil Gibran

All love is expansion, all selfishness is contraction. Love is therefore the only law of life. He Who Loves lives.

- Swami Vivekanand

People seldom learn from the mistakes of others - not because they deny the value of the past, but because they are faced with new problems.

- Ilya Ehrenburg

BLISSFUL THOUGHTS

In deep silence, you can hear the voice of God.

- Sri Aurobindo

Let noble thoughts come from every side.

- Rig Veda

Thoughts have a very long life. Thoughts are reborn.

- GITA

A simple life is its own reward.

- G Satayana

Science means simply the aggregate of all the recipes that are always successful. The rest is literature.

- Paul Valery

Patience is an asset for a weak person and ornament of a strong person.

- Anonymous

Death is our friend, he is the truest of friends. He delivers us from agony. He helps us against ourselves. He ever gives us new chances, new hopes. He is like sleep, a sweet restorer.

- M.K. Gandhi

A sacrifice is the true hallmark of a doctor. So doctors should have the spirit of sacrifice. They should be compassionate and considerate towards poor.

- Sri Satya Sai baba

Burdens become light when cheerfully borne.

- Ovid

He is the happiest, be he king or peasant, who finds peace in his home.

- Goethe