

Plenty of water on Moon ?

NASA Finds 25 Gallons in One Strike, Increases Hope for Outpost

The lunar dud for space enthusiasts has become a watershed event for NASA. Spacecraft that crashed into the moon last month kicked up a relatively small plume. But scientists have confirmed the debris contained water – 25 gallons of it – making lunar exploration exciting again.

Experts have long suspected there was water on the moon. So the thrilling discovery announced Friday sent a ripple of hope for a future astronaut outpost in a place that has always seemed barren and inhospitable.

“We found water: and we didn’t find just a little bit. We found a significant amount,” Anthony Co-laprete, lead scientist for the mission, told reporters as he held up a white water bucket for emphasis.

He said the 25 gallons of water the lunar crash kicked up was only what scientists could see from the plumes of the impact. Some space policy experts say that makes the moon attractive for exploration again. Having an abundance of water would make it easier to set up a base camp for astronauts, supplying drinking water and a key ingredient for rocket fuel.

“Having definitive evidence that there is substantial water is a significant step forward in making the moon an interesting place to go,” said George Washington University space policy scholar John Logsdon.

The October mission involved two strikes into a permanently shadowed crater near the south pole. First, an empty rocket hull slammed into the Cabeus crater. Then, a trailing spacecraft recorded the drama live before it also crashed into the same spot four minutes later.

Source: Sunday Times, 15.11.2009, India

Mars, the King of Craters

Mars and the earth’s moon are considered the two biggest hotspots of impact craters in the solar system, the former due to its proximity to the asteroid belt and thin atmosphere and the latter due to complete lack of atmosphere. Both have hundreds of thousands of impact craters as compared to earth, which has less than 200 of them. Mars has the biggest known impact crater in the solar system. The Borealis Basin on its north pole has a diameter of about 10,000 km. The second biggest known crater in the solar system is on our own moon – the Aitkin Basin on its south pole is about 2,500 km wide. The third biggest, the Hellas Basin, is again on Mars, with a diameter of about 2,100 km.

(Compare that with the biggest on Earth, the Vredfort crater in South Africa, which is 300 km wide.) Mars even has the highest mountain in the solar system – Olympus Mons, which rises 27 km above the ground. (Due to low gravitational field).

Source: Indian Express, 23.5.2010

Shale Gas could End India's Energy Woes

The most striking transformation of India's energy sector is taking place not in nuclear or solar power, but in natural gas. The Krishna-Godavari offshore gas finds, the making of a national pipeline grid and, now, the first Indian venture into shale gas will dramatically change the energy profile of the country. Recent corporate moves in shale gas have been particularly dramatic. Reliance Industries has struck three multi-billion dollar deals with US shale gas firms this year alone. Even public sector oil firms have tied up with foreign firms in search of shale gas know-how.

Shale is a common rock formation often impregnated with oil and gas that, in the past, have been commercially too expensive to extract. This has changed following technological advances in the 1990s. A shale gas revolution has converted the US from gas importer into a gas-surplus country. American gas prices have fallen so rapidly that in energy equivalent terms US gas is now as cheap as \$12 barrel oil and about half the price that India has fixed for Krishna-Godavari gas. Shale gas is already shaking up the global system. Europeans see it as the means to break their dependence on Russian gas. One reason India is rightly refusing Iran's pricing mechanism for its future pipeline is that Tehran's yet to understand that global gas prices are set to go southward for decades. Iran's insistence that its gas price should be pegged to that of oil's is patently absurd. The US, leaders in this technology, are cognizant that shale gas would reduce carbon emissions by pushing out dirty coal and potentially tame oil-rich irritants like Venezuela and Iran. In April, it offered to provide assistance to any country seeking to exploit its shale gas reserves.

Not unexpectedly, a hidebound New Delhi doesn't even have an estimate of our shale gas reserves. What is known is that there are enormous shale deposits across north India, from Rajasthan to Assam and as far south as Andhra Pradesh. On the basis of these deposits, most geologists believe India may be among the five largest shale gas reserve-holders in the world. But New Delhi is an obstacle in another way. Present exploration policies separate bidding for normal oil and gas from bidding for non-conventional gas sources. This means that an energy firm looking for oil and gas that stumbles on shale gas has an incentive to ignore or even hide its discovery. India's private sector is nimbly jumping on to the shale gas bandwagon. India's government needs to wake up to an energy revolution. After all, this is a change that has been going on for 20 years.

Source: Hindustan Times, 25.6.2010

US Billionaires Vow to Donate Half Their Wealth

America's ultra-rich are queuing to join in a grand gesture of generosity. Forty US billionaires have signed up to pledge at least half of their fortunes to charity under a philanthropic campaign kicked off by Warren Buffett and Bill Gates. The two estimate that their efforts could generate \$ 600 billion in charitable giving.

In an unprecedented mass commitment, top figures including New York's mayor Michael Bloomberg, the hotel heir Barron Hilton, CNN media mogul Ted Turner, and the Star Wars director George Lucas have lent their names to the "giving pledge", an initiative founded six weeks ago to encourage the US's richest families to commit money to society's most pressing problems.

The pledge is not a legally binding contract but is described as a moral commitment. Inspired by the Bill and Melinda Gates Foundation which pumps billions into fighting disease in developing countries, it does not prescribe any particular charitable causes but is a statement of principle.

Buffett, the 79 year old Nebraska stock picker nick named the Sage of Omaha, who has a \$47 billion fortune, said the aim was to generate peer pressure encouraging billionaires to take an aggressive approach to philanthropy.

"We're hoping America, which is already the most generous society on earth, becomes more generous over time," he said.

To imbue team spirit, Buffett plans regular get-togethers for his fellow billionaires, kicking off with a series of dinners for 15 to 20 people at locations around the US this autumn.

Experts were asking how much being pledged was new money, as opposed to wealth already committed to charitable foundations. "I think it's remarkable that so many people have agreed to go public with their commitments," said Stacy Palmer, the editor of the Chronicle of Philanthropy. "But I'll be more convinced that this is truly transforming philanthropy when I see names on the list who aren't the usual suspects."

Buffett and Gates have been banging the drum for the initiative by contacting billionaires asking them to lend their names.

So far, roughly half of the 70 to 80 individuals approached have agreed to pledge money.

Source: Hindustan Times, 6.8.2010

Minerals Discovered in Afghanistan

Mineral development could be worth more than \$908 billion.

Potential Value in \$ Billion			
Iron	420.9	Graphite	0.7
Copper	274.0	LapisLazuli	0.7
Niobium	81.2	Flourite	0.6
Cobalt	50.8	Phosphorus	0.6
Gold	25.0	Lead and Zinc	0.5
Molybdenum	23.9	Mercury	0.5
Rare Earth Elements	7.4	Strontium	0.4
Asbestos	6.3	Sulfur	0.2
Silver	5.3	Talc	0.2
Potash	5.1	Magnesite	0.2
Aluminium	4.4	Kaolin	0.1

*Sources: U.S.G.S. Afghanistan Geologic Survey;
Department of Defence
and Hindustan Times, 15.6.2010*

Top of the World Universities

2010			2009	2008
Rank	University	Country	Rank	Rank
1	University of Cambridge	UK	2	3
2	Harvard	US	1	2
3	Yale	US	3	2
4	University College, London	UK	4	7
5	MIT	US	9	8
6	University of Oxford	UK	5	4
7	Imperial College, London	UK	5	6
8	University of Chicago	US	7	8
9	California Institute of Tech.	US	10	5
10	Princeton	US	8	12
47	Peking University	China	52	50
187	IIT Bombay	India	163	174
-	IIT Delhi	India	181	154

Source: H.T. dated 14.9.2010

Nutritious Food

Healthy food must satisfy four conditions: it should give nutrients, take the least time to digest, leave an alkaline residue in the blood stream and not leave a toxic residue. By these criteria, only fruit, vegetables, nuts and sprouts (herbs, milk of cow, honey) are healthy. We should ask ourselves whether we are eating out of hunger or for the taste: only healthy foods will satisfy hunger.

- If the body craves fried food, it lacks fatty acids, Give it raw nuts, not fries.
- If the body craves salty food, it lacks minerals. Give it vegetables, not chips.
- If the body craves sweets, it lacks glucose. Give it fruit, not chocolates.

Harvard School of Public Health: Eat a plant-based diet rich in fruits, vegetables and whole grains; choose healthy fats, such as olive and canola oil; eat red meat and unhealthy fats, such as saturated and trans fats, sparingly; keep calories in check.

Michael Pollan, activist and author of the *Omnivore's Dilemma* wants people to differentiate between "food" and "edible food-like substances". Don't eat anything that contains ingredients you would not stock in your kitchen, such as calcium propionate (and mono sodium of the comate MSG), he says. His mantra: Eat food. Not too much. Mostly plants.

Source: Hindustan Times, 22.8.2010

World's Longest Tunnel Ready Under Swiss Alps

A giant drilling machine punched through a wall of rock under the Swiss Alps on Friday to complete the world's longest tunnel, amid scenes of jubilation among miners and dignitaries.

Miners on both sides of the tunnel, which has been under construction for 15 years, stepped through and shook hands, television images showed.

"Here, in the heart of the Swiss alps, one of the biggest environmental projects on the continent has become reality," said Swiss Transport Minister Moritz Leuenberger.

The 57-km (35.4-mile) rail link, which will open in 2017, will form the lynchpin of a new rail network between northern and southeastern Europe.

The tunnel is seen as an important milestone in the creation of a high-speed transportation network connecting all corners of Europe. It will allow millions of tons of goods that are currently transported through the Alps on heavy trucks to be shifted onto the rails, particularly the economically important link between the Dutch port of Rotterdam and Italy's Mediterranean port of Genoa.

"It's a day of joy for Switzerland," said Peter Fueglistaler, Director of Switzerland's Federal Office of Transport.

Source: Hindustan Times, 16.10.2010

Storms Hurl Antimatter into Space

For the first time, scientists have discovered that powerful thunderstorms on Earth can fling beams of antimatter into space.

The never-before-seen phenomenon, captured by NASA's orbiting Fermi gamma-ray observatory, has been billed as the most exciting discoveries in geosciences in a very long time.

Antimatter is a mirror image of normal matter with unusual properties – protons with negative charges, electrons with positive charges, and so on. It was created in equal abundance to normal matter at the beginning of the universe, but was destroyed when it came in contact with the normal matter.

“These signals are the first direct evidence that thunder-storms make antimatter particle beams,” lead researcher Michael Briggs, of the University of Alabama in Huntsville, said.

Fermi is designed to monitor gamma rays, the highest-energy form of light. When a piece of antimatter strikes the observatory and collides with “normal” matter, both particles immediately annihilate and are transformed into gamma rays – which Fermi can detect.

In the new study, presented at the 217th meeting of the American Astronomical Society in Seattle recently, Fermi's Gamma-ray Burst Monitor instrument picked up gamma rays with energies of 511,000 electron volts – a telltale sign that an electron has met its antimatter counterpart, a positron.

The gamma-ray detector spotted the antimatter signals while searching for at terrestrial flashes of gamma rays. To date, scientists have identified 130 gamma-ray flashes from Earth since Fermi's launch in 2008, and four of them clearly show antimatter signatures.

The tops of thunderstorms harbor electric fields. Under the right conditions, scientists think, these fields can become strong enough that they drive an upward avalanche of electrons.

Source: Hindustan Times, 13.1.2011

Geotechnical Problems of Water Resources Development in India – The Role of Instrumentation

(Excerpts of 32nd IGS Annual Lecture, IIT Bombay, Dec. 16, 2010 by V.M. Sharma)

Let not a single drop of water that falls on the land go into the sea without serving the people.

- *Parakrama Bahu, 12th Century Ruler of Serendip
(Now Sri Lanka)*

We are fortunate to have been bestowed with plenty of water resources. This precious resource needs to be developed and managed. What has been done so far in the field of water resources development is very little compared to what remains to be done. Just one example of the potential of river Yamuna in Uttarakhand and Himachal Pradesh, will demonstrate our capability and what remains to be done.

The Yamuna river along with its numerous tributaries in Uttarakhand Himalayas constitute about 6000 MW of Hydropower potential hardly 10% of which has been tapped so far. In a total stretch of about 62 km between Ichari in Tons valley and Khara power house in Yamuna valley through five run of the river schemes a total of 550 MW of hydropower is being generated by utilizing a gross available head of 240 m.

The Chibbro underground power house of the Yamuna Hydrel Scheme Stage-II, Part-I on river Tons is the first underground power house cavern constructed in the Himalaya in the Indian subcontinent under not very favourable rock conditions. The head race tunnel of Yamuna Hydrel Scheme Stage-II, Part-II also posed challenging tunneling conditions on account of intersection of two regional thrusts namely Krol thrust (MBF) and Nahan thrust and their intra-thrust zone traversing for about 1 km length and experience of squeezing and flowing conditions with rock closures in the tunnel. The tunnel was successfully driven in this weak zone by trifurcating it into three tunnels of 4.8 m diameter size each. The siphon tunnel below the Tons river from Chibbro underground power house is also a unique feature constructed in the project. The Khara hydrel scheme was constructed across the fragile Siwalik rocks comprising sand rock, boulder conglomerate, siltstone and claystone with water charged horizons to give rise to flowing and squeezing conditions during tunneling. The 12 km long power channel was constructed in a hostile terrain with numerous streams and unfavourable unstable patches causing landslides and instability problems of cut slopes along its banks resulting in delays in commissioning of the project. Two important tectonic features passing through the Khara Hydrel scheme are:

- (a) Yamuna Tear a major fault with a sinistrial sense of movement showing a huge 4 km horizontal shift of Siwalik rocks along this fault; and
- (b) Foot Hill Thrust (FHT) encountered during the excavation of Khara power house and bypass channel which shows deposits of Indo-Gangetic alluvium overridden by middle Siwaliks. Neotectonic activity along Yamuna Tear has been witnessed in the area indicated by cracks and displacement of tiles in the lining of power channel after two years of the commissioning of the Khara project.

Having done all this, we should have been leading the world. But we are not. If we have a problem today we still look to the west. Had we done our work systematically, instrumented our water resources development projects, analyzed our data and experience and involved our teaching and research institutes into this task of nation building, we would have been world leaders in this field.

How to Wish Worries Away

- Keep yourself busy. Look at the rational assumptions of a problem and also alternative solutions.
- Don't fuss about trifles. Don't permit little things to ruin your long term happiness.
- Avoid being in the company of people who always find the negative in the positive.
- Be aware of all the feelings experienced due to a problem
- Bury the past which is dead.
- Physical exercise, deep breathing and meditation helps when you are feeling stressed.
- Be in sync with your natural sleep-wake cycle.
- Write down positive affirmative statements prior to sleep. Example: I am free from worry, tension, stress, anxiety, anger, insomnia, pain...I have good memory, focus, attention, confidence, relationship...
- When an option is not visible, sleep over the problem and you might find the answer next morning. The brain works calmly when you sleep.

Humour - True Friendship

An army officer used to go to a bar. He asked for two pegs of whisky in two glasses in the winter. He drank one glass and then another. After a few weeks, someone asked, "Sir! Why you are drinking from two different glasses? You can drink two pegs in one glass only."

The officer replied, "My friend has been killed in Kargil war. We used to drink together. So I drink in his memory".

After some time, the officer asked for one peg of whisky only. Then his associate asked him politely.

"Sir! Why are you drinking today in one glass only?" The officer replied, "I have left drinking."