

# SCIENCE CENTRE NEWS LETTER

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## SCIENCE CENTRE

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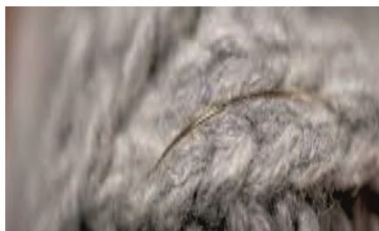
### WHAT'S NEW IN SCIENCE?

#### Researchers develop ultra-thin semiconductor fibers that turn fabrics into wearable electronics

Researchers from Nanyang Technological University, Singapore (NTU) have developed ultra-thin semiconductor fibres that can be woven into fabrics, turning them into wearable electronics.

To develop their defect-free fibres, the NTU Researchers selected pairs of common semiconductor material and synthetic material - a silicon semiconductor core with a silica glass tube and a germanium core with an aluminosilicate glass tube. The materials were selected based on their attributes which complemented each other. These included thermal stability, electrical conductivity, and the ability to not allow electric current to flow through (resistivity).

Silicon was selected for its ability to be heated to high temperatures and manipulated without degrading and for its ability to work in the visible light range, making it ideal for use in devices meant for extreme conditions, such as sensors on the protective clothing for fire fighters. Germanium, on the other hand, allows electrons to move through the fibre quickly (carrier mobility) and work in the infrared range, which makes it suitable for applications in



wearable or fabric-based (i.e. curtains, tablecloth) sensors that are compatible with indoor Light fidelity ('LiFi') wireless optical networks.

The Researchers inserted the semiconductor material (core) inside the glass tube, heating it at high temperature until the tube and core were soft enough to be pulled into a thin continuous strand.

The glass is removed once the strand cools and combined with a polymer tube and metal wires. After another round of heating, the materials are pulled to form a hair-thin, flexible thread.

In lab experiments, the semiconductor fibres showed excellent performance. When tested, the fibres could detect the entire visible light range, from ultraviolet to infrared and robustly transmit signals of up to 350 kilohertz (kHz) bandwidth.

The fibres were also evaluated for their washability, in which a cloth woven with semiconductor fibres was cleaned in a washing machine ten times, and results showed no significant drop in the fibre performance.

Courtesy - R.S. M Poonawala Sarvajanic Experimental School

### SCIENTIST OF THE MONTH

#### Dr. Rajpal Singh Sirohi

Dr. Rajpal Singh Sirohi was born on 7<sup>th</sup> April 1943 in Uttar Pradesh. He completed graduation from NAS (Nanakchand Anglo Sanskrit) College, Meerut, Uttar Pradesh in 1962 and Master's Degree from Meerut College in 1965. He obtained Ph.D from IIT (Indian Institute of Technology), Delhi in 1970.

He began his career as a Scientific Officer at the Indian Institute of Science, Bangluru, Karnataka and was responsible for building several interferometer (is a measurement method using the phenomena of interference of waves) including Mach-Zehnder Interferometer [it is a device to determine the relative phase shift variations between two collimated beam (parallel beam)



derived by splitting light from a single source) and the Jamin Interferometer [it provide very exact measurements of the refractive index (it gives the indication of the light bending ability of that medium) and dispersion of gases]. He worked as a Professor at Indian Institute of Technology, Madras from 1967 to 1969.

He was awarded Galileo Galilei Award of International Commission for Optics in 1995, Padma Shri Award in 2004 and Life time Achievement Award by Optical Society of India in 2007. Currently Dr. Rajpal is Professor at Alabama A & M University, United States.

Courtesy - R.S. M Poonawala Sarvajanic Experimental School



### Timings

Tuesday to Sunday  
& Public Holidays  
9.30 am to 4.30 pm

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## SCIENCE FACTS APRIL 2024

1 April 1826	Samuel Morey Patents the internal combustion engine.
1 April 1865	Austrian -born chemist Richard Adolf Zsigmondy ( made research in colloids ) was born.
1 April 1976	Jovian - Plutonian gravitational effect is first reported by the Astronomer Patrick Moor
2 April	World Autism Awareness Day. (UN)
3 April 1973	The first portable cell phone call was made in New York City, United States.
3 April 1984	Indian Astronaut Mr.Rakesh Sharma travelled into the Space.
6 April 1911	German Biochemist Feodor Felix Konrad Lynen (made discoveries concerning the mechanism and regulation of cholesterol with Konard Bloch) was born
6 April 1920	American Biochemist Edmond H. Fischer was born.
6 April 1965	Launch of Early Bird, the first Communications Satellite to be placed in Geosynchronous Orbit.
8 April 1818	German Chemist August Wilhelm von Hofmann was born.
8 April 1911	American Chemist Melvin Calvin (Discoverer of Calvin Cycle) was born.
9 April 1777	German Physicist Tomas Johann Seebeck was born.
10 April 1927	American Scientist Marshall Warren Nirenberg was born
11 April 1905	Albert Einstein revealed Special Theory of Relativity (special relativity)
12 April	International Day of Human Space Flight (UN)
12 April 1955	The Polio Vaccine, developed by Dr. Jonas Salk was declared safe and effective.
12 April 1961	First Russian Astronaut Yuri Gagarin traveled into Space.
14 April 2003	Human Genome Project was completed with 99% of the human genome sequenced to an accuracy of 99.99%
15 April 1874	German Physicist Johannes Stark ( discoverer of the Doppler effect in canal rays and the splitting of spectral lines in electric field ) was born.
20 April 1927	Swiss physicist Karl Alexander Muller (worked for superconductivity in ceramic materials) was born.
22 April	International Earth Day.
22 April 1909	Italian neurologist Rita Levi-Montalcini ( co-discoverer of nerve growth factor NGF) was born.
23 April 1858	German Physicist, Max Planck (who wrote the Planck Constant) was born.
25 April	World Malaria Day (WHO)
30 April 1895	French Scientist Mr. Rontgen discovered X-rays.

U.N- United Nations

WHO -World Health Organization

Answers: 1) a, 2) a, 3) b, 4) d, 5) c, 6) c, 7) c

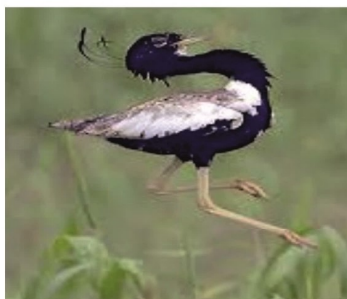
## SCIENTIFIC QUESTION

### Rare Bird - Bengal Florican

The Bengal Florican is also called as the Bengal bustard, is a bustard species native to the Indian subcontinent, Cambodia and Vietnam. It is listed as critically endangered on the IUCN Red List (International Union for Conservation of Nature, is an inventory of the global conservation status and extinction risk of biological species) because fewer than 1000 bustard were estimated to be alive as of 2017. It is the member of the genus *Houbaropsis*.



The male Bengal Florican has a black plumage (is a layer of feathers that covers a bird and the pattern, colour and arrangement of these feathers) from the head and neck to under parts. Its head carries a long lanky crest and the neck has elongated display plumes. The upper side is buff with fine black vermiculations and black arrow head markings and there is a conspicuous large white patch from the wing coverts (is one of a set of feathers which cover other feathers) to the remiges (are located on the posterior side of the wings). The feet and legs are yellow, the bill and iris are dark. The female is buff-brown similar to male's back with a dark brown crown and narrow dark streaks down the side



of the neck. Her wing coverts are lighter than the remiges and covered in fine dark barring. Immature Bengal floricans look like a female. Adult Bengal floricans range from 66–68 cm (26–27 in) in length and stand around 55 cm (22 in) tall. The female is larger than the male and weighs around 1.7–1.9 kg (3.7–4.2 lb) against a weight of 1.2–1.5 kg (2.6–3.3 lb) in males.

The Bengal florican has two disjunct populations. One occurs from Uttar Pradesh through the Terai of Nepal to Assam and Arunachal Pradesh in India. The other occurs in Cambodia and perhaps adjacent southern Vietnam. However, the birds use grassland near the lake to breed and move away from the water in the wet season when the breeding grounds are flooded. Similarly, the Terai population seems to move to warmer lowland locations in winter. Migrations are not long-distance, however, Restricted to tiny fragments of grassland scattered across South and Southeast Asia, the Bengal Florican is the world's rarest bustard.

Courtesy - R.S. M Poonawala Sarvajanic Experimental School

## KNOW THE EXHIBIT

### Your Weight on Mercury

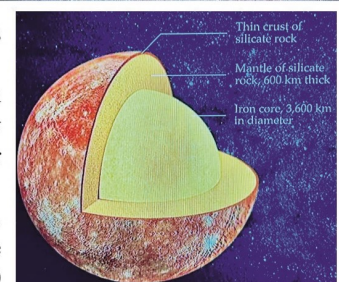
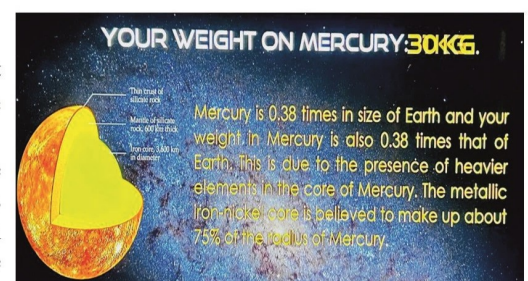
Mercury is 0.38 times smaller in size of Earth and your weight in Mercury is also 0.38 times that of Earth, this is due to the presence of heavier elements in the core of Mercury. The metallic iron-nickel core is believed to make up about 75% of the radius of Mercury.

Mercury has crinkles. As the iron core of the planet cooled and contracted, the surface of the planet became wrinkled. Scientist has named these wrinkles, lobate scraps. These scraps can be upto a mile high and hundreds of miles long. Mercury has a molten core. Scientist from NASA have come to believe the proposed solid iron core of smaller planets cools rapidly but the core of Mercury contains lighter elements such as sulphur, which would lower the melting temperature of the core material. It is estimated Mercury's core makes up 42% of its volume, while the Earth's core make up 17%.

Mercury is the second densest planet. Even though the planet is small, Mercury is very dense. Each cubic centimetre has a density of 5.4 grams. Only the Earth has a higher density than Mercury. This is largely due to Mercury being composed mainly of heavy metals and rock. Mercury's core has more Iron than any other planet in our solar system.

Mercury is the most cratered planet in the solar system. The surface of Mercury is covered in craters. These are caused by numerous encounters with asteroids and comets. Craters larger than 250 km in diameter are referred to as a Basin. The 'calories Basin' is the largest impact crater on Mercury covering approximately 1550 km in diameter.

This exhibit is situated at "Entering Space Gallery" between Fun Science Gallery and Power of Play Gallery at the first floor of Science Centre.



## SCIENCE PROJECT

Surat Municipal Corporation had organized 'Science Fair-2023' at Art Gallery, Science Centre Surat on 18<sup>th</sup> and 19<sup>th</sup> August, 2023 for the students of Std. 8 to 12. R.S. M Poonawala Sarvajanic Experimental School had participated their project on 'obtaining electrical energy from wind without natural wind' under the sub theme of 'Affordable and Clean Energy'.

The aim of the project is conversion of mechanical energy into electrical energy. There are 1,28, 305 km long railway tracks in India. Every year India spends 9500 crores of electricity only on railway. Ways to generate electricity can be found by which these costs can be reduced. Electricity can be generated easily by using an electrical generator.



### Types of generators:

- 1) Hydro Electric Generator: In which the water stored at a height is used to rotate the coil in the generator. Example: Ukai Hydro Power Plant (100 MW)
- 2) Thermal Genertaor: In which coal or other similar sources are used to rotate the coil in the generator. Example: Ukai Thermal Power Plant (1100 MW)
- 3) Nuclear Power Generator: In which generator coil is used to rotate by the nuclear materials. Example: Kakrapar Atomic Power Plant (1034 MW)

**Disadvantages:** 1) Expensive, 2) Cannot used at all locations



## SCIENCE QUIZ

1. The process of transfer of charges from a charged object to the Earth is called \_\_\_\_\_.  
a) Earthing                                      b) Lightning                                      c) Oscillation motion                                      d) Electron movement
2. Humans beings can be categorised as \_\_\_\_\_.  
a) Heterotrophs                                      b) Autotrophs                                      c) Parasites                                      d) Saprotrophs
3. Which one of the following is a parasite?  
a) Lichen                                      b) Cuscuta                                      c) Pitcher plant                                      d) Rhizobium
4. Which of the following set of substances contain acids?  
a) Grapes, lime water                                      b) Vinegar, soap                                      c) Curd, milk of magnesia                                      d) Curd, vinegar
5. Which of the following is an acid-base indicator?  
a) Vinegar                                      b) Lime water                                      c) Turmeric                                      d) Baking soda
6. Bile is produced in \_\_\_\_\_.  
a) Gall bladder                                      b) Blood                                      c) Liver                                      d) Spleen
7. Which is the first enzyme to mix with food in the digestive tract?  
a) Pepsin                                      b) Cellulose                                      c) Amylase                                      d) Trypsin

## SUMMER CAMP-2024

Surat Municipal Corporation is going to organize 'Summer Camp-2024' at first floor of the Museum, Science Centre from 10<sup>th</sup> to 20<sup>th</sup> May 2024. Students can learn about craft, astronomy, Science, basic electronics, robotics and drone. In summer camp, to groups are made according to the age. Group 'A' is for children of the age group 7 to 12 years and Group 'B' is for 13 to 17 years. Interested students can download Summer Camp forms from [www.suratmunicipal.gov.in](http://www.suratmunicipal.gov.in) and submit it at Science Centre Surat till 04/05/2024 (except Monday) during 10:00 am to 4:00 pm.