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News & Views

India builds station inside 27km rail link

A railway station in India will be built inside a 27km-long rail tunnel at a height of 3,000m. The Keylong station is part of the Bilaspur-Manali-Leh railway line close to the China-India border. Once completed, the station in Himachal Pradesh will be the first station of an Indian railway network to be located inside a tunnel.

"When the final surveys are completed, there could be many more stations inside tunnels on the route," said Chief Engineer D.R. Gupta of Northern Railway. The project will include 74 tunnels, 124 major bridges and 396 minor bridges, according to the first phase of the survey. A final survey is expected to be completed in 30 months, after which a detailed project report will be finalised.

Once completed the line will connect all important locations of Himachal Pradesh and Jammu and Kashmir. It is important because it can facilitate in movement of goods and personnel to the frontier areas. The railway would cut the travelling time between Delhi and Leh from 40 hours to 20 hours.

Source: The Times of India, Oct. 18, 2018
https://www.tunneltalk.com; downloaded on 27.11.18

Progress on Mumbai metro line 3

Work is progressing well in Mumbai, India, with 17 TBMs either in operation or preparing to launch for excavation of the 33km long, twin tube all underground metro Line 3. In August 2018, Terratec assembled the fifth of its seven TBMs to work on the project. The 6.68m diameter dual mode hard rock TBM will join the other four Terratec machines already working on the project. The first four have achieved advance rates of up to 15m/day and 91m/week during the early stages of their drives on contracts 2 and 5. The new machine will work on Contract UGC-06 and progress from the CSIA International Airport shaft.

The two 6.68m diameter dual-mode hard rock TBMs are being used by the HCC Hindustan Construction Company / Moscow Metrostroy JV awarded Contract 2 of Line 3 by the MMRCL Mumbai Metro Rail Corporation in July 2016. Both machines are excavating the 14km long twin tunnels from the Chhatrapati Shivaji Terminal (CST) TBM launch shaft and are currently excavating towards the Mumbai Central Station receiving shaft (Fig.1).

The other three new Terratec dual-mode hard rock TBMs are being used by the J. Kumar – China Railway No. 3 Engineering Group JV for the excavation of sections on the line's 4.94km contract 5 (Dharavi Station – CSIA Domestic Airport TBM receiving shaft) and the 4.45km contract 6 (CSIA Domestic Airport – Marol Naka TBM receiving shaft), which were also awarded last July.

In addition to the hard rock TBMs, Terratec has supplied two re-manufactured 6.61m diameter mixed rock EPBMs, which will also be deployed by the J. Kumar – China Railway No. 3 Engineering Group JV in Mumbai. These TBMs were recently used on Delhi Metro new Pink Line

and have since undergone extensive refurbishment in order to fulfil a section of highly weathered ground on contract 5.

"We have again selected Terratec as a project partner after using four Terratec TBMs on our Delhi Metro contracts (CC20 & CC24), where we completed our tunnelling operations on time and without any issues. We believe our goals of safe and timely tunnelling will once again be achieved using Terratec technlogy," said Urin Wanbanterng, UGC-06 Construction Manager.

Terratec is the lead TBM supplier on the Mumbai project with a 41% market share.

Source: Terratec News Release; Tunnel Talk, 6.09.2018

Mumbai metro lowers 17th and final TBM

On October 15 Mumbai Metro Rail Corporation (MMRC) lowered the 17th and final TBM to work on the Mumbai Metro 3 corridor. It also marks the completion of 10.5km of tunnelling works of the proposed 33.5km by the second week of October.

"Tunnelling work is progressing satisfactorily and with the last TBM in the underbelly of the city we will work with more enthusiasm," said MMRC Project Director Subodh Kumar Gupta. Managing Director Ashwini Bhide added: "With this, all 17 TBMs are underground and poised to complete tunnelling soon by following strict safety and quality norms."

The 5.8m diameter TBMs have been named after the rivers flowing in the state and were manufactured by STEC, Terratec, Herrenknecht and Robbins. Krishna 1 was the first TBM to be lowered at Naya Nagar station on September 18, 2017, and has completed 1.7km so far. The line 3 corridor will run on the Colaba-Bandra-SEEPZ stretch and have 27 stations, of which 26 will be underground.

Source: The Free Press Journal; Tunnel Talk, 16.10.2018

46km Bilaspur-Manali-Leh rail line to be world's highest

The proposed Bilaspur-Manali-Leh rail line will have many firsts to its credit. At 5,360 meters above the sea level, it will be the world's highest railway line. The 465-km line, to be built at a cost of Rs 83,360 crore, will include India's first underground railway station in Keylong. The proposed alignment passes through the Shivaliks, Himalayas and the Zanskar range and four mountain passess - Rohtang La, Barlacha La, Lachung La and Tangla La.

The project will include 74 tunnels, 124 major bridges and 396 minor bridges, according to the first phase of the survey done for the project. The only project comparable to the railway line is the Qinghai-Tibet line in China, which is at a height of around 2,000 metres above sea level.

The railways wants the strategic line, to be completed by 2022, along the Indo-China border to be declared a national project. The railways is also seeking the help of the US for satellite imagery to survey the route and will also use the Lidar method for an understanding of the geology of the entire route.

"We can start construction to showcase Indian Railway's presence in the valley. The railway line will provide relief for locals as well as Army personnel living there," said Alok Kumar, who is overseeing the project.

The line will connect Sundernagar, Mandi, Manali, Keylong, Koksar, Darcha, Upshi and Karu and other important towns of Himachal Pradesh and Jammu & Kashmir enroute.

The railway line's elevation will begin from Bilaspur at a height of 500 metre and culminate in Leh at an elevation of 3,215 metre. The highest road point (Tanglangla Pass) enroute at 5,360 meters will be the highest of any railway in the world. Over 50% of the line will be underground with 27-km long tunnel near Manali.

Currently, the final location survey of 465-km line is on and considering the difficult terrain, it will take at least two years to complete it, after which the project will be sent for approval.
The railway has sought Central funding for 51-km stretch between Upshi and Leh. Lok Sabha MP Thupstan Chhewang also wrote to Railway minister Piyush Goyal on September 6 demanding the project to be declared as national project.

"The line is strategically important and will provide all-weather surface connectivity to far-flung areas of Ladakh region. It will also boost tourist inflow, which will be beneficial for local population. Travel time will reduce by half, the rail project will be executed in a way that it need not close during extreme weather," said Desh Ratan, chief engineer of the project.

Source: Hindustan Times, 19.10.2018

PM to launch works on Zojila tunnel

Prime Minister Narendra Modi is going to inaugurate the work on prestigious Zojilla tunnel in Jammu and Kashmir (J&K) state of India. The tunnel will provide all-weather connectivity between Ladakh and the Kashmir valley. Prime Minister will also lay foundation stones or inaugurate other infrastructure projects. The Prime Minister is also expected to dedicate to the nation the 330- MW Kishenganga Power Project constructed in the Gurez area of Kashmir. "The PM will attend the commencement of work on Zojila tunnel on the Srinagar-Leh National Highway at an event in Jive-tsal in Leh," an official spokesman said.

Modi will also lay foundation stone for the Srinagar Ring Road and Jammu Ring Road at separate events at the Sher-e-Kashmir International Conference Centre (SKICC) Srinagar and at the General Zorawar Singh Auditorium in Jammu.

Union Minister for road transport and highways Nitin Gadkari will also be present at the events.

The 14 kilometre long Zojila tunnel will be India's longest road tunnel and Asia's longest bidirectional tunnel. Earlier this year, the Cabinet Committee on Economic Affairs, chaired by the prime minister, had approved the construction, operation and maintenance of this two-lane bi-directional tunnel with parallel escape (Egress) tunnel between Baltal and Mina-marg on the Srinagar-Leh section of the National Highway at a cost of Rs. 6800 crore. The construction of this tunnel will provide all-weather connectivity between Srinagar, Kargil and Leh.
This route remains snow-bound for a large part of the year, and is ravaged by frequent avalanches.

The tunnel will cut down the time taken to cross the Zojila pass from the present 3.5 hours to just 15 minutes, besides making the drive much safer and convenient.

Source: Hindustan Times, 19.5.2018

Cabinet clears setting up 2 more oil reserves

In a move to bolster the country's crude oil reserves, the Cabinet approved construction of two more strategic petroleum reserves with aggregate capacity of 6.5 million tonnes (MT) at Chandikhol in Orissa and Padur in Karnataka, railway minister Piyush Goyal announced.

Under phase-1 of the strategic petroleum reserve (SPR) programme, government has built crude oil storage facilities with total capacity of 5.33 MT, equivalent to around 39 million barrels, at three locations-Visakhapatnam, Mangalore and Padur.

"Cabinet has approved two additional storage facilities with capacity aggregating 6.5 MT at Chandikhol of 4 MT and at Padur of 2.5 MT, the creation of which will help in significantly strengthening the country's strategic oil reserves," Goyal told reporters here after a Cabinet meeting.

"We are going to explore the PPP (Public-Private Partnership) mode for execution of these underground caverns for which potential investors will be approached," Goyal said, adding that the Cabinet has only accorded in-principle approval, while costs of the advanced design and engineering required would be worked out.

A petroleum ministry release said the completed phase-I of the SPR programme has estimated supplies of around 10 days of India's crude requirement.

"Cabinet's approval for establishing additional 6.5 MT strategic petroleum reserve facilities will provide an additional supply of about 12 days," it said.

Last month, the first consignment of 2 million barrels of crude oil arrived from the UAE, intended to fill one of the two strategic reserve caverns at Mangaluru.

Source: Hindustan Times, 28.6.2018

111km Jiribam-Imphal rail link to help open economy, boost tourism

With the world's tallest railway bridge on a concrete pier and passing through several tunnels, including India's second longest, the Jiribam-Imphal railway line in Manipur is hurtling towards completion and will reduce travel time between Manipur and Assam by six hours.

But most importantly, the line will connect city Imphal with the country's railway network and boost Manipur's economy and open it up for tourists.

To achieve this, Indian Railways had to choose one of the most difficult terrains to construct the 111km railway line.

"Northeast Frontier Railway (NFR) undertook the construction of a new broad gauge line project from Jiribam to Imphal in Manipur, which borders Myamnar. It is identified as a 'national project' due to its strategic importance and potential for national development and integration besides its potential to serve as a vital link in the Trans-Asian Rail Network.

"The railway line cuts across the lower Himalayan range necessitating series of tunnels through the hills and tall bridges across the deep valleys," said Saibaba Ankala, Chief Engineer (Construction) of NFR.

Over 50% of the line will pass through 47 tunnels (stretching a little over 63km) and the world's highest pillar at 141 metres (double the height of Qutub Minar and equal to a 45-storey building). It will run eastwardly to connect Imphal with Silchar in Assam. Once constructed, the area around the tallest bridge will be developed as a tourist attraction.

Railways officials said 60% of the work has been completed and the line is expected to start functioning by mid 2020.

Bridge number 164 of the line across the valley of river Ijai near Noney, with a pier height of 141 metres, is going to be the world's tallest rail girder bridge pier, surpassing the existing record of 139m of Mala-Rijeka viaduct in the Balkan country Montenegro in Europe.

"The entire northeast is located in a region prone to very severe earthquakes, identified as Zone-V of the Seismic Code. The area is also marked with very high wind speeds and heavy rainfall for six months in a year. The general soil profile is shale which is most undesirable for bridges of this magnitude. Hence, the biggest challenge is to ensure sustainability of the bridge against the extremities of the nature," Ankala said.

The construction is not easy with the material coming from 2,000km away and workers facing serious threat to their lives.

"Presence of several militant outfits in Manipur is a major security concern to the site engineers in the form of frequent threat calls, attacks, firing and kidnapping for ransom. It is a real challenge to ensure the safety and security of the work force as well as the assets, for which the support of the state government is immense," said Ved Prakash, spokesperson for the Indian Railways.

The material requirement for the bridge is 65,000 cubic metre of concrete, 12,000 tons of reinforcement steel, and 600 tons of high tensile steel for the girders having greater strength and resistance to dynamic forces caused by moving trains. All these materials are transported from various parts of the country along National Highway 37.

Source: Hindustan Times, 17.5.2018

India keen to build, export bullet train coaches to Japan

India has proposed to Japan that it is keen to manufacture and export the bullet train coaches which could bring down the cost of operating the Shinkansen trains in the country, a senior official of the Indian Railways said.

India is building the country's first high speed rail corridor between Mumbai to Ahmedabad which is expected to be operational by 2022. Initially, India is set to buy 18 such Shinkansen trains from Japan for Rs. 7,000 crore.

"We have proposed to the Japanese side that they help us with the technology to make the bullet train coaches locally. Once we do that, we can build the coaches at a much lower cost. In fact they would be the cheapest in the world," Rajesh Agarwal, Member, Rolling Stock, Railway Board told Press Trust of India on the sidelines of a conference here on high speed railways. "Then we can take them across the world. Many countries would rather buy it from us rather than China. Be it countries in South-East Asia, even Europe and the USA," he said.

He said that the Modern Coach Factory, Raebareli in Uttar Pradesh is well equipped to produce the coaches. "Add to this around 150,000 skilled workers, 50 railway workshops and around six production units that railway has at it's disposal," Agarwal said.

The Ambassador of Japan to India Kenji Hiramatsu said the discussions over manufacturing the Shinkansen coaches locally were going on. "The discussion on this is going on. I believe it's best to manufacture locally and we are seriously thinking about it," he told his reporter. If the move works out, it will also open a new business opportunity for the state owned organisation which is reeling under high operating costs.

The scope for high speed railways across the globe has huge potential. It is currently in different stages in the US, Vietnam, Malaysia, Singapore, Thailand and Indonesia.

"The idea is to get Japan to produce not just the rolling stock for railways in India but also other sectors like defence using our manufacturing units. That will be big takeaway," said Agarwal. The 508-km long bullet train corridor in India will have 12 stations, with about 350 km of it in Gujarat and 150 km in Maharashtra. The bullet trains with 10 coaches each, will have one business class coach and nine standard coaches each. The lowest fare is expected to be Rs. 250 and the maximum Rs. 3000. Land acquisition is underway for the project. The government has already started getting funds from the Japanese International Cooperation Agency (JICA), which is providing a soft loan of Rs. 88,000 crore for the project over 50 years at an annual interest rate of 0.1%. Repayments will start after a moratorium of 15 years from the date the load was released.

Source: Hindustan Times, 9.11.2018

World university rankings: A record 49 from India among the best in the world

Led by Indian Institute of Science (IISc) in Bangalore, India has a record 49 institutions among the best universities in the world, according to the Times Higher Education (THE) World University Rankings 2019 published Wednesday.

While IISc remained the top school from the country, the Indian list saw some fresh names including the newly established Indian Institute of Technology in Indore (IIT Indore) making an impressive debut in the global rankings. However, all Indian institutes are outside the top 200 global list that was topped by Oxford University.

While IISc was kept in the 250-300 ranking cohort, IIT Indore made its debut with a presence in the 351-400 best universities group ahead of established IITs in Delhi, Madras and Mumbai.

IIT Bombay with a global ranking in the 401-500 group is the third best from India and has slipped in the latest ranking by 50 places when compared with its previous ranking. IIT Roorkee, however, improved its ranking by 100 places to be clubbed in the same group as IIT Bombay. After the top 200 list, THE does not assign individual rankings to universities but club them in groups.

Pradeep Mathur, director of IIT Indore said his institute has been focusing on research by investing in research facilities, providing incentives for publications and patents, and recruiting committed researchers.

India increases its presence again, claiming 49 places this year, up from 42—the fifth best-represented nation in the world. The country is the most-represented country in the table when

nations with representatives in the top 200 are excluded, Phil Baty, editorial director of Global Rankings for THE said in an email.

Interestingly, two private institutes—Karnataka based Jagadguru Sri Shivarathreeswara University now renamed as JSS Academy of Higher Education and Research, and Tamil Nadu-based Amrita University have made the most progress in the 2019 rankings among Indian institutes.

Besides, three new IITs and two Indian Institute of Science Education and Research (IISER) have found a place among the top 1,000 universities in the world. This in a way reduces apprehension about whether new institutes established by government will be able to catch up with their old peers.

"India's bursting with innovation and ambition—the nation has serious potential to grow into a leading player in global higher education. But while it increases its presence again in this year's table, the majority of its universities remain immobile or in decline, struggling against increased global competition—particularly from east Asia," Baty said.

"Sustained investment, a continued drive to attract leading global talent, and a strengthened international outlook will be key to boosting its global reputation and research influence. Its current higher education reforms could be key to helping institutions progress," he added.

Globally, Oxford claims first position for a third consecutive year followed by Cambridge and Stanford University. The Massachusetts Institute of Technology (MIT) rises one place to number four but the California Institute of Technology drops two places to number five.

Tsinghua University of China is the new number one school in Asia replacing National University of Singapore.

Source: Hindustan Times, 3.10.2018

Mars probe poised for touchdown

Mars is about to get its first U.S. visitor in years: a three-legged, one-armed geologist to dig deep and listen for quakes.

NASA's InSight makes its grand entrance through the rose-tinted Martian skies on Monday, after a six-month, 480 million kilometre journey. It will be the first American space craft to land since the Curiosity rover in 2012 and the first dedicated to exploring underground.

NASA is going with a tried and true method to get this mechanical miner to the surface of the red planet. Engine firings will slow its final descent and the spacecraft will plop down on its rigid legs, mimicking the landings of earlier successful missions. That's where old school ends on this $1 billion US-European effort.

Once flight controllers in California determine the coast is clear at the landing site - fairly flat and rock free - InSight's 1.8 metre arm will remove the two main science experiments from the lander's deck and place them directly on the Martian surface. No spacecraft has attempted anything like that before. The first don't stop there.

One experiment will attempt to penetrate 5 metres into Mars, using a self-hammering nail with heat sensors to gauge the planet's internal temperature. That would shatter the out-of-this-world depth

record of 2.50 metres drilled by the Apollo-moon-walkers nearly a half-century ago for lunar heat measurements.

The astronauts also left behind instruments to measure moon-quakes. InSight carries the firstseismometers to monitor for mars-quakes - if they exist. Yet another experiment will calculate Mars' wobble, providing clues about the planet's core. It won't be looking for signs of life, past or present. No life detectors are on board.

The spacecraft is like a self-sufficient robot, said lead scientist Bruce Banerdt of NASA's Jet Propulsion Laboratory.

Source: Hindustan Times, 23.11.2018

How engineers are straightening the Leaning Tower of Pisa

"It's still straightening," said engineer Roberto Cela, gazing at the Leaning Tower of Pisa gleaming in the autumn sunshine of northern Italy.

"And many years will have to pass before it stops."

The gravitationally-challenged landmark is leaning less after years of ambitious engineering work. Fortunately for the millions of tourists who come here every year, the 57 metre tower remains beautifully askance. The medieval bell tower has leaned to one side ever since building started in 1173 on ground that proved a little too soft. The tower was closed to the public in January 1990 for 11 years over safety fears, as its tilt reached 4.5 metres from the vertical, threatening to turn it into a pile of rubble. "We installed a number of tubes underground, on the side that the Tower leans away from," said Cela, technical director at the OPA, which looks after Pisa's main monuments.

"We removed soil by drilling very carefully. Thanks to this system, we recovered half a degree of lean," he said.

Michele Jamiolkowski, an engineer of Polish origin who adopted Italian nationality, coordinated an international committee to rescue the landmark between 1993 and 2001.

Engineering lecturer Nunziante Squeglia of Pisa University, who works with the Surveillance Group that was set up after the rescue work, has been studying and measuring the tower for 25 years. He says that the tower straightened by 41 cm until 2001, and another 4cm since then.

To understand how the 14,500-tonne building is moving, measurements are made as often as once an hour, some automatically using pendulums, some manually using a surveyor's optical level.

"The tower tends to reduce its lean in the summer, when it's hot, because the tower leans to the south, so its southern side is warmed, and the stone expands. And by expanding, the tower straightens," said Squeglia.

Source: Hindustan Times, 3.12.2018

Scientists conduct chopper survey

A team of scientists from the CSIR-National Geophysical Research Institute (NGRI), Hyderabad, is conducting a research survey using helicopters in Ramnagar, Uttarakhand state to explore the presence of minerals, metals and water in the area.

Abhay Manglik, chief scientist of NGRI, said they were conducting a five-day heli-borne transient electromagnetic survey in Ramnagar and Kaladhungi for mineral and groundwater exploration as well as for mega geotechnical projects. In this method, an electrical impulse is generated in a large loop below the helicopter and the induction effect of the ground is measured by the receiver. Minerals and other substances within 500 metres from the earth's surface can be detected. Manglik said the main objective was to test the efficacy of the specialised technique so that it can be applied for earthquake hazard assessment and exploration of natural resources in the hilly terrain.

Source: Hindustan Times, 9.12.2018

Solar rooftop installation at record 1,538 MW

India witnessed record installation of 1,538 MW of solar rooftop in the year ended September 30, 2018 taking the total capacity in the category to 3,399 MW, according to a report.

"There was record installation of 1,538 MW (rooftop solar) in last 12 months (up 75% year-on-year) ended September 30,2018," said the report by consulting firm Bridge to India.

It said rooftop solar capacity is expected to touch 15.3 GW by March 2022 in a status quo scenario. This is about 38% of the government's 40 GW target. According to the report, commercial and industrial installation consumer segment dominates the market with 70% share, while residential segment continues to lag with just 9%. It also stated that OPEX model where third party developers own and develop projects on customer sites, is still growing faster than rest of the market and added 559 MW capacity in the last 12 months (35% of the market share). The study also highlighted that Maharashtra (473 MW), Tamil Nadu (312 MW), Karnataka (272 MW), Rajasthan (270 MW) and Uttar Pradesh (223 MW) are the top five states accounting for 54% share of the total market.

It said the CAPEX market (where entire rooftop is owned by rooftop owners) is even getting more fragmented with top 10 players having a share of only 18% (21% last year). The top 3 players include Tata Power (4.4%), Mahindra (2%) and Sunsure (2%). The study also stated that in invertor market, Chinese players are growing and command a combined share of 43%. Bridge to India MD Vinay Rustogi said: "75% growth in a year plagued by safeguard duty and GST uncertainty is absolutely fantastic. Ongoing fall in module (solar) price should continue to drive growth in the next few years.

"Rooftop solar has huge growth potential and should be given more policy support particularly when utility scale solar is increasing facing acute land and transmission connectivity challenges."

Source: Hindustan Times, 10.12.2018

Arresting pollution

It seems that all stars, planets, moon, sun, air, Agni and nature or directions have been polluted. Seasons also appear to work against nature. In spite of being full of virtue, Prithvi has lost its rasa in all medicinal plants. Medicinal plants are without original qualities and have been polluted. When such pollution occurs, human beings suffer from disease. Due to pollution of weather, several disease will crop up and ruin the country.

- Charaka Samhita
Source: Times of India

Today's environment

Environment today is question of survival…Our rivers are dying, cities are choking, underground water tables are depleting, the air is not fit for breathing…Only a strong people's movement can

bring a change in our present situation…Unless we have a green vote bank, the attitude of political parties towards the environment will not change.

- M.C. Mehta
Environmental Litigator and Magsaysay Awardee
Source: Times of India

A positive attitude attracts good fortune

Some people appear to be evidently lucky. While others are trapped in a cycle of bad luck. But can we really do anything to improve the workings of luck?

Professor Richard Wiseman spent over a decade studying people's attitude to luck and how they affect the reality. His revolutionary study of the factors of luck resulted in his best-selling book 'The Luck Factor'.
The difference between lucky and unlucky people is striking. Lucky people tend to think positively even amid severe misfortune.
Unlucky people are usually pessimistic, sad and chronic complainants. They attract negative situations and misfortunes with constant sadness, doubt and fear of failure. Unknowingly they become a victim of laws of attraction.
Professor Wiseman identified four basic principles that lucky people knowingly or unknowingly follow.
One, listen to your instincts or gut feelings (conscience) before making any decision. Two, be open to new experiences and break the normal routine. Three, spend some time every day remembering what went well. Four, count the blessings and thank God. Visualise yourself in lucky situations every day.
A positive attitude gives us energy and vigour and tends to attract fortune by law of attraction. (Brave nations are lucky nations).

Source: Hindustan Times, 14.9.2018

Humour

- Poor tunnel collapses as it does not understand our theories.

- Prof. Kalman Kovari

- What is beyond the laws of the nature?
  The inner joy is beyond the Laws of the nature.

- Anonymous

- Worms ate up thousands of books but did not receive a certificate of erudition.

- H.H. Kamlesh D. Patel (2018)
Author of "The Heartfulness Way"

- Smiles are magical. Spread Cheerfulness

- Deepika Padukone (2016, Actor)

- A frog asked an astrologer, "Please tell my future?"
  Astrologer: A young cute girl will touch you.
  Frog: Wow, Great, When & Where?
  Astrologer: Next semester in biology lab…