

SCIENCE CENTRE NEWS LETTER

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SCIENCE CENTRE

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WHAT'S NEW IN SCIENCE?

Potentially fatal combinations of humidity and heat are emerging across the globe.

Most of us know that humid heat is harder to handle than the "dry" kind and recently, some scientists have projected that later in the century, in parts of the tropics and subtropics, warming climate could cause combined heat and humidity to reach levels rarely if ever experienced before by humans. Such conditions would ravage economies and possibly even surpass the physiological limits of human survival.

The study identifies thousands of previously rare or unprecedented bouts of extreme heat and humidity in Asia, Africa, Australia, South America and North America, including in the U.S. Gulf Coast region. Along the Persian Gulf, researchers spotted more than a dozen recent brief outbreaks surpassing the theoretical human survivability limit.

The outbreaks have so far been confined to localized areas and lasted just hours, but they are increasing in frequency and intensity, say the author Colin Raymond, who did the research as a Ph.D student at Columbia University's Lamont-Doherty Earth Observatory. The study appears in the Journal Science Advances.

Analyzing data from weather stations from 1979 to 2017, the author found that extreme heat/humidity combinations doubled over the study

period. Repeated incidents appeared in much of India, Bangladesh and Pakistan.

Humidity worsens the effects of heat because humans cool their bodies by sweating, water expelled through the skin remove excess body heat; and when it evaporates, it carries that heat away. The process works nicely in deserts, but less well in humid regions, where the air is already too laden with

moisture to take on much more. Evaporation of sweat slows. In the most extreme instances, it could stop. In that case, unless one can retreat to an air-conditioned room, the body's core heats beyond its narrow survivable range and organs begin to fail. Even a strong, physically fit person resting in the shade with no clothes and unlimited access to drinking water would die within hours. Meteorologists measure

the heat/humidity effect on the so called "wet bulb" centigrade scale; in the United States, these readings are often translated into "heat index" or "real-feel" Fahrenheit readings. Prior studies suggest that even the strongest, best-adapted people cannot carry out normal outdoor activities when the wet bulb hits 32°C, equivalent to a heat index of 132°F. The study found that worldwide wet-bulb readings approaching or exceeding 30°C on the web bulb have doubled since 1979.



SCIENTIST OF THE MONTH

Kunchithapadam Gopalan

Kunchithapadam Gopalan was born on 12th August, 1938 in Tamil Nadu. He did B.Sc. in Physics from the University of Madras in 1959 and M.sc. in Nuclear Physics from Andhra University in 1960. He joined Tata Institute of Fundamental Research (TIFR) in 1970 but moved to Physical Research Laboratory (PRL) in 1973. After that he started his work at the National Geophysical Research Institute (NGRI) where he served for the rest of his career.

After his early studies on meteorites and lunar samples, Gopalan's focus shifted during his working days at PRL to Geochronology. He worked on the Precambrian Rajasthan and Madhya Pradesh using Rb-Sr

dating techniques with Mass Spectrometer as well as the volcanic rocks of the Deccan Plateau. He is credited with the setting up of Mass

Spectrometer, a facility for Argon-argon dating of rocks and an isotope facility at Physical Research Laboratory (PRL).



The Council of Scientific and Industrial Research (CSIR) awarded him the Shanti Swarup Bhatnagar Prize in 1982. The Indian Academy of Sciences elected him as a fellow in 1986, followed by Indian National Science Academy in 1986, Indian Geophysical Union in 1988 and the National Academy of Sciences,

India in 1992.



Timings

Tuesday to Friday
9.30 am to 4.30 pm

Saturday - Sunday
& Public Holidays
11.00 am to 6.30 pm

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SCIENCE FACTS AUGUST 2020

2 August 1861	Indian Scientist Sir Prafullchandra Ray was born.
4 August 1956	India's first Nuclear Reactor "Apsara" was established at ' Trombay' (BARC-Bhabha Atomic Research Centre)
5 August 1930	Neil Alden Armstrong (First person to set foot upon the moon) was born.
6 August 1881	Prof. Alexander Fleming (discoverer of Penicillin) was born.
7 August 1976	"Viking 2" Spacecraft of America entered into the Orbit of Mars.
8 August 1901	Ernest Lawrence (inventor of Cyclotron) was born.
12 August	International Youth Day. (by U.N.)
12 August 1919	Well known Indian Scientist Dr.Vikaram Ambalal Sarabhai was born.
14 August 1888	Johan Logie Baird (inventor of colour Television) was born.
17 August 1870	Frederick Russell (inventor of first successful typhoid fever vaccine) was born
21 August 1754	William Murdoch (inventor of Gas lighting) was born
22 August 1920	Denten Cooley (who conducted the first artificial heart transplant) was born.
25 August 1989	Space Craft 'Voyager 2's closest approach to Planet Neptune was noted.
26 August 1906	Albert Sabin (inventor of oral polio vaccine) was born
29th August	International Day against Nuclear Tests. (by U.N.)
	U. N. : United Nations
Answers: 1) a 2) a 3) c 4) c 5) b 6)c 7) b 8) c	

SCIENTIFIC QUESTION

What is Botox?

Botox is a drug that weakens or paralyzes muscle. In small doses, it can reduce skin wrinkles and help treat some muscle conditions. Botox is a protein made from Botulinum Toxin that the Bacterium Clostridium Botulinum produces. This is the same toxin that causes Botulism (toxin which causes Paralysis).

Botox is a toxin, but when people use it correctly and in small doses, it has a number of medical and cosmetic uses. Botox injections are probably best known for reducing skin wrinkles. Botox can also help treated crossed eyes, eyelid spasms, excessive sweating and some bladder disorders.

Botox derives from a bacterium called Clostridium Botulinum. This Bacterium is present in many natural settings including soil, lakes, forests, in the intestinal tracts of mammals and fish. Naturally occurring Clostridium Botulinum Bacteria and spores are generally harmless. Problems only arise when the spores transform and the cell population increases. At a certain point, the bacteria begin producing Botulinum toxin, the deadly Neurotoxin responsible for botulism. Commercial versions of Botulinum toxin include:

- Botox (Onabotulinumtoxin A)
- Dysport (Abobotulinumtoxin A)
- Xeomin (Incobotulinumtoxin A)

- Myobloc (Rimabotulinumtoxin B)
- Jeuveau (Prabotulinumtoxin A)

Botox targets the nervous system, disrupting the nerve signaling processes that stimulate muscle contraction. This is how the drug causes temporary muscle paralysis. In order for muscles to contract, nerves release a chemical messenger called Acetylcholine at the junction where the nerve endings meet muscle cells. Acetylcholine attaches to receptors on the muscle cells and causes the muscle cells to contract or shorten. Botox injection prevents the release of Acetylcholine, which stops muscle cells from contracting. The toxin reduces abnormal muscle contraction, allowing the muscles to become less stiff.

The primary use of Botox is reducing the appearance of facial wrinkles. According to AOCD (American Osteopathic College of

Dermatology), the Food and Drug Administration (FDA) has approved Botox for the following uses:

- Crossed eyes or Strabismus
- Eyelid spasms or blepharospasm
- A neurological movement disorder called cervical dystonia
- Excessive sweating known as primary local hyperhidrosis.



KNOW THE EXHIBIT

Hyper Paraboloid (Saddle)

This exhibit is situated between Ticket Window and Souvenir Shop.

A hyperbolic paraboloid is mathematically defined by the equation $z = x^2 - y^2$. The name "hyperbolic paraboloid" comes from the property that the xy (Horizontal) cross-sections are hyperbolas and the yz (Vertical) cross-sections are parabola. The richness of these forms excites us visually and presents us with interesting mathematical problems. This type of shape is widely used for making saddles, designing of Roof Structures etc.



SCIENCE QUIZ

- How many periods and groups are present in the periodic table?
a) 7 periods and 18 groups b) 8 periods and 7 groups
c) 7 periods and 7 groups d) 8 Periods and 8 groups
- What is the other name for group 18th elements?
a) Noble gases b) Alkali metals c) Alkali earth metals d) Halogens
- The IUPAC name of $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$ is?
a) 3-Butene b) Prop-1-ene c) But-1-ene d) Butyne
- What is the ancient name for all human beings?
a) Monkeys b) Chimpanzee c) Homo Sapiens d) Invertebrates
- Some fruits like mango, lemon, etc. have a sour taste due to the presence of what?
a) Acetic Acid b) Citric Acid c) Lactic Acid d) Oxalic Acid
- Why the visible red colour of moon is appeared during lunar eclipse?
a) Dust in space b) Dust in moon's atmosphere
c) Dust in earth's atmosphere d) none
- What is the average rate of the heart beats (per minute) in an adult?
a) 60 b) 72 c) 84 d) 96
- Which of the following pigment causes eye colour of person?
a) Cornea b) Choroid c) Iris d) Vitreous Body

SCIENCE PROJECT

Surat Municipal Corporation had organized Science Fair at Art Gallery, Science Centre Surat on 30 and 31st August, 2019. Sir V.D.T. Girls High School had presented their Project on "Convert Heat Energy into Electrical Energy"

Aim of the project was use of Solar panel to generate electricity for irrigation and to light up the street lights. The generated electricity will be used for the working of a water pump which transfers water from any water body to a water tank which is located far away. The water will pumped out through a connecting wire and outlet pipes will allow the water to go in the field. In this manner the crops, plants, etc. will get watered and farmer need not stand all the time in the field for watering the plants. We can also light up the street light using the electricity generated by the solar panels. Due to this the farmer can work at night as well.

Benifits of Solar irrigation:

- Eco- Friendly
- No Air Pollution
- Save Man power
- Low Maintenance Cost
- Long life time
- No need of fuel or electricity
- Production of high quality fruits and vegetables
- It would give relief from taking loans.
- Solar Power may be stored and can be used by farmers for household activities.

