2012-2022



Diamond Jubilee Year

1961 - 2021

The Zoological Society

Sri Venkateswara College

presents

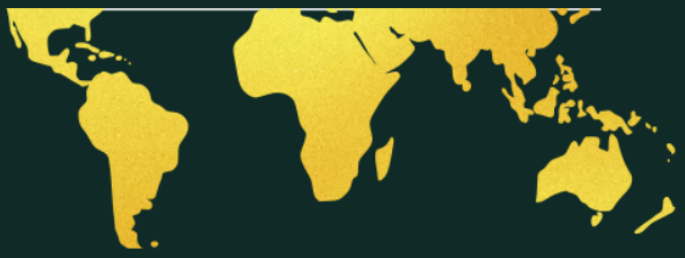
PHOENIX

10th Edition

2021-2022



A Miniature Zoological World



Ten Years Of Phoenix



We have all come a long way,
From scratching our heads with fingernails,
and scribbling art at the back of our notebooks.
Young minds blazed a trail, ten years back into the time
To the making of Phoenix.
From contemplating through notions and facts,
Inking down our beliefs, for the sole purpose of expression
To molding ourselves into savants.
From juggling the googly thoughts,
Sipping over tea and coffee, penning down ideas
To having them being orchestrated to perfection
We have come a long way!
Abiding by the changes, that time demanded
We altered our modus operandi,
when ink was replaced by keyboards
And brushes had their own digital varieties.
We have come a long way!
For learning, was the only constant deed
With every shortcoming being addressed to heed
Here we all reunite together,
Rising from the flames of furtherance,
To celebrate these ten wondrous years of our phoenix-hood!
For you know, reader,
We have come a long way!

By Shalini Raman, SZH

MEMBERS

PATRON

PROF. C. SHEELA REDDY
(PRINCIPAL)

EVOLVERE

CONVENOR
Dr. Anita Verma

CO-CONVENOR
Dr. Mansi Verma

COMMITTEE MEMBERS
Dr. Rajendra Phartyal
Dr. Richa Misra
Dr. Namita Nayyar
Dr. Aarti Seherawat

PRESIDENT
Palak (TZH)

VICE PRESIDENT
Ranjanee Aron (SZH)

GENERAL SECRETARY
Himanshu Potlia (TZH)
Dhritismita Pathak (TZH)

TREASURER
Vipasha Soni (TZH)

JOINT TREASURER
Anushka Puri (SZH)

JOINT SECRETARY
Gaurav Dutta (SZH)
Aditi Singh (SZH)

EXECUTIVE HEAD
Saloni Verma (TZH)
Muskan (TZH)
Kanishka (SZH)
Debjeet (SZH)

PHOTOGRAPHER
Srianshu Kumar Panda (SZH)

VOLUNTEER
Madhav Gupta (SZH)
Deepanshu (SZH)
Madhumanti (SZH)
Chetna (FZH)
Shivangi (FZH)
Nishita (FZH)
Anushka (FZH)

DESIGNERS
Soniya (SZH)
Ayushi Sinha (FZH)
Isha Yadav (FZH)

PHOENIX

CONVENOR
Dr. Mansi Verma

CO-CONVENOR
Dr. Anita Verma

COMMITTEE MEMBERS
Dr. Ajaib Singh
Dr. Rajendra Phartyal
Dr. P. Jayaraj
Dr. Preeti Khandelwal

EDITOR-IN-CHIEF
Shubhi Agrawal (TZH)
Chandni Mysa (TZH)

DESIGNER-IN-CHIEF
Ritika Semwal (TZH)
Simran Prajapati (TZH)

MANAGING EDITOR
Anuvrinda Sharma (SZH)
Shalini Raman (SZH)

CREATIVE HEAD
Nishita Singh (SZH)

EDITORS
Tanya Goel (SZH)
Kunal Yadav(SZH)
Abhijeet (FZH)
Aditya Singh (FZH)
Dhwani Goel (FZH)
Nancy (FZH)
Shivangi Choudhary (FZH)
Shweta Pagariya (FZH)
Simran Yadav (FZH)
Tanvi (FZH)



Prof. C. Sheela Reddy
Principal

1961 - 2021
Tirumala Tirupati Devasthanams

శ్రీ వేంకటేశ్వర కళాశాల
Sri Venkateswara College
(University of Delhi)
NAAC 'A' Accredited

From the Principal's Desk

"Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes, and having fun." said Mary Lou Cook. Over the last decade, PHOENIX, the annual magazine of the Department of Zoology, has been a huge platform where science and creativity culminates.

It gives me immense pleasure to extend my heartiest congratulations to the Department of Zoology on the release of the 10th Edition of their annual magazine 'PHOENIX'. The magazine is beautifully woven with the sheer hard work and determination of the students and teachers of the department who have put their heart and soul in creating the magazine.

The Department of Zoology has always been the locus of excellence and the credit for this can be attributed to the dedicated staff and students of the Department. The teachers of the Department are the guiding lights who strive to bring out the best in their students by creating an environment where the students can focus both on academic success as well as extra-curricular activities for holistic development. The Zoological Society 'Evolvere' regularly conducts events like informative talks and webinars by eminent speakers of national and international stature. 'Evolvere' also conducts several workshops , webinars, interactive and fun sessions, every year. The 10th edition of the magazine beautifully documents every effort made by the Zoology Department over the years, even in the uncertain times of COVID-19 pandemic.

I appreciate the efforts of the entire team and would like to congratulate them on completing 10 dynamic years of Phoenix and for the release of their successful edition of magazine.

Best Wishes for the future!

C. Sheela Reddy

PRINCIPAL

From the Convenor and Co-Convenor



The Department of Zoology at Sri Venkateswara College, throughout its checkered history of 49 years, has become synonymous with innovation and excellence. The academic calendar of the Department being littered with achievements in both curricular and co-curricular areas is a testament to the fact that the tradition of excelling on all fronts is well alive.

"Every year, society events bring something special for us. Let it be Evolvere or Phoenix. They have given us the opportunity to interact with the most dynamic students of the Department, who are not just talented in organizing events, but at the same time are creative, innovative and hardworking. Our students have stood like a pillar for us. They have taken this magazine to new heights. To further say, these students are our extended family and the family is growing every year with newer members from all three years and more responsible teachers contributing to the success of our events."

The Department has been successful in maintaining its enthusiasm even during the pandemic. Our events have been graced by renowned international speakers from the UK, Netherlands and Portland. This academic year, the Department showcased the theme "PET plastic" in its annual departmental event. The International event was elevated by an informative lecture by the eminent speaker, Dr. Jay Mellies, Professor of Biology, Reed College, Oregon, USA. Complementing the talk were several student activities, including photography and quiz competitions. Students got to showcase their creativity with the best-out-of-waste competition. The event boasted the zealous participation of many!

Culminating a decade's worth of hard work and ardor, we present with great pride, the 10th edition of our magazine, 'Phoenix'. Filled with a passion akin to the great flames of the mighty beast, our magazine personifies the vision, creativity and curiosity of our students. This year, the magazine acts as a miniature rendition of the entire world- PANGAIA. Divided into the seven continents, it updates readers about the wonders happening in a zoologist's world.
Readers beware, once you start reading, you may never know when to stop!

The release of the 9th edition of the magazine marks a special day for us as we had our magazine released by the world-renowned primatologist, Dr. Jane Goodall. This year calls for another celebration as both societies have become a decade old. We are very excited to commemorate this event with a very special guest who has created landmarks in the field of evolutionary biology. We will be having Dr. Douglas Futuyama with us!

Our deepest gratitude goes to Prof. C. Sheela Reddy, our honorable principal, for her unwavering guidance and support. We sincerely thank our students for burning the midnight oil and making this magazine possible. We wish that we keep on inspiring our students and avid readers time and time again.

- Dr. Anita Mansi VERMA

TEACHERS' TABLOID



Dr. Anita Verma

Specialised in Entomology and Physiology

She is a bearer of motivation for all of us and has helped us find a way out of a convoluted subject like physiology for over years and continues to do so!



Dr. Vartika Mathur

Specialised in Insect-plant-microbe interaction

Understanding animals would never have been fun, if it were not for her classes. Undoubtedly, she is 'the human form of the 100 emoji'.



Dr. Om Prakash

Specialised in Fish Biology and Proteomics

Fun and outdoorsy, he is always full of energy. On-field, filled with love for cricket; In class, he lifts everyone's spirit.



Dr. Ajaib Singh

Specialised in Molecular Biology

Being responsible for kindling our interest in biochemistry, he is a prodigious educator who transforms each interaction into a special learning experience.



Dr. Rajendra Phartyal

Specialised in Fish Endocrinology and Protein purification

Tall and wise. With roots of knowledge, he helps us reach the skies. Despite his humorous ways, his teaching never fails to convey.



Dr. Mansi Verma

Specialised in Molecular Biology and Bioinformatics

She is a true motivation for all of us, always encourage us to do the things better & better with unique ideas out of the box. Ma'am with you we do extra brain storming every day.



Dr. P. Jayaraj

Specialised in Cancer Biology and Reproductive Biology

The oncology enthusiast of our Zoology Department who never fails to enthuse everyone with his out-of-the box ideas!



Dr. Riyaz Bakshi

Specialised in Neurophysiology and Medical Diagnostics

Holding his position as the guru he is in our minds, he is responsible for providing us a realistic insight, motivating us to touch the sky.



Dr. Vagisha Rawal

Specialised in Entomology

Cheerful and lively with a knack for perfectly drawn diagrams, she is the understanding friend that we all can count on!



Dr. Richa Misra

Specialised in Tuberculosis Biology and Human gut microbiome

Whether in theory classes or in the fields, she's always there to give the best knowledge ever and clear every doubt, be it silly or professional!



Dr. Namita Nayyar

Specialised in Molecular Biology and Biotechnology

Smart and eloquent, she carries herself with elegance. Professional and bold, she is full of enthusiasm towards her goals.



Dr. Preeti Khandelwal

Specialised in Cell and Molecular Biology

We are forever grateful to have been taught biochemistry by her, for she never failed to drill grueling concepts. We treasure her mnemonics like sustenance for life!



Dr. Sadqua Shameem

Specialised in Ichthyology and Fisheries

We all captivated with your detail explanation and your methodology is unique and amazing. You connect all the missing links between us and chordate.



Dr. Aarti Seherawat

Specialised in Entomology

Warm and welcoming is her style, she has guided us with utter diligence and will always drive us towards excelling in what we truly desire!



Dr. Himani Khurana

Specialised in Metagenomics, Genomics and Molecular Biology

The smiling and jolly soul of our department, she plays the role of a teacher or the dearest friend you need to talk to marvellously!



Dr. Nawaz Alam Khan

Specialised in Stress Biology & Dietary Supplements, Larviculture

His hardworking and kind demeanor, along with his compassionate and enthusiastic approach to teaching, helps our curiosity thrive and brings out the best in everyone.



Mr. Amarjeet Singh

Specialised in Fish Biology

With his passionate and spirited behaviour, he can make even a boring topic so interesting and enjoyable that urges the students to learn more!

Tell me and I forget.

Teach me and I remember.

Involve me and I learn.

– Benjamin Franklin

Zoology Department Committees



Exam planning and Datesheet Committee

DR. OM PRAKASH
Dr. Mansi Verma
Dr. Preeti Khandelwal
Dr. Aarti Seherawat

Chemical purchase Committee

DR. AJAIB SINGH
Dr. Riyaz Bakshi
Dr. Richa Misra
Dr. Sadqua Shameem

Zoology Tour and Excursions Committee

DR. OM PRAKASH
Dr. Vagisha Rawal
Dr. Preeti Khandelwal
Dr. Ajaib Singh

AQAR Compilation Committee

DR. VARTIKA MATHUR
Dr. Richa Misra
Dr. Namita Nayyar
Dr. Mansi Verma

Alumni Committee

DR. OM PRAKASH
Dr. Vagisha Rawal
Dr. Namita Nayyar
Dr. Perumal Jayaraj

Workload and Timetable Committee

DR. VARTIKA MATHUR
Dr. Richa Misra
Dr. Namita Nayyar

Zoology Society

DR. ANITA VERMA
Dr. Rajendra Phartyal
Dr. Mansi Verma
Dr. Richa Misra
Dr. Namita Nayyar
Dr. Aarti Seherawat

Class Mentor and Student Grievance Committee

DR. ANITA VERMA
Dr. Vartika Mathur
Dr. Om Prakash

Museum and Slide Sorting Committee

DR. PERUMAL JAYARAJ
Dr. Riyaz Bakshi
Dr. Vagisha Rawal
Dr. Namita Nayyar
Dr. Sadqua Shameem
Dr. Rajendra Phartyal
Dr. Nawaz Alam Khan

Instrument and Equipment purchase and upkeep Committee

DR. OM PRAKASH
Dr. Ajaib Singh
Dr. Preeti Khandelwal
Dr. Riyaz Bakshi
Dr. Amarjeet Singh

Admissions Committee

DR. ANITA VERMA
Dr. Sadqua Shameen
Dr. Nawaz Alam Khan
Dr. Amarjeet Singh

Zoology Magazine Committee

DR. MANSI VERMA
Dr. Anita Verma
Dr. Ajaib Singh
Dr. Rajendra Phartyal
Dr. Perumal Jayaraj
Dr. Preeti Khandelwal

Library and Book Bank Committee

DR. RAJENDRA PHARTYAL
Dr. Perumal Jayaraj
Dr. Vagisha Rawal
Dr. Sadqua Shameem
Dr. Aarti Seherawat

Department Maintenance Committee

DR. AARTI SEHERAWAT
Dr. Mansi Verma
Dr. Riyaz Bakshi
Dr. Sadqua Shameem
Dr. Amarjeet Singh
Dr. NawazAlamKhan



EVOLVERE

PHOENIX



MEET THE CORE TEAM MEMBERS



It's all done and dusted. We have finally reached the climax of this enthralling experience. This year-long magazine harbors not only the vision of the present lot but of many significant people over the past decade. PHOENIX, as a miniature rendition presents the most aesthetic juxtaposition of thoughts and creativity. Every word that is penned down and every shape that has been designed gives us a glimpse of the hard work and dedication of the people behind it. My journey with Phoenix began when I first saw the cover page of the 7th edition and immediately wanted to be a part of it. Three years since then, it has finally come to an end with the 10th edition. It is the last message that I am writing for this magazine, and through this, I would like to thank my team members for their willful efforts and contribution to this magazine. I resign my utmost gratitude to the readers, for it is they who make this tedious process a boisterous success.

Shubhi Agrawal

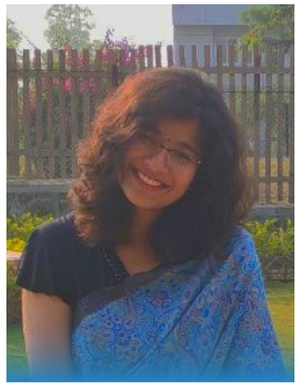
EDITOR-IN-CHIEF



As i write this, I can't believe that 3 years have passed by... I joined Team Phoenix back in 2019 as editor in the pre-pandemic era, worked on the 9th phoenix edition as the creative head in the online mode and now as we are moving back to the normal way of life and gearing up for the release the 10th edition of phoenix in semi-online mode, I can say that i have seen different phases of Phoenix's working and i realise one thing that 'The Show Always Goes On' and that's precisely what 'Phoenix' is all about- To rise beyond the uncertainities of life and keep moving on! This edition may not be the best edition but its worth a read because genuine efforts count, right?
On this note, presenting to you the 10th edition of Phoenix which is not only about the theme but it's a tale of 10 long years of a beautiful journey.
Hope y'all like it!!

Nysa Chandni

EDITOR-IN-CHIEF



Joining college amidst the corona outbreak, with the world going into a state of paralysis, was an experience in itself. With college marking a major milestone and hoarding opportunities, the new virtual approach entailed a new understanding, with its own set of conditions, limits, and possibilities. Phoenix presented itself as a window of hope, with scope for learning, understanding, and growing. Further, having been given the opportunity to be Managing Editor, especially for the celebratory event of the release of the 10th edition of our magazine, is something I will be ever grateful for. The zealous team, consisting of a group of kind yet passionate individuals, provided a safe place where skills were gained and honed to perfection, all thoughts were heard, and fresh perspectives were encouraged, with a sense of understanding guiding us in the right direction. These visions were then beautifully crafted into words or painted into art, with individuality seeping through each stroke, which in turn added up and contributed to making this magazine the gem it has always been.

Anuvrinda Sharma

MANAGING EDITORS



Just like knowing and listening about the evolution of this entire world from a concentrated landmass smack dab in an endless water stretch to a well-differentiated fully-fledged existence leaves us wonderstruck, I have seen this edition setting a beautiful example of division of labor, teamwork, dedication, and sincerity from the very beginning. From the presentation of our utmost authenticity to synthesizing exquisite work of art and knowledge, makes my heart pound with thrill and delight to finally watch it in its molded form of perfection. I feel full of the joys of spring making it to the core team and working with the splendid minds of my fellow lot, which was always backed by our forever supportive faculty members. This edition comes with an insightful ride, touching various corners of the world, which will undoubtedly leave you awestruck with its facts! Rejoicing the spirit of a decade of this storytelling, I now allow you to experience this exposition of talent and novelty!

Salini Raman

MANAGING EDITORS



Getting the opportunity to be the Designer-in-Chief for the 10th edition of this magazine was a mammoth task, but seeing the final result made it all worthwhile. This was a chance for me to learn and grow, independently as well as with a team. All the meetings and discussions now seem fruitful, even the missed deadlines. A big thanks to the entire team who worked day and night to get it all together. This entire process was made possible due to the cumulative efforts of everyone involved. Phoenix has been an important part of my college life and I can say with assurity that when another decade will pass, I will cherish this more then than I do it now.

Ritika Semwal

DESIGNER-IN-CHIEF



I knew designing the magazine wouldn't be a low-hanging fruit but, I never knew it would give me a lifetime experience. The journey started when I first saw the 8th Edition of Phoenix in someone's hand and, the fact of how beautiful it looked from front to back and with every single page that turned over made me willing to join the team! So, in the coming year, I became a part of it. Soon I was given the task of designing the page, and honestly, the first page I designed wasn't something I was very proud of. Self-doubt came in, but still, I continued, tried my best to do better, practiced, designed, and after a while I became good at it. This gave me the first lesson of this journey- Persevere when you fail. Along with this, I realized that a lot of hard work goes into creating a well-presentable magazine for the readers. Various ideas, designs, layouts have to settle for 'behind the scenes' of the magazine but the final output justifies all the time we put into it. As a Designer-in-Chief, what I had before me was a great responsibility. I acknowledge that, and must confess- 'Phoenix gave me more than I looked for'.

Simran Prajapati

DESIGNER-IN-CHIEF



It was an amazing experience to work with the whole team and bring together such exquisite work to life. Being the creative head of the magazine was an incredible experience. Designing the magazine was challenging, but it all worked well in the end. I have learned a lot here and got a lot of guidance from my team members. Though we all were sitting at our home during this pandemic, by designing the articles we somehow felt connected. It was fun designing the magazine and helped me embrace my creative side. It was a delightful experience to design each article and explore a plethora of ideas and bring up together such an extraordinary piece of work. We spent a lot of time designing the articles and giving life to them, and I hope you will like our magazine. Stay safe!

Nishita Singh

CREATIVE HEAD

PHOENIX

TABLE OF CONTENTS

Africa

03 **Africa: Origin of the First human**
05 **Oddest Triassic Couple**
07 **Serengeti**
09 **The Art Of Mummification**
10 **The Twin Capital of the World**

19

Asia

21 **Siberian Permafrost**
23 **Dwarfism on Flores Island**
25 **Chanting of Enchanting Folklore of India**
27 **Reality of Elephant Tourism**

35

Europe

37 **Greek Science**
39 **Science in the Era of Holocaust**
41 **Biomimetic Architecture in Europe**

51

South America

53 **Columbian Exchange of Diseases**
54 **Alpaca: A Future Weapon against Coronavirus**
55 **Amazon Fires: Is This A Wake Up Call?**
57 **Intoxicating Keepers**
58 **Clues To Mars on Earth's Atacama Desert**

67

At A Glance

67 **Rank Holders**
69 **E.C.A. Achievers**
70 **e-Farewell 2021**
71 **Zooflix**
73 **Creative Corner**

81 **Wildlife Symposium**
82 **Termitology**
83 **Research at SVC Zoology**
85 **Third Year Zoology Hons. (TZH)**

11

13 **Bioprospecting: Creating Value in Cancer Research**
14 **Antarctica- World's Largest Fish Breeding Ground**
15 **Why are Penguins not found in the North Pole?**
17 **Climate Change: The risk of non-native Marine Species establishing around Antarctica**

Antarctica

29

31 **The Great Barrier Reef**
32 **"Climate refugee"- The Growing Reality of Sinking Tuvalu**
33 **Ancient Marsupial "Junk DNA" - Any Good?**

Australia

43

45 **Rethinking Humans in North America- The New World**
47 **Extinction Event in the Gut Microbiota**
48 **Protecting the North Atlantic Right Whale using Vocalizations**
49 **Born To Kill: The Story of Serial Killer Genes**

North America

59

61 **Dive in The Depths**
63 **Do Painkillers make us Less Empathic?**
64 **Zoonotic Diseases**
65 **Flatfish: A Phylogenetic Engima**

Around The World

75 **Into The Wild**
77 **Evolvere Annual e-fest 2021**
78 **Phoenix Magazine Release 2021**
79 **e-Teachers' Day**
80 **Reproductive Health**

87 **Second Year Zoology Hons. (SZH)**
89 **First Year Zoology Hons. (FZH)**
91 **Let's bring back the old times**
92 **Message from our Seniors**

Fair Use Disclaimer

This magazine is non-commercial and may contain copyrighted images. All rights and credits go to their rightful owners. No copyright infringement is intended.

Cover Page by- Chandni Mysa
Back Page by- Simran Prajapati
Section Headers by- Ritika Semwal













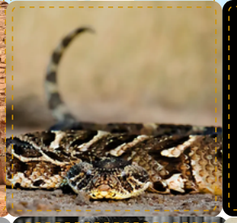






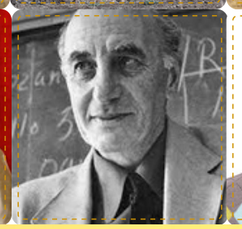




















- **Africa, the second-largest continent, is bounded by the Mediterranean Sea, the Red Sea, the Indian Ocean, and the Atlantic Ocean.**
- **Africa is home to a wide number of different biomes and ecosystems. There are 8 different major biomes in Africa: the Mediterranean, semi-desert, desert, temperate grassland, montane, tropical rainforest, dry savanna, and moist savanna.**
- **The African elephant is the largest living land animal in the world. The African elephant can weigh up to 7 tons and be 11 feet (3.4 meters) tall. The large ears of African elephants enable them to hear each other's calls up to 4 kilometers or 2.5 miles away.**
- **The continent of Africa has the highest concentration of national parks anywhere on the planet with 335 national parks as of 2014 that protect more than 1,100 species of mammals, 100,000 species of insects, 2,600 species of birds, and 3,000 species of fishes.**
- **African wildlife includes giraffes, hippopotamus , African elephants, lemurs, wildebeests, zebras, western green mamba, white rhinoceros, cheetahs, spotted hyenas, etc.**
- **Omicron, the COVID variant of concern of 2022 was first spotted in South Africa. It spreads more easily than the original SARS-CoV-2 virus owing to its high mutations.**
- **Africa's oldest human burial site was discovered, dating to about 78,000 years ago at a cave site called Panga ya Saidi near the Kenyan coast.**
- **The first partial skull of a child of *Homo naledi* believed to be up to 250,000 years old, was discovered in a South African cave. The research team named the child "Leti," which means "the lost one" in the nearby Setswana tribal language.**
- **Research shows that oil derived from olives and sunflower of South African origin is rich in unsaturated fatty acids, in particular oleic (monounsaturated) and linoleic (di-unsaturated) acids which offer great health benefits.**
- **WHO approved the first-ever vaccine against malaria i.e. Mosquirix. The new vaccine fights the deadliest of five malaria pathogens and is the most prevalent in Africa and is administered to children under five in a series of four injections in Africa.**
- **A study of ancient Africans suggests dairy consumption predated the evolution of lactase persistence genes which suggests that humans were drinking milk before they could digest it. Genes that enable lactase persistence in humans are widespread in modern Africa with four known lactase persistence mutations. (European populations rely on just one.)**



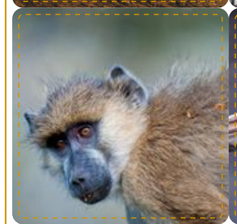


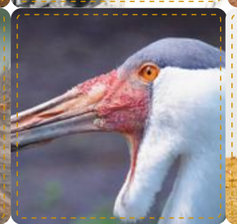


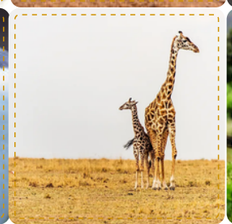










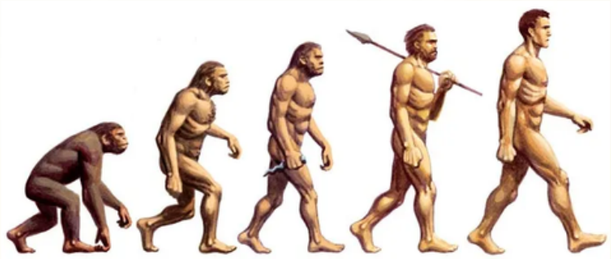








AFRICA: ORIGIN OF THE FIRST HUMAN



-By Shivangi Choudhary , FZH

As we all must have learned in chapter 12 of biology evolution about 15 million years ago (mya), monkeys called Dryopithecus and Ramapithecus existed. They had fur and walked like gorillas and chimpanzees. Ramapithecus was very similar to man while Dryopithecus was like a monkey. Few fossils have been found in Ethiopia and Tanzania. These emerging hominid traits lead to the belief that about 3-4 mya, primate-like humans travel east of Africa. They were probably no longer than 4 feet but went straight. Two mya, the Australopithecus probably lived in the grasslands of East Africa. Evidence suggests that they hunted with stone weapons but ate the fruit. Some of the bones found were different. This creature was called the first human hominid and was named Homo habilis. Brain capacity was between 650-800cc. They rarely ate meat. Fossils found in Java in 1891 reveal the next stage, namely, Homo erectus, about 1.5 mya. Homo erectus had a brain mass of about 900cc. Homo erectus probably ate meat. A Neanderthal man with a brain size of 1400cc lived near Eastern and Central Asia between 1,00,000-40,000 years ago. They used skins to protect their bodies and to bury their dead. Homo sapiens originated in Africa, migrated to continents, and were developed into different races. During the ice age, between 75,000-10,000 years ago, modern Homo sapiens emerged. In the 1970s, archaeologist Mary Leakey led a scientific expedition to the Laetoli region of Tanzania in East Africa. There, he and his team looked for clues about a person's background. In 1978, they discovered a series of prehistoric steps similar to those of modern-day volcanoes. These steps were performed by human beings now called Australopithecus.



Homo sapiens is the most autapomorphic (especially found) among hominids in their skull structure and postcranial skeletal structure. It is also sharply distinguished from other living things in its unique symbolic sense of consciousness. The fossils and archaeological records have come together to clearly show that both our physical and mental traits came from Africa but at different times. Modern fossils were developed on that continent in the range of 200–150 Ka. The incident involved was short-lived because it was unexpected in the fossil record. In contrast, the first convincing movement of symbolic behavior is not yet apparent until (perhaps well) after 100 Ka. Solid genetic reconstruction that writes under the distinct appearance of H. sapiens may also have a neural substrate bond that allows for symbolic understanding. This profit potential was not exploited until it was "discovered" through cultural promotion, apparently through the introduction of language. Modern-day people seem to have left Africa to fill the whole world only after their physical and mental traits were discovered on that continent.

It is clear, then, that humanity occurs in two distinct stages. First, the modern morphology of a different person was established, most clearly in Africa, and just after 200 Ka. The event involved the ancient body form of Homo. Only 100 Ka later, also in Africa, and in the context of the Middle Ages industry, when modern symbolic behavior began to emerge, documenting new forces that were present but could not be applied to the original anatomical H. sapiens. In evolutionary terms, this crossing was completely customary because all new behavior must be allowed to the existing structure: Birds, for example, had feathers millions of years before they chose to fly, and tetrapods found their organs somewhere. The present evidence, therefore, suggests that H. sapiens as we know it today had a dual origin: First as an anatomical entity, and later as a piece of information. A clear indication of both fossils and archaeological records is that both new phenomena occur in Africa, where the first modern humans have recently increased to fill the earth.



DRYOPITHECUS



RAMAPITHECUS



AUSTRALOPITHECUS



Homo habilis



Homo erectus

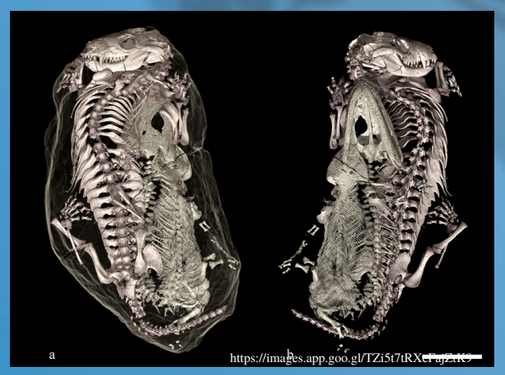
ODDEST TRIASSIC COUPLE

-Nishita Singh, SZH

In 1975, a paleontologist named **James Kitching** discovered the fossilized cast of what was an animal burrow in the **Kwazulu Natal Province** in the Karoo basin of **South Africa**. Back in the early Triassic period, around 250 million years ago, that particular burrow in the ground had filled up with sediments that eventually hardened and became a fossil. And in that burrow, researchers discovered the nearly complete remains of a therapsid cynodont called *Thrinaxodon liorhinus*.

But it wasn't alone there.

Almost 40 years later, researchers took the cast from South Africa to France, where it underwent a high resolution synchrotron scan revealing another occupant in the burrow. It was neither another *Thrinaxodon* nor even the member of the same species but its roommate was a temnospondyl amphibian *Broomistega putterilli* ,both entombed in the same lithified burrow cast.



And that's what makes this burrow cast an incredible fossil because it contains not just the animal that made it but also a very rare animal that might have been among *Thrinaxodon* preys. It provides a wealth of information to investigate about behavioral interaction of two unrelated taxa.

But how did they end up together?

And what killed and preserved them this way for up to 250 million years?



To figure out how *Thrinaxodon* and *Broomistega* became entombed together, scientists looked at the burrow itself ,along with their fossilized bones. They concluded that the cause of death was a flash flood that carried fast moving water and sediments into the burrow encasing the animals. This would explain the discrete sedimentary layers in the burrow. These animals were buried in a high energy burrow filing episode. Both animals had complete skeletons lying adjacent to each other. *Thrinaxodon* was found lying on the floor, while *Broomistega* was resting on the right side, pushed on top by the flood water entering the burrow.

But what were these two animals doing in the same burrow to begin with?

Thrinaxodon was a carnivorous proto-mammal and *Broomistega* was an early amphibian relative, not a likely cohabitation. Based on the morphology and anatomical characters, *Broomistega* was not the burrow creator. *Thrinaxodon* on the other hand was probably the burrow owner and *Broomistega* was just a visitor. Interspecific shelter sharing associations among vertebrates are unlikely in confined places. There are many possible scenarios on what might have brought them together and researchers were able to use the bones of both creatures to figure out which one is most likely.

The Small diameter of *Thrinaxodon* burrow excludes the possibility of *Broomistega* being accidently washed in by flood waters. Researchers noticed that *Broomistega* had two small holes above its left eye, so maybe it was prey to *Thrinaxodon*. This was also ruled out as, when they compared the distance between those holes with the distance between the upper and lower canines of *Thrinaxodon*, it didn't match. Also, its skeleton was complete and didn't have any other bite marks on it.

Another theory of *Thrinaxodon* hoarding *Broomistega* as food was also ruled out as it is an uncommon behavior especially in hot environments which favors rapid decomposition. Another scenario of *Thrinaxodon* being dead before *Broomistega* entered the burrow was also rejected based on the position of *Thrinaxodon* skeleton, as it's spine was curved against the wall of the burrow which suggested that its body was still pliable at that time and not stiff, like it would be if it had died and then become rigid through the process of rigor mortis. Instead, the flow of sediment and water was able to mold *Thrinaxodons'* body to match the curve of the wall so it either died during the flood or just before it. Another scenario is that maybe *Thrinaxodon* was just sleeping, also known as aestivating or deep sleep. Researchers think that it is the best explanation based on the skeleton itself and on what little is known about the environment that these animals lived in .The position of *Thrinaxodon* forelimbs to the side of its skull looks like a natural resting position. Animals enter deep torpor to slow down their metabolism and reduce their activity during this period in order to survive. Several burrows have been discovered from the Karoo region of South Africa with *Thrinaxodon* curled up inside suggesting that they were preserved while asleep. *Broomistega* must have crawled into the burrow on its own .Scans revealed several partially healed broken ribs suggesting that it was likely crushed just a few weeks before it died .The injury was probably really painful as it was unable to move and breathe. So it probably wanted protection in the shelter.

Little did they know that it was their last day. This odd couple of the early Triassic are a snapshot in preserving a moment between two completely different species just trying to survive another day in our planet's history.



unsplash.com

Serengeti

AN UNENDING CANVAS OF MAMMALS

It was about 52 years ago when we finally landed on the moon and for the first time, we looked back at our own planet- Earth. Since then, the human population has more than doubled. And we must celebrate the natural wonders that still thrive here and must preserve them to make sure people and nature thrives. The World still has sanctuaries and on occasion, they hold spectacular gatherings of wildlife.

The unspoilt corner of Africa's Serengeti holds one such real-life thrilling animal drama. The Serengeti sustains herds of over a million of wildebeest. Here one thing which is important to know is how many wildebeests are actually there in this region. And the answer is- They are enormous in numbers. They are seemingly everywhere, in every direction that we look when we stand on this land and as far as we can see, there are gnus (wildebeests). The number of wildebeest is even more than all the zebras and the giraffes and the antelope and the gazelle and the next 12 most abundant herbivores that live in Serengeti. Even as an estimate there are about 500 gnus for every lion on the Serengeti. How is that possible? How can this place support so many wildebeests? That's the big question and that's what scientists wanted to understand.

To understand this, we have to go back in time when scientists started counting wildebeest. Around 1950, the first year they counted approx. 250,000 wildebeests, then a few years go by

We must celebrate the natural wonders that still thrive here and must preserve them to make sure people and nature thrives. The World still has sanctuaries and on occasion, they hold spectacular gatherings of wildlife.

and suddenly there number jumped to 400,000. And then just few more years after that there's 700,000. The population continued to grow until it peaked at 1.4 million in 1977 when it became the largest herd of large herbivores in the world. Then everyone began to wonder, are there too many gnus, and if not then why had they stopped increasing? Scientists knew that this is not a case of population explosion since large animal populations don't show such characteristic. This was a case of population rebound from a virus called Rinderpest.

With the virus was being under control, the population of these animals was increasing and with this the entire ecosystem was also transforming. This is when the Serengeti rules unraveled i.e., How the Serengeti works was now clear. When the wildebeest numbers are appropriate i.e., as high as millions, more grass is being eaten and with less grass there are less chances of wildfire spreading. In turn there are more trees that get to grow and more food for giraffes, elephants and birds. Also, more wildebeest mean more food for predators (lions, hyenas and cheetahs) and hence, a win-win situation for everyone. Therefore, despite being at the middle of the ecological pyramid, these herbivores are the one on which entire ecosystem sustains – they are the keystone species of Serengeti.

This opens up room for asking one more question- if gnu's population increase why lion's population don't increase much. The answer is migration- wildebeest migrate but their predators don't! Over 1.2 million wildebeest migrate together with 300,000 zebra and other gazelle in a constant cycle, through the Serengeti-Mara ecosystem, throughout the year constantly searching and grazing grass with each wildebeest covering 800 to1000 km on its individual journey along age-old migration routes. This is popularly known as the Great Wildebeest Migration or simply The Great Migration, the largest herd of plant eating mammals on earth. In fact, with up to 1,000 animals per km², this is the greatest show on earth which is even visible from space. This is one of the nature's greatest spectacles that attract scientist, tourist, and wildlife enthusiast to Serengeti, giving them a chance to witness two million wildebeests, thousands of lions and elephants and numerous other animals including zebras, gazelles, giraffes, leopards and hyenas showing how survival rules in the endless plains of Serengeti.

- Simran Prajapati, TZH

A Different kind of migration



quora.com

Following the Wildebeest on their migration is a fascinating species that benefits from the huge volume of dung left behind.

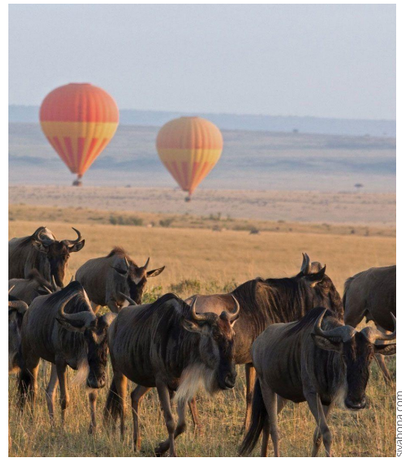
Dung Beetle is most often seen climbing over a pile of gnu poo and at each stop, the beetle will roll a few dung balls and lay its eggs within, giving the emerging larvae a nutritious start in life before undergoing a metamorphosis into the winged adult beetle. There may be three generations of Dung Beetle within each annual Wildebeest migration.











syabona.com

THE ART OF MUMMIFICATION



- Chandni Mysa
TZH



Mummification Canvas Prints | Fine Art America





mummies-cairo-04.jpg (1200×799) (nypost.com)

‘ Egyptian Mummification was at the heart of their culture’

Mummies exist not only in the virtual world of movies like "The Mummy" or "Mummies Alive” cartoons, but this concept of the existence of mummies and mummification is true for the real world as well.

Ancient Egyptians strongly believed that human existence continued even after death and that the soul returned to the body in the afterlife provided the body of the deceased was kept intact by careful preservation. This gave rise to the phenomenon of mummification. Natural mummification is thought to have been practiced by proto-dynastic people, who buried the corpse in the sand, which preserved the dead body. Artificial mummification, on the other hand, involves several sophisticated techniques which include the use of chemical reagents.

With the help of scientific studies done on Egyptian mummies, researchers concluded that three mummification techniques were used by ancient Egyptians.

The first method of mummification was the most expensive and used for preserving royal pharaohs. In this method, the internal organs and brain were removed from the body except for the heart as they believed the heart was weighed in the afterlife for the goodness of the person. The entire body and body cavities were then covered with natron salt for about 40-70 days for dehydration. After complete dehydration, the body was then washed with water or alcohol. It was then stuffed with materials like resins, spices, crushed myrrh, sawdust particles mixed with resins, and occasionally onions. Furthermore, the antimicrobial hot liquid resin was poured all over the body and was then embalmed with materials like oils, aromatic resins, beeswax, perfumes, etc. to prevent moisture entry. Sometimes, embalmers painted the body and the face of the mummy and decorated it as well. Amulets were also placed at specific locations in the body during different steps of mummification. The mummy was then finally bandaged layer by layer and was then covered with a red linen shroud. Being intricate of all methods, this method gave the most protection to dead bodies.

The second and the third mummification methods were less expensive. In the second method of mummification, oil of cedar was injected into the anus and then the anus was plugged. The body was then treated with natron. After this, the anal plug was removed to drain out the liquified stomach and intestines with the oil. The third method involved the removal of internal organs followed by the burial of the whole body in natron salt.

Unfortunately, mummification which was once a widespread and honored tradition for the ancient civilization has now reduced to being a lost art. But, its legacy still remains which can be visualized in our modern-day culture wherein we embalm the dead before the funeral as a way of honoring them.

THE TWIN CAPITAL OF THE WORLD

Igbo Ora, a town located in the midst of Oyo State, Southwest Nigeria is also popularly known as the twin capital of the world. Home to approximately 198,514, it has the highest number of twin births in the world. A prominently engraved plaque welcomes first-time visitors to the historic town from the main gate: "THE NATIONS HOME OF TWINS- IGBO ORA." A sculpture of a woman, a mother of twins, with one infant strapped to her back and the other on her chest with a girdle, while the twins lift their hands in an ecstasy of joy, can be found a little further into the town. The most credible estimate to date stands at an average of 45 to 50 sets of twins per 1000 births, a study conducted by British gynecologist, **Patrick Nylander**, between 1972 and 1982.



pulse.ng

The consumption of yam and okra leaves by women in Igbo-Ora is thought to impact their multiple births. Although there is no clear link between dietary intake and twin births, a study conducted at the Lagos University Teaching Hospital suggests that a chemical found in Igbo-Ora women and the peelings of a widely consumed tuber (yams - *Dioscorea rotundata*) may be the cause. The yam may contain phytoestrogen, which can help female mammals have numerous pregnancies (the mother). Furthermore, no scientific investigation has provided comprehensive mechanisms behind the diets. Locals, on the other hand, feel that the eating of "ilasa," a soup made from okra leaves (*Abelmoschus esculenta*) and "amala," a traditional delicacy made from cassava (*Manihot esculenta*), are the most likely dietary factors responsible for twinning in the community.







While others think that genetics could be the answer. The gene variant rs11031006 (FSHB) and the gene encoding the morphogenic protein rs17293443 are the two most common genes that influence dizygotic twinning (SMAD3). Maternal age and race, height and weight (170 cm and BMI of30), parity, diet, discontinuation of oral contraceptives, and usage of ARTs (Assisted Reproductive Technologies) are all factors that could influence twinning in Nigeria and around the world.



ILASA

The annual World Twins Festival takes place in the town, which honors the many twins who live in the area. The historic event is a week-long festival in which the local community turns to their twin neighbors to show their respect for the cultural phenomena.

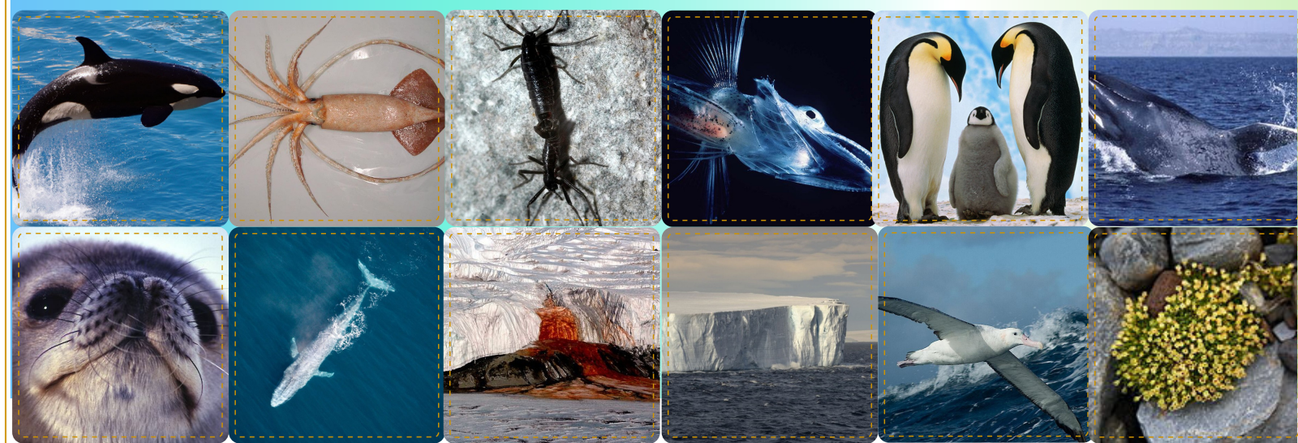
-RITIKA SEMWAL, TZH

ANTARCTICA





- **Antarctica is World's fifth-largest continent, giving a home to diverse and unique wildlife. It is also the highest, driest, coldest, and windiest continent on earth.**
- **It houses the smallest human population, but more than 250 species live here. A total of 82 scientific bases are present in Antarctica. They collectively provide support to a total continent-wide population of around 4000 people in summer and 1000 people in winter.**
- **Species living here are called extremophiles as they can adapt to the extremely cold temperatures and living conditions in Antarctica.**
- **It is the land of a range of marine wildlife and birds, including penguins! The most common birds in Antarctica are penguins. A total of 18 different species of penguins can be seen here, including the Emperor Penguin.**
- **Penguins symbolize this polar region, though they live on seacoasts throughout the Southern Hemisphere.**
- **The largest land animal (in its real sense) is a wingless midge, *Belgica antarctica*.**
- **Krill- The producers in Antarctica are tiny organisms, known as phytoplankton.**
- **Sessile hydrozoans, corals, sponges, bryozoans, the foraging crablike pycnogonids and isopods, the annelid worm polychaeta, echinoids, sea stars (starfish), and a variety of crustaceans and mollusks are present on the sea bottom of the nearshore zone.**
- **Around 30,000 species of modern fish inhabit the coldest continent. Antarctic fishes are well adjusted to survive in the harsh cold climates of the region. About 90 percent of species of bottom fishes are exclusively found in Antarctica.**
- **Native mammals of Antarctica are all marine and include seals (pinnipeds), porpoises, dolphins, and whales (cetaceans). Sheep, rabbits, dogs, cats, rats, mice, and human beings are some alien mammals that reside semi-permanently in Antarctica.**
- **The single biggest mass of ice in the World is "The Antarctic Ice Sheet" and can sometimes be up to four miles thick.**
- **The continent makes up about 90 percent of the planet's freshwater ice and around 70 percent of the total freshwater on earth.**



BIOPROSPECTING
Creating Value in Cancer Research

– Chandni Mysa, TZH

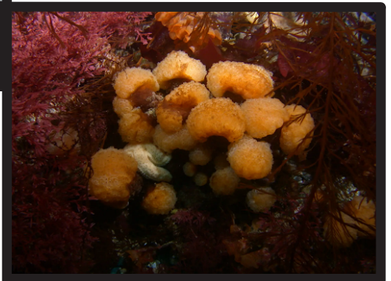
The Frozen Desert of the world– ANTARCTICA, happens to be the least explored continent of the world, lying far away from the madding crowd. It is the driest and the coldest continent on earth where there is no native human habitation. Yet, the quest of humankind to know the unknown and to explore the mystery behind life flourishing amidst such extremities offered by this place has never ceased to enthrall the scientists around the world.



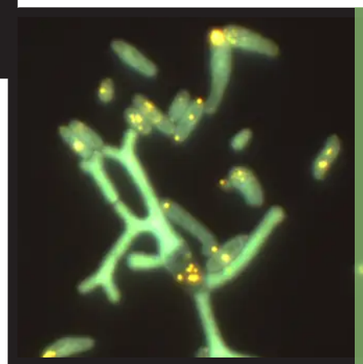
Finding the microbiome samples (Credit: Maggy Amsler)

The extreme ecosystems of Antarctica shelter various organisms like some exceptional animals, plants, and different microbial groups like viruses, bacteria, fungi, etc. which are all sources of certain bioactive compounds that enable them to tolerate the conditions of extremities and are thus an important tool for Research. Bioprospecting i.e. the exploration of natural sources like biological organisms for bioactive compounds for the development of commercially valuable products for human use, is gaining importance. Over the years, Bioprospecting studies in Antarctica yielded many significant discoveries that are now proven to be vital in many areas of scientific research. And, the field of Oncology happens to be one such area of advancement.

Recently, a new study has revealed the possibilities of the development of an anti-melanoma drug from an Antarctic invertebrate– *Synoicum adareanum*. *Synoicum adareanum* is an Antarctic 'Sea Squirt'. It is a tunicate belonging to the class Ascidiacea. It is a sessile species living amongst red algae and starfish at the bottom of the ocean and derives its nutrition from microorganisms and organic carbon present in the surroundings.



Sea Squirt (Credit: Bill Baker, USF)



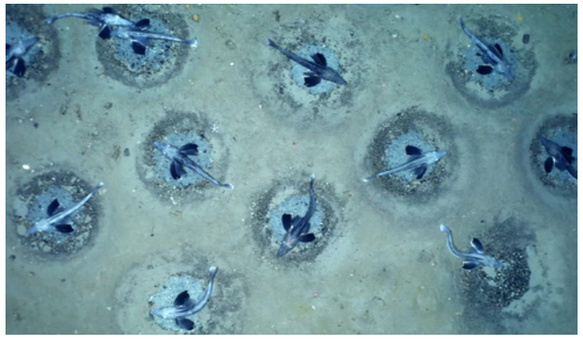
DNA-stained micrograph (Credit: Eric Lundin, DRI)

According to the research paper published in 2020 on MDPI titled 'Uncovering the Core Microbiome and Distribution of Palmerolide in *Synoicum adareanum* Across the Anvers Island, Archipelago, Antarctica', the tissues of this sea squirt contains high levels of Palmerolide – a compound highly active against melanoma. Melanoma is the malignant cancer of melanocytes (cells which provide color to the skin). Palmerolides are potent V-ATPase inhibitors and have submicromolar activity against melanoma. As per the researchers, it is a key "first" in Antarctic science to find a "Core Microbiome". They have also identified that the composition of the core microbiome of the species is unique as compared to the microbiomes of other Ascidiaceans and is made up of an assemblage of bacteria. It is speculated that Palmerolide is produced by a member of the sea squirt's microbiome. The genomic studies of the microbiome are still under research, the results of which will help us identify the bacteria present in the microbiome that produces Palmerolide. This will lead to a remarkable advancement in the understanding of melanoma treatment.

Melanoma is the most serious type of skin cancer which develops in melanocytes (cells producing melanin in our body). It is the most dangerous because it spreads quickly to other parts of the body if not treated timely. At present, there are very few drugs available for melanoma treatment and, thus, this discovery appears to be a ray of hope in cancer research as this Ray of Hope has the potential of finding the 'CAN' in cancer and saving millions of lives.

ANTARCTICA-WORLD'S LARGEST FISH BREEDING GROUND

By - Aditya Singh,FZH



Antarctica-many of us who might think this word would consider it as a barren land almost covered with ice. But to environmentalists and researchers it is a storehouse of many natural species thriving there.

Antarctica is the highest, driest and coldest continent on Earth with temperatures going as low as -89.2C. 98% of Antarctica is covered in ice up to 4.7km thick. The continent experiences 6 months of constant daylight in summer and 6 months of darkness in winter. With such climatic conditions Antarctica still has 9000 known animal species, over 1000 species of fungi, 700 species of algae, 25 species of liverworts, 300-400 of lichens and 67 species of insects.

Recently, Antarctica has become the spotlight in news all over the world regarding a natural ecosystem found there which might blow up our minds. Researchers have found a massive fish breeding colony below the ice covering Antarctica's Weddell sea. The fascinating part is that it is the largest known fish breeding ground ever discovered. A breeding ground of Neopagetopics ionah (a species of ice fish) of globally unprecedented extent has been discovered in the southern Weddell Sea Antarctica. The species of fish found belongs to the category of notothenioid icefish (icefish belong to the family Channichthyidae which mainly inhabit Antarctic and sub-Antarctic waters. They have notothenioid adaptations which help them to survive in cold

This humongous fish colony was found by a German research team aboard a vessel named Polarstern in February 2021. This discovery was announced to the world by The Alfred Wegener Institute (AWI) of the Helmholtz Center for Polar and Marine Research situated in Germany.

According to the report published by the journal Current Biology about 60 million icefish nests were grouped together in the Antarctic Weddell sea. The colony covered about 92 square miles (about 238.279 sq. km) of the seabed, which makes it the largest such breeding colony ever discovered. Round fish nests were discovered measured 6 inches deep and 29 inches in diameter. Each fish nest had around 1500-2500 eggs guarded by 1 adult icefish. This suggests that nest building and egg guarding is a common parental care behavior of channichthyids. Further observations revealed that on an average, one breeding site per three square meters, and one to two active nests per square meter.





These unique observations in the Weddell Sea were made by the OFOBS (Ocean Floor Observation and Bathymetry System). It is a special camera system built to explore the seafloor of extreme environments, the camera was towed on special fiber-optic and power cable generally at about one and a half meters above the seafloor. These camera systems have been deployed to monitor the colony till a research vessel returns to the region later to study the vast breeding ground.

This discovery has opened vast scopes for future research in many unexplored areas of the world. Many such natural wonders are still waiting to be discovered. The largest fish breeding ground found in the Antarctic waters is itself a unique ecosystem which needs to be preserved. Hence, it calls out for the establishment of a marine protected area (MPA) by responsible stakeholders to avoid exploitation of the newly found ecosystem.

Why are penguins not found in the north pole?

-SHALINI RAMAN, SZH

A very intriguing question that arises in our minds whenever we see a penguin being featured on the telly or in some article is why are they so astonishingly found only in the southern hemisphere despite having a high tolerance for extreme weather conditions? Here are some of the observations that might have an answer to this.

Penguins have a fairly diverse existence, with eighteen known species that are entirely distributed, though quite unevenly, in the southern hemisphere alone. This is so as, out of all eighteen, seven of them are located in the Antarctic, some of them being the Emperor Penguins and the King Penguins. Six species have been spotted in Australia and New Zealand, there is one African species, and the rest inhabit the Americas with the Galapagos Penguins. This distribution gives us the gist that temperature is not a deciding factor, as commonly misinterpreted by many people in this context. So, why are penguins not found in the northern hemisphere?

Flight is often considered an important defence against various kinds of external factors such as land predators, and it allows the birds to escape attack and nest high up on cliffs, but penguins are flightless species of birds, so it is likely that they would not be able to travel long distances, due to the influence of adaptive radiation. Growing up watching documentaries, we have often come across about how the penguins usually spend most of their time in the water, hunting for food, and, over time, have evolved into great swimmers. The only time they spend on land is while mating during the breeding season, therefore, it would be very strenuous for them to exist in a niche that does not have long stretches of water bodies, which is a necessity for their survival. Now, the problem with the north pole is that it is smack dab in the middle of an enormous iceberg, i.e., there is no water body found in the north pole. Scientists and researchers have documented that the ice in that region is very thick and has multiple layers This can result in a hostile environment for the penguins, who, as discussed earlier, cannot survive without being in water which is where they do most of their hunting, failing which, they can die of starvation. Therefore, they exist in places where water is easily accessible. Drawing reference from the past, a great black and white flightless bird which was very close to the penguins in appearance, called The Great Auk (*Pinguinus impennis)* used to exist in the north pole but was soon brought to extinction by humans who exploited this species for selfish needs in the 1800s. Legends suggest that when sailors from the north travelled towards the south, they came across coastlines occupied by black and white seabirds. They couldn't fly, but they could swim! This reminded them of the great *Pinguinus impennis*, which is how they got their names: Penguins. Albeit the Great Auk was never a 'real' penguin, its legacy lives on in the naming of our feathered friends in the south.



Great Auk *Pinguinus impennis*



This is not all, in the year 1936, a Norwegian polar explorer named Lars Christensen threw away the gauntlet and introduced potential penguins in the Arctic in an attempt to see if they could survive there. He picked nine King Penguins from South Georgia's beaches and sent them north aboard the *SS Neptune*. They were made to settle on the Lofoten islands, where they would be safe and away from foxes and other land predators. Over the next decade, other species of penguins, including Macaroni Penguins, were also introduced. Their existence in the Arctic was short-lived due to probable reasons, and the last time they were spotted was in 1949. No one is sure where they disappeared or whether they managed to proliferate, but in jig time, an island in the Arctic played host to a small population of penguins and captured a mesmerizing view of all times.

As a known fact, scientists and researchers are inexorable and believe in getting closer to the impossible. Sources have confirmed about plans being considered to introduce polar bears in the south and make them and the penguins coexist, but that would come with a lot of expenses and a threat to the Antarctic ecosystem, hence, this plan remains on the shelf for the current future.

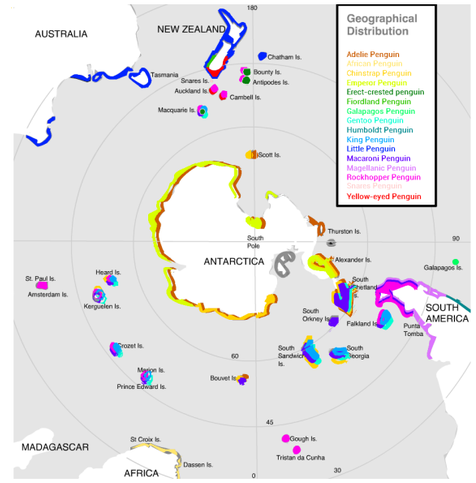
KNOW THE PENGUINS

GEOGRAPHICAL DISTRIBUTION OF PENGUINS IN THE WORLD

8 Different species live on or near Antarctica

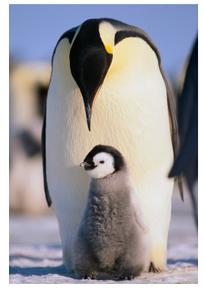
14,000,000 Penguins living Antarctica

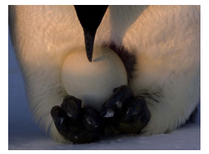
0 Humans living Antarctica





THE EMPEROR





The Emperor is largest of all penguins

45 Kilo

115 cm

The male Emperor stays with the egg for 40 days while the female finds food.

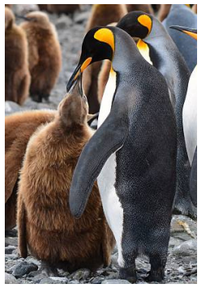
THE KING

The King can sing

9-15 Kilo

95 cm

Both the male & female King brood the egg in turn while the other finds food.





CLIMATE CHANGE: THE RISK OF NON-NATIVE MARINE SPECIES ESTABLISHING AROUND ANTARCTICA

By: Saloni Verma, TZH



Non-native marine species
Halicarcinus planatus

blogspot.com

Despite the ongoing uniformity of the planet's flora and fauna, several biogeographic zones have escaped recent invasions so far. The most prominent is Antarctica, where due to poleward tectonic drift compounded by temperature and changing oceanic boundaries, a major portion of the indigenous biota has diverged from other regions.

Although Antarctica is the world's most isolated continent, it has not been spared from the detrimental effects of human activity.

Overharvesting, pollution, and the introduction of alien species have a local and regional impact on Antarctica's distinctive marine ecosystems and indigenous faunas. Antarctica is undergoing considerable ecological and environmental change, which could make it easier for non-native marine species (NNMS) to establish.

The transport and assembly of NNMS in Antarctica have been hampered by two fundamental factors: a lack of human activity and a hostile climate. Both of these elements, however, are changing. Elevated water temperatures can adversely affect some indigenous communities by improving the survival of NNMS and reducing biological resistance. The ice-free marine habitats of the Antarctic Peninsula may already provide small areas suitable for alien species. *Halicarcinus planatus* (a crab species) on Deception Island is the southernmost discovery and may indicate an expansion of the southward range or transmission between regions. *Halicarcinus planatus* is unusual because it breeds in summer and winter and has a juvenile age that can withstand lower temperatures.



www.antarctica.gov.au

ocean-acidification and the southern ocean Australian - Antarctic program

Colonization by non-native vascular plants is at the greatest risk due to increased temperatures, increased water availability, increased ice-free habitat, and increased human invasions. Recent studies suggest that the Antarctic environment will continue to experience extreme seasonal fluctuations in light availability and deep continental shelf compared to other parts of the world. However, the availability of light is affected by UV-B radiation due to ice cover and ozone depletion. Increments in light accessibility will likely drive communities dominated by benthic fauna, such as sponges and corals, to those ruled by macroalgae. Ocean acidification, and consequent undersaturation of calcite, could be a worldwide and pervasive change within the marine environment and it'll influence all Antarctic marine environments. Augmentation in plastic remains combined with increments in temperatures paves way for the continuous drop in the amounts of sea ice.

The successful establishment of a cohort of mussels (Mytilus cf. platensis) in the shallow tidal habitat of the South Shetland Islands in 2019 demonstrates the ability of this species to complete its early life stages in this extreme environment. Genetic analysis and shipping records show that this observation is consistent with the major vectors and pathways connecting Southern Patagonian and the Antarctic Peninsula, indicating potential future invasion of Antarctic ecosystems.

Marine invasive species around the world have social, financial, and ecological consequences associated with other anthropogenic impacts such as climate warming, ocean acidification, and pollution to heighten weight on biological systems. Antarctica is itself a biogeographic region, and global warming not only endangers charismatic native species but also reduces the distribution and physiological barriers of non-invasive species in tides and shallow waters. Whether they are the result of direct anthropogenic or indirect biological interactions, the consequences are fatal for the most unique marine biotas on the planet.

Driving communities dominated by benthic fauna, such as sponges and corals, to those ruled by macroalgae



antarcticajournal.com

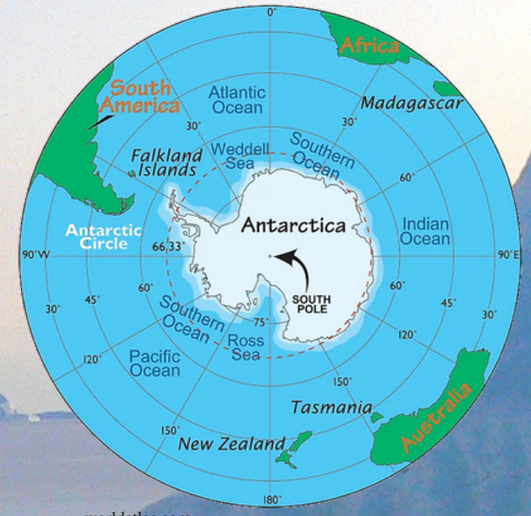


Phys.org



mussels (*Mytilus cf. platensis*) in the shallow tidal habitat of the South Shetland Islands

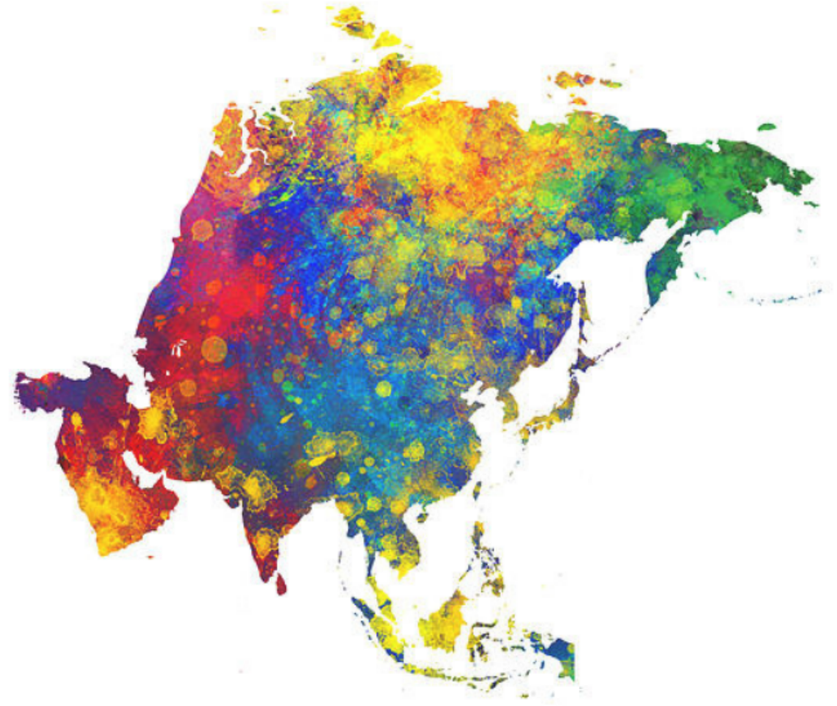
Ecoregistros.org

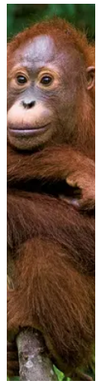


worldatlas.com















● Asia, a continent home to a 4.69 billion people and 17 biodiversity hotspots, is a core part of Eurasia placed in the Eastern and Northern Hemisphere.

● It holds its position as one of the most biodiverse landmasses, providing diversity in terrain and climate leading to an evolutionary cascade giving rise to numerous endemic species, many of which are under threat due to human-created circumstances.

● The Coral Triangle (CT), as indicated by its name, is a roughly triangular area cradled by tropical waters around Indonesia, Malaysia, Papua New Guinea, the Philippines, the Solomon Islands and Timor-Leste. This area consists of a minimum of 500 species of reef-building corals in each ecoregion along with 76% of all known coral species in the world. It also serves as a habitat for 52% of Indo-Pacific reef fishes and 37% of the world's reef fishes. Rapidly increasing anthropogenic activities along with climate change are causing mass destruction of this diverse haven.

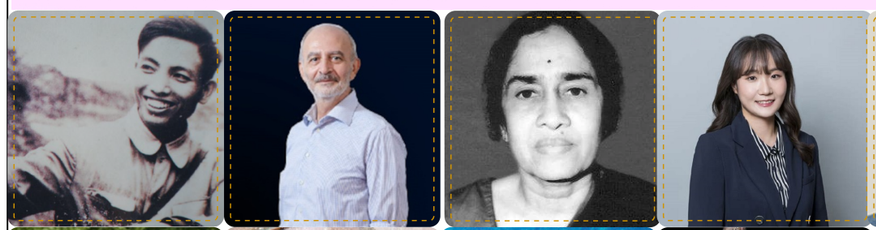
● Volcanic eruption in 1,200km south of Tokyo resulted in formation of a new landmass in the Pacific Ocean, about 50km south of Minami Ioto, the southernmost island of the Ogasawara group.

● Recently researches in Philippines excavated fossils of Homo luzonensis, a new hominin similar to Homo floresiensis, also known as the “Hobbit” of Flores. Further, freshly discovered stone tools in Sulawesi, predate human arrival suggesting the presence of a third unidentified hominin in South-east Asia.

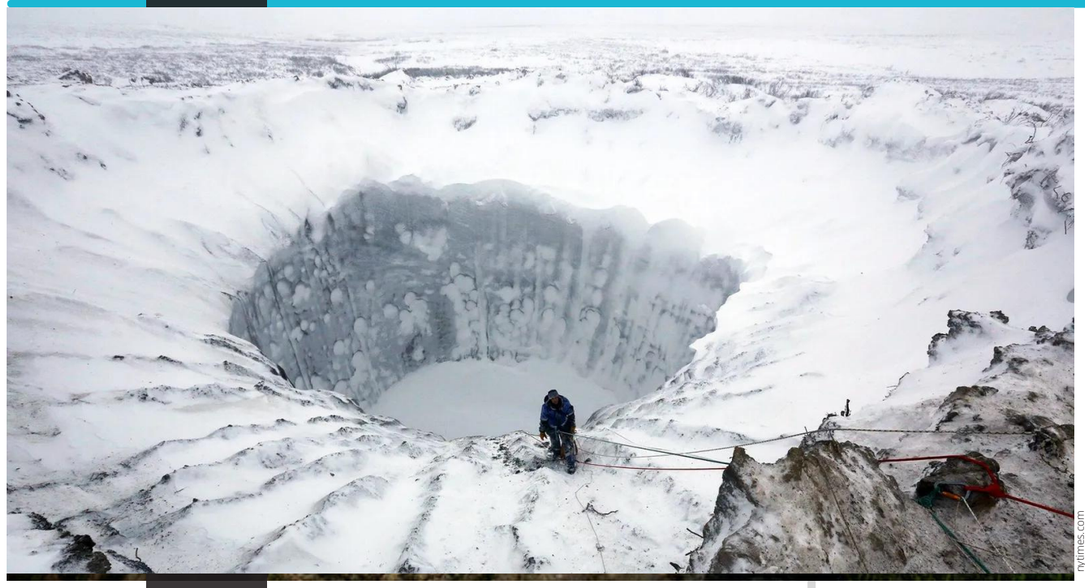
● This Corpse flower (Amorphophallus titanium) is native to the Sumatra rainforests in China and is renowned for being the world’s largest unflowered inflorescence, credited by the direct translation of its scientific name to “misshapen phallus”. Their average life-span is of a good 30-40 year, with a blooming season expected 7-10 years. Its common name arises from the fact that the odour secreted by the flower mimics that of a dead person.

● China successfully, carried out cloning of two cynomolgus monkeys (Macaca fascicularis) macaques via Somatic cell nuclear transfer (SCNT), using fetal fibroblasts, the first of its kind since Dolly the sheep.

● Nasalis larvatus or the Proboscis monkey endemic to the jungles of Borneo, primarily inhabit coastal mangroves, island rivers and swamps. They hold a unique position in the primate world, with their long-fleshy nose serving as their unique characteristic, which they also use as an attracting agent, to lure in mates. Scientists believe that these extended organs create an echo chamber that functions to amplify the primates call, luring in females and for intimating rivals.







Siberian Permafrost

- Anuvrinda Sharma, SZH

Permafrost can be defined as a permanently frozen layer of the earth's surface, which includes soil, rocks, and sediments, bound together by ice for a minimum span of two years to millions of years. The formation of this time-resistant reservoir is seen only in places where the average temperature drops below 32°F or 0°C and remains in this cold state. The occurrence of this layer spans a quarter of the Northern Hemisphere and is extensively spread in the Arctic regions of Canada, Siberia, Greenland and Alaska.

The Siberian permafrost is one of the oldest layers of permafrost, owing to its development rooted in the Late Pleistocene, approximately 18-27 thousand years ago. The formation of this layer was attributed to the average temperature that ranged 8-10°C below the current temperature. In Siberia, the permafrost occupies around 80% of its land, however, numerous cities and industrial complexes have established themselves on top of this layer. The permafrost layer is at its thickest (over 1 km) in Yakutia, Central Siberia, where it forms the coldest block of the lithosphere in Northern Eurasia. Further, bacterial strains from ancient permafrost sediment, in Central Yakutia, Eastern Siberia, at Mammoth Mountain near Aldan River valley, frozen for 3.5 million years, were isolated and analysed to provide insight into microbial growth during that stature in time. Subsequent analysis of phospholipid fatty acids evinced the dominance of bacteria over fungi.



The permafrost is also known for its natural safeguarding ability as it homes preserved tissues of animals long extinct. Mammoth teeth, preserved in the permafrost, have produced the oldest DNA on record, thus, opening a new door for genetic cloning and analysis. Previous to this discovery, the oldest DNA sequenced belonged to a horse specimen that lived 560,000 to 780,000 years ago (Permafrost layer in Thistle Creek, Canada).

While the permafrost provides a plethora of ancient specimens trapped in time, it has fallen prey to the same predator responsible for destroying every other form of nature: Climate Change. Due to the increase in the average temperature of the planet, there is the thawing of the permafrost layer, i.e., this layer is melting. Although this melting has led to the discovery of multiple well-preserved historic fossils, it has also opened a gateway for prehistoric microbes that were previously dormant, to become active and enter through to our present world. Some of these microorganisms could also have a pathogenic origin and thus, potentially cause severe diseases in humans, animals, and plants with major impacts on public health, socioeconomic wellbeing and natural ecosystems.

Anthrax outbreak is testimony to this, wherein the reindeer herds in Siberia were severely affected, causing thousands of deaths. Its occurrence has been attributed to the presence of infected carcasses or spores released from the active layer of the permafrost. A study proved that the permafrost had been thawing rapidly for six years before the outbreak. The span from 2011–201, known to be relatively warmer, was followed by cold years along with a thick snow cover in most snow-frequented cities. This switch in temperature prevented the freezing of the soil. Furthermore, the spread of Anthrax was supposedly highly intensified by a parched summer of 2016. Thus, it led to the conclusion that the epidemiological situation of Anthrax in previously contaminated Arctic regions falls under dire need for constant climatic surveillance.



A fully intact lion cub was also discovered well preserved in this frozen sheet of time.

Siberia is also home to the widening chasm of the Batagaika crater, also known as the world's largest crater, described as resembling a stingray or a tadpole in shape. Each exposed layer of the crater wall is like a snapshot in time, assisting scientists in understanding the past climatic conditions. Layers of permafrost exposed at the bottom might be up to 650,000 years old. *Equus lenensis* (a Pleistocene horse) and *Bison Priscus* (prehistoric steppe bison) are a few prehistoric specimens that have emerged from the thawing soil, along with assorted remains of cave lions and wolves. Researchers found evidence that the region had a relatively warmer climate and dry, windy conditions during the Pleistocene Epoch. This crater has also earned its name as "Climate time bomb" or as "methane bomb," as climate change has directly affected the physical properties of the permafrost, and methane and carbon emissions provide a measure of the extent of melting of this layer. A study conducted on the same indicated that the intensification of methanogenesis everywhere was due to ancient organic matter released from thawing permafrost.

Thus, the Siberian permafrost provides an insight into the future, holding knowledge crafted by our past. But sadly,climate change has already started consuming this layer gradually taking control and very soon we will all be put on trail for our actions, the current paralysed situation of the world being a testimony to this.

DWARFISM ON FLORES ISLAND

Rampasasa people are from Waemulu village, Flores – near Liang Bua where 'the Hobbit' fossils were discovered.



theconversation.com

Have you ever seen hobbits or dwarves? I have only read about them in stories of J. R. R. Tolkien with their most suitable presentation in movies like The Hobbit and The Lord of the rings. But do these fragments of Tolkien's fictional Universe with the lore of hobbits and dwarves breathe air in real life? The indigenous people of the small village of Rampasasa on Flores Island of Indonesia might have an answer to this.

Homo floresiensis, a new species was uncovered in the Liang Bua cave of Flores Island in 2003. Nine parietal skeletons of the species have been recovered till now. One complete skull has also been referred to as the LB1. These fossils were tiny, human-like, with the brain size of a chimp. These were around three feet tall. With a height of 4.5 feet are the people of the nearby village of Rampasasa. But are these modern pygmies related to Homo floresiensis?

What lies the reason behind this phenomenon of Dwarfism? A genetic cause? A pathological disease? Some magical power or a curse? Much to the dismay of many scientists, the remains extracted couldn't provide them with definitive DNA fragments. But some of these questions could be answered with subsequent studies over time.

The current archeological evidence dates the existence of Homo floresiensis to be as old as 100,000 to 60,000 years ago.



https://www.nationalgeographic.edu

Recent studies on genome sequencing of 32 pygmies haven't established any direct relation between Homo floresiensis and modern humans. They couldn't find any mysterious gene that may have belonged to H. floresiensis. Genetic analysis shows that the present-time pygmies do bear the ancestry of the Neanderthals and the Denisovan, similar to their Southeast Asian neighbors.

These pygmies are considered to have gone through insular dwarfism, similar to what Homo floresiensis has undergone. Insular Dwarfism is the process in which large mammals evolve into smaller mammals (reduced body size) when their population (reduced body size) when their population becomes restricted to a small geographical area. It primarily occurs on islands. Reduction in body size may come across as an advantage due to a lack of inadequate resources to sustain a large population of bigger-sized animals. Another reason can be an unlikely chance of presence of big predators and competitors from similar species.

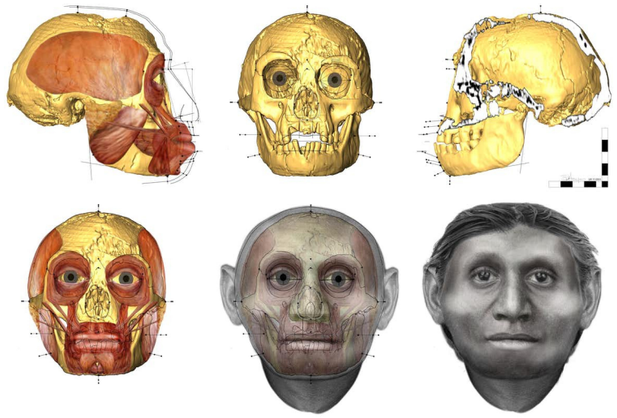
Homo floresiensis or more commonly called the Hobbit triggered a mega debate with its discovery. While some argued that the female skeleton excavated belonged to a Homo sapien suffering from dwarfism, microcephaly, or other physical defects, some argued that it may have descended from *Homo erectus*, or *Homo habilis* (another hominin). Its classification posed difficulties mostly because extracting DNA from fossils is harder than extracting it from preserved bones. The number of fossil

Left is the skull of Homo floresiensis, next to a Homo Sapiens skull.



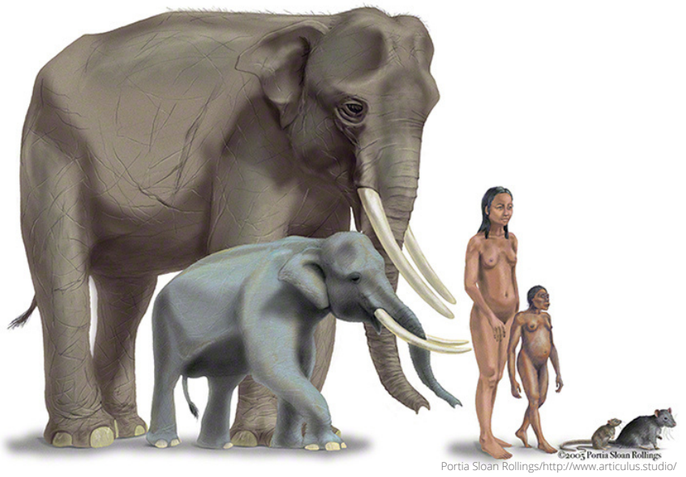
https://www.haaretz.com

Facial approximation of 'the Hobbit' by Dr. Susan Hayes.



Hominins and Stegodon, typically large-bodied mammals, both became dwarfed on the island of Flores in Indonesia. Small mammals, like rats, got bigger.

https://theweek.com



Portia Sloan Rollings/http://www.articulus.studio/

The excavation site in Liang Bua, Indonesia where Australian scientists discovered the a female skeleton of an ancient human-like species now referred to as 'the Hobbit'.



https://www.bbc.com

remains of *H. floresiensis* is also not a lot. Moreover, human fossils are just rare.

This tiny adult possessed many odd features. Its skull had a brow ridge that broke into two sections, similar to ancient hominins. Its feet were more similar to apes. Other features that differentiate LB1 from the modern *Homo sapiens* are that the former lacks a chin, has a small cranial capacity, and has less torsion in the upper arm bone. It is a mixture of both modern and archaic features.

No gene flow can be traced from Hobbits to pygmies. It's also hard to define when the ancestors of Pygmies reached the island. No specific genes in hobbits can be linked to the small stature of the people of Flores. Richard Green and colleagues analyzed that pygmy became diminutive due to natural selection. This natural selection was based on pre-existing genetic variations, so there was no need for an ancient Hobbit to look for the reasons behind it. The closure is that human-like people moved to the island and underwent insular dwarfism twice.

Richard Green, a scientist involved in the study, remarks that,

"Strange things might happen on islands".

- SHUBHI AGRAWAL,TZH

CHANTING THE ENCHANTING FOLKLORE OF INDIA

-Tanya Goel, SZH

आ नो भद्राः क्रतवो यन्तु विश्वतः



Or 'Aa No Bhadrah Kratavo Yantu Vishwatah' is a splendid Sanskrit shloka concerning science meaning 'Let noble thoughts of science and knowledge come to us from every time and every direction of the universe'.

From the dawn of the spell, humans fancied that a spirit is escorting the cosmos but still the presence of that 'supernatural power' is an enigma. Humans have indeed unraveled almost all of the mysteries of this world, although there lie many quests that are yet to be solved. We are all well acquainted with the great 'Indian Mythology' but do we know it to the deepest core? Hitherto, the science behind Indian Mythology fascinates the big brains overseas. 'Yesterday's paradoxical times are today's manoeuvers'.







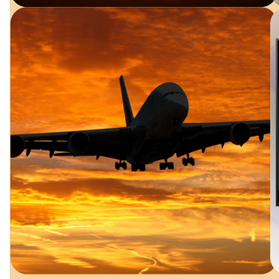


Centuries ago, space travel seemed a miracle while the stories associated with it were considered Science Fiction, however, today it is a possibility. Thus, it shouldn't be a big deal if tomorrow we are time traveling or having a conversation with aliens. As we know, the Hindu Epics, Ramayana & Mahabharata, were written ages before and many things that were contemplated fantasy then are converted into a reality today, with all the credit leaning towards science

Yet, other examples remain unsolved but new research-based approaches directed worldwide would provide us with a different hypothesis about how all these things must have happened. One such example was elucidated by Christopher Conan Doyle, the author of many books and research papers discussing the reasonings and facts behind the mythologies and myths.









The 'Amrita' or the Elixir of Life, consumed by the Devatas to achieve immortality, is something that enthralls every soul. The Bhagavad Purana talks about 'Amrit Manthan' or 'Samudra Manthan'. Sage Durvasa cursed Lord Indra and all other Devatas to be completely depleted of their powers.

They approached Lord Brahma who guided them to seek the aid of Lord Vishnu. Vishnu advised in order to get their powers back, the Devatas would have to churn the ocean of milk and bring out the magical nectar-Amrita. This extraordinary churning is regarded as 'Samudra Manthan' or 'Amrita Manthan'. Devatas endeavored the help of Asuras to fulfill this colossal mission.

The Puranas suggest that the Amrita is either a steroid that provides strength or a potion that possesses the powers to stop man from aging and dying. Christopher Doyle provides a scientific angle towards the mysterious powers of the Amrita.

All living cells replicate through division, creating identical copies of DNA present in their nucleus. A normal virus translates its DNA into RNA following a set of instructions to assemble proteins. Proteins carry out an extensive array of functions within organisms like DNA replication, response to stimuli, catalyzing metabolic reactions which help the viruses to burst through cells, resulting in the killing of these cells and infection of new ones. But a retrovirus works differently. Its RNA is converted into DNA by the process of Reverse Transcription. This DNA is inserted into the host cell which causes the virus to be a part of the host cell. Through the process of evolution, a significant part of human DNA is inherited from retroviruses.

According to science, it is believed that the Amrita is a potion that consists of viruses that switch on the telomerase (protein useful in cell division) that conducts cell replication but simultaneously it contains retroviruses which activate the p53 protein (known to kill cancer cells) which terminates the chances of cancer. Ergo, the 'Amrita Manthan' is illustrated as an act of science in which a potion is prepared that not only ceases the ageing but also ensures the termination of cancer. The ocean serves as a dwelling for retroviruses and bacteria which gives the water its milky appearance (it is believed that during Manthan, the water was whitish in color). This water is mixed with medicinal plants and Ratna (any precious yielding of the earth), to get the nectar or the Amrita. But does 'Amrita' really exist in the universe? As of now, there's no proof but we don't know what the future holds for us.

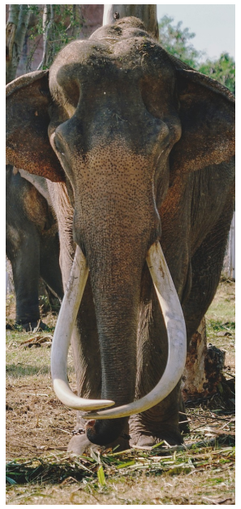
However, there are many secrets mingled with our mythology, like the birth of adult Draupadi and Drishtadyumna from the fire of a 'yagna' which remain a mystery to the scientific intellects. It would take immense fact-finding to decrypt all of them, and when that happens, the world would receive absolute blessings from 'Magnificent Mythology'!

Reality of Elephant Tourism



KUNAL RAO, SZH

A new industry is expanding rapidly nowadays, known as Wildlife Tourism across the planet and in South East Asia. Thailand is the hub for wildlife tourism. Most youngsters like to see the wildlife closely, ride, and play with them. In Thailand, animals employed in wildlife tourism are Asian elephants, Asian Tigers, Macaques, dolphins, etc. **Asian Elephant** is the national animal of Thailand. In Thailand, the total number of Elephants is around 6783-7483, with 3783 being captive and 3000-3500 wild.



The Venues in Thailand which offer wild animals for tourist entertainment are in popular tourist destinations: Ko Lanta; Krabi, Phuket; Phang Nga; Khao Sok; Surat Thani; Ko Samui; Ko Phangan; Hua Hin; Bangkok; Kanchanaburi.

Many tourists enjoy interacting with wildlife and watching them perform seemingly harmless acts such as painting but fail to realize that for doing such activities, what painful training methods they need to go through. Mahout are those people that train captive wild elephants for various activities. The training of an elephant starts when it's two years old with the assistance of hook sticks and spike chains on their feet. First of all, they teach them a way to sit, for this mahout with the help of hooks, twist their back and front leg and teach them to sit down. With repeated practice of activity, the elephant can do these activities. But, it causes lots of pain and stress to the animals.



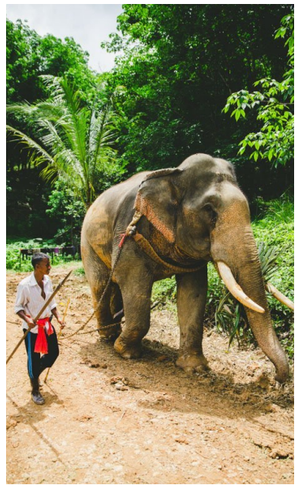


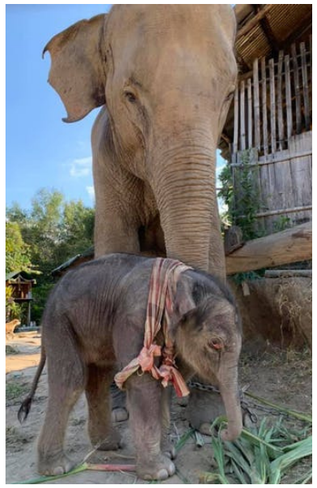


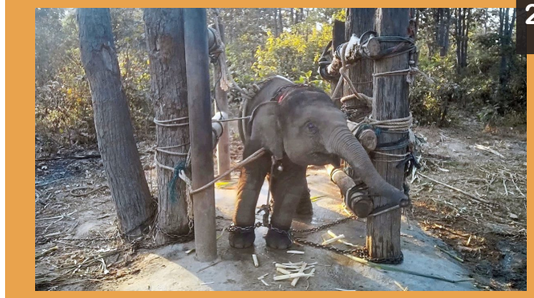




Most camps have the policy to extend the frequency of water provisioning during hot weather. Elephants within the wild spend large percentages of time foraging, so roughage is fed regularly by mahouts and sometimes supplemented with treats (bananas, sugar cane) during the day by tourists. The typical body condition score (BCS) of elephants in northern Thailand generally was high, between four and five (out of five), meaning most were overweight; none had a BCS of 1 (too thin). Diets are somewhat limited, and elephants don't have access to a wide range of food choices of wild elephants. Most camps feed two forms of roughage (Napier grass and corn stalk). Common diseases or other health disorders include wounds, ectoparasites, nail cracks, constipation, colic, and eye problems, which generally are caused by improper management. Most of the time, there is an inappropriate use of ankus wounds in the feet of elephants & other parts of the body. Excessive walking on concrete and aging were associated with foot problems, particularly nail cracks. Gastrointestinal problems have occurred by eating food contaminated by insecticides or fertilizers. Only 18% of camps have a veterinarian on-site, although 36% have an elephant clinic, a selected area has restraint facilities and basic medical supplies. Elephants are intelligent, social animals, so ensuring that captive environments meet psychological needs is imperative, but not always possible in a very tourist camp environment. Only some camps consider the mental state of elephants, including the essential need for socialization, or even perhaps understand its importance.







Asian Captive Elephant Working Group (ACEWG) was created in 2015 by a gaggle of regional and international Asian elephant experts, including veterinarians, conservationists, and researchers. The goal is to raise awareness about problems faced by elephants in tourism and provide recommendations to boost elephant management practices and health care throughout Asian range countries.

The objectives of the **Thai Elephant Alliance Association (TEAA)** are to:

(1) Promote members to work together on elephant-based tourism issues.

(2) Encourage positive perspectives about captive elephants and the way of life with elephants in Thailand.

(3) Center for education and consulting about
elephant-related topics.

(4) Encourage and improve elephant conservation messages utilized by member facilities.



OCEANIA





- Oceania consists of 14 countries, with Australia being the dominant region.
- Most of Oceania is surrounded by the Pacific Ocean, the reason why this region has been named as “Oceania.”
- Three island groups make up this group- Continental islands, high islands, and low islands.
- Oceania and Australia have their own distinctive flora and fauna. Birds are commonly found in Oceania since they can easily move from one island to another. Around 110 endemic species are present in Oceania and Australia. Flightless birds such as emus, kiwis, wekas, etc. are native to this region. Major native land animals are lizards and bats.
- The Great Barrier Reef off the coast of Queensland, Australia, is the world’s largest coral reef system. It’s one of the seven wonders of the natural world. It’s the only living thing visible from outer space.
- Recently, scientists have discovered a rare baby ghost shark in New Zealand. These baby ghost sharks are also known as chimeras and are expected to provide insights regarding organisms that have so far not been found because they live in deep water.
- The Sydney funnel-web spider found in Australia is the world’s deadliest spider. The funnel-web spider injects a deadly poison whenever it bites and death occurs within an hour. However, an anti-venom has been developed and for more than 30 years there has been no fatality.
- Humans and some other primates exhibit "handedness," or the tendency to use one hand more naturally than the other. Scientists once thought this was a unique feature of primate evolution, but more recent research suggests handedness is also common in kangaroos.
- Emu Are the Only Birds with Calf Muscles. Emus are unique among all bird species, for example, in having a gastrocnemius. This powerful muscle, located on the back of the lower leg, forms part of what's known as the calf muscle in humans. What they lack in wing size emus make up for with leg power.



The Great Barrier Reef

- Aditi Singh , SZH





A new report, the Reef Outlook Report, says that global climate change will cause huge damage to the reel. The report was written by the Great Coral Reef Marine Park Authority. Warmer and more acidic water round the reef will curtail calcification, which is how the coral grows and becomes strong. The corals become bleached, lose their colors and plenty of species that survive around the reef will be in peril. The Australian government has already spent AU$125 million to enhance the health of the reef within the last two years.

The Reef Outlook Report also warned of other dangers to the reef. These include poor quality water running into the ocean from the mainland. This water is polluted with farm insecticides and rubbish from nearby towns. The increasing amount of development on the coast is destroying natural marine and coastal habitats; there's also some damage from fishing. Although there are already many initiatives going on but the improvement is quite slow. The major reason for all the problems is our unsustainable ways of development, even this beautiful creature is now suffering cause of our actions. The reef is now said to be in a stable state after the 'magical' spawning event in 2021. We should be grateful about it and take it as a warning and look forward to our goals and actions in the future to preserve the pristine beauty of this UNESCO World Heritage Site.. We surely can't undo our previous actions but it's high time to change our approach and save our environment and, needless to say 'ourselves'.

The Great Barrier Reef, measuring 2,300 kilometers in size, is present in the north-east coast of Australia and is the largest living system on Earth and may be seen from space. The reef has 400 species of corals, supporting over 2,000 fish species, 4,000 types of molluscs and countless different invertebrates. It should actually be described as a big mechanism of reefs, because it isn't one long concrete system but made of nearly 3,000 separate reefs and 1,000 islands.

The Great Barrier reef has 1,500 species of fish, and plenty of other animals, algae, and corals. This includes many vulnerable species. The Great Barrier Reef is also the habitat of the 'sea-cow' and the large green turtle and thus this reef draws greater scientific interest. Whales, dolphins, and porpoises are seen within the Great coral reef as well. This includes the dwarf razorback, Indo-Pacific humpback dolphin, and also the *Megaptera novaeangliae*. Most of the population of the dugongs live there. Most nesting sites are on islands within the northern and southern regions of the reef. About 1.7 million birds use the sites to breed.





By: Simran Prajapati, TZH

There are nine small coral islands in the west-central Pacific Ocean that group together to make one country - Tuvalu. Home to some 11,000 inhabitants, this developing country barely exceeds the height of 3 meters above mean sea level, placing it in the list of the world's lowest-lying countries.

It would be better to introduce Tuvalu as a victim of global climate change, which has become an existential threat for its long-term habitability. Flood tides, more frequent and intense rainfall events, together with spring tides and tropical cyclones, are predicted to occur. The impact would be tremendous enough to sink the country in the next 30 to 50 years. Extreme weather conditions have already been draining its water resources. Coastal flooding has resulted in saltwater intrusions, which have been damaging the island's groundwater reserves, thus limiting freshwater availability. Persistent droughts have been directly affecting livestock such as pigs and chickens causing them to go thirsty. Rising saltwater also has been destroying deep-rooted food crops (for example, coconuts no longer bear fruit) and has thus contributed to food insecurity as well.

The condition of Tuvalu became apparent when its foreign minister, Simon Kofe addressed the United Nations COP26 climate summit by standing knee-deep in the ocean, filming the video from the place that was once dry land. "The statement juxtaposes the COP26 setting with the real-life situations faced in Tuvalu due to the impacts of climate change and sea-level rise and highlights the bold action Tuvalu is taking to address the very pressing issues of human mobility under climate change," Kofe said in his recorded video speech. "In Tuvalu, we are living the realities of climate change and sea-level rise," he said and appealed for bold and alternative actions.



Tuvalu is not the only country going through such conditions. As per World Bank data, sea level in the entire western Pacific Ocean has been increasing at a rate 2–3 times the global average since 1990.

The leaders of these Pacific Island countries have been emphasizing immediate action but, despite being on the frontline of climate change, these island countries lacked representation at the climate conference in Glasgow due to Covid restrictions.

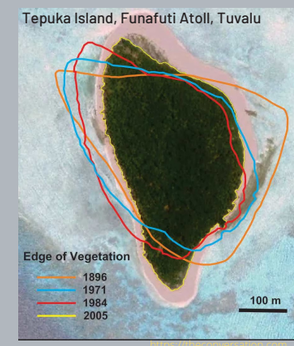
Rising sea levels do have some legal consequences as well. For example, if the situation worsens and some of these island nations sink, they would have to lose their statehood. If Tuvalu gets completely submerged due to climate change, its citizens would have to relocate and move to locations less vulnerable to sea-level rise altogether, giving rise to 'Climate change Refugees.' Some of its people have already migrated to other countries with more than 4,000 living in New Zealand, some cannot afford to settle down in other nations, and some do not want to migrate. For the Tuvalu government, saving the country from sinking under the sea or perhaps even managing the supply of food and water for the remaining citizens isn't feasible owing to their poor economic conditions.

The effect of climate change is jeopardizing Tuvalu's existence as a country. It is still unclear whether a country would retain its sovereignty if it sinks.











Tasmanian Devils were one of 13 marsupials whose DNA was analysed for evidence of viral fossils. Photo: Shutterstock



Scientist Emma Harding wonders whether viral fossils stored in human DNA could be protecting us against viral infections. Photo: Emma Harding



Marsupials like this possum have young that grow in the pouch. Scientists think viral fossils may be protecting pouch young against infection. Photo: Shutterstock



Scientists are searching the genomes of old-world primates for traces of a virus that thrived more than 13 million years ago. (Illustration by André da Loba)

ANCIENT MARSUPIAL "JUNK DNA"– ANY GOOD?

What is "junk DNA"? - In genetic terminology, regions of DNA that are non-coding are known as junk DNA. Instructions (coding) that are responsible for producing proteins in the cell are contained in the DNA. However, the quantity of DNA present inside each cell is huge. Out of this, all of the genetic sequences do not even code for a protein. The ratio of coding and noncoding DNA is variable among different species. For example, in the human genome almost all (98%) of the DNA is noncoding, while in bacteria, only 2% of the genetic material is non-coding. Over the years, researchers have found evidence that hint towards some utility of junk DNA. Some of the gene sequences once considered "junk" are actually traces of viruses in the DNA from an ancestral infector. Its already known with respect to the viral genome, that the virus leaves behind a piece of its existence in the body as an after-effect of its occurrence. However, if this happens in any of the germ cells, it will then be passed on through the generations. These are known as endogenous viral elements (EVEs). It may provide some form of functional activity, as opposed to just being a pile of junk. Some lines of evidence suggest that fragments of what were originally non-functional DNA have undergone the process of exaptation throughout evolution.

Experimenters at UNSW Sydney involved in the study examined the DNA and RNA of 13 Australian marsupial species. They believe that viral fossils might play a role in preserving animals from infection. "*These viral fragments have been retained for a reason. Over millions of years of evolution, we would expect all DNA to change, however these fossils are preserved and kept intact,*" says doctoral student and lead researcher Emma Harding, from UNSW's School of Biotechnology and Biomolecular Sciences. Their study shows how the viruses buried in the animals' DNA are used to make non-coding RNAs, which carry out various functions inside the animal cells such as providing protection against outside infection. This research can result in being a potential asset for exploring the wonders of 'viral fossils.'

For better understanding of Ms. Harding's work, we need to go back hundreds of years ago when Australia was part of the Gondwanaland supercontinent along with South America, Africa and Antarctica. Scientists presume that the first marsupials originated in South America and later migrated to Australia via Antarctica. The lack of competition caused the marsupials to further evolve, with about 250 species now living in Australia, and about 120 in South America. According to Ms. Harding, when we look at the genetic makeup of Australian marsupials, the presence of viral fossils, known as endogenous viral elements (EVEs), act like the markers of the time when the animal was infected. She says, "My research looks at EVEs in Australian marsupials to firstly identify what types of viruses have integrated, and secondly investigate if they play an active role in the marsupial cells."

One of the EVEs she discovered was from the *Bornaviridae* family of viruses, which first entered the animals' DNA during the time of the dinosaurs, when the South American and Australian landmasses were still joined together. She further added that *Bornaviridae* viruses were previously thought to have evolved 100 million years ago but the one she found, it was almost in every marsupial DNA they observed and estimated it to be around 160 million years old. So basically, by studying the evolutionary history of viruses, it can give us an insight about the changes they might undergo in the future and this can help us to stave off outbreaks and tragedies.

- Shalini Raman
SZH































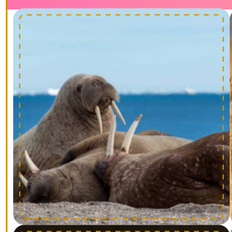








- **Located entirely in the Northern Hemisphere, Europe is acknowledged as the 'Peninsula of Peninsulas' as it is encircled by the Arctic Ocean to the north, the Atlantic Ocean to the west, and the Mediterranean Sea to the south.**
- **Prague Castle in the Czech Republic is recognized as the largest castle complex in the world, accommodating architecture spanning from Gothic to Renaissance Eras.**
- **Some of the most prominent minds were born in Europe that changed the thinking of people in many aspects. Those glorious souls are none other than Sir Isaac Newton, Charles Darwin, Aristotle, Pythagoras, Albert Einstein, Galileo Galilei, Robert Boyle, and many more.**
- **The fauna of Europe is miscellaneous in many aspects. Around 100,000 invertebrate species, 344 freshwater fishes, 75 species of Amphibians, 100 reptilian species with 800 species of birds along with 270 species of mammals are known to make Europe myriad.**
- **Marine species richness is pronounced in the Mediterranean Sea which also homes 600 Sponge Species (45% of them being endemic), 143 Echinoderms species with about 500 species of Cnidarians, and 1000 species of Oligochaetes.**
- **344 freshwater fish species are known to be found in Europe, of which 200 species are endemic. Europe harbors around 75 amphibian species, of which 56 are endemic. Southern Europe is rich with Amphibian fauna.**
- **Although no reptile is endemic to Europe, they sure are bountiful. Colubrids (Grass Snakes, Smooth Snakes, Western Whip Snake), Viperids (European Adder, Blunt-nosed Viper) with some typhlopids, Boas, European Green Lizard, Iberian Wall Lizard, and the Native turtles (European Pond Terrapin, Marginated Tortoise and Greek Tortoise) increase the beauty of European Diversity.**
- **European birds encounter themselves in a long list of 800 species, of which 445 of them breed in Europe. Prunellidae (accentors bird family) is endemic to the Palaearctic region, while the Holarctic region has four families of endemic birds.**
- **With around 270 species of mammals known in Europe, about 78 of them are considered endemic. 25 insectivore species (European Hedgehog, Common Shrew) with 35 species of European Bats (Horseshoe Bat, Mediterranean Horseshoe Bat, Natterer's Bat) incorporated in European Fauna. Extensive Predators like Brown Bear, Eurasian Wolf, Eurasian lynx, Iberian Lynx, Foxes are comprehensively escalated throughout Europe yet are gravely endangered.**
- **With all summed up, Europe's nearly 60% species are threatened while another 9% are being competent to be included in the threatened status. Degradation of forest and habitat loss are the major threats to terrestrial animals whilst accidental mortality, pollution, overexploitation is blameworthy for the decreasing population and increasing concern for marine animals of Europe.**







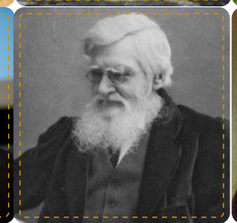


















Greece is the first country in Europe that showed the emergence of advanced civilizations, starting with the Cycladic civilization.

Ancient Greece was known all over the world for its ever-booming wealth that functioned to support its newfound civilizations, and till date holds its position as the most advanced pre-industrial economy, as credited by economists. Ancient Greek mathematicians contributed to many important developments in the field of mathematics, including the basic rules of geometry, the idea of formal mathematical proof, discoveries in number theory, mathematical analysis, applied mathematics, and were almost successful in establishing integral calculus. The discoveries made by several Greek mathematicians including Pythagoras, Euclid and Archimedes are still used in mathematics today.

The Greeks also developed astronomy, which they treated as a branch of mathematics, at a more sophisticated level. The first geometrical, three-dimensional model to explain the apparent motion of the planets were developed in the 4th century BC by Eudoxus of Cnidus, and Callippus of Cyzicus. The Antikythera, a device for calculating the moments of planets, dates from about 80 BC and was the first ancestor of the astronomical computer. Hippocrates, a physician during the classical period, was dubbed as the father of medicine owing to his immense contribution to the field of medicine. The achievements of ancient Greek science were the finest in antiquity.

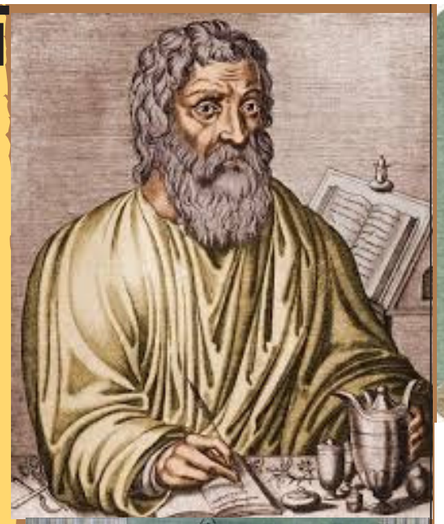
Of all the Indo-European tribes of European origin, the Greeks were at the foremost, especially when taking into consideration the period wherein they developed an advanced culture that would then be passed on and play an important role in future evolution.

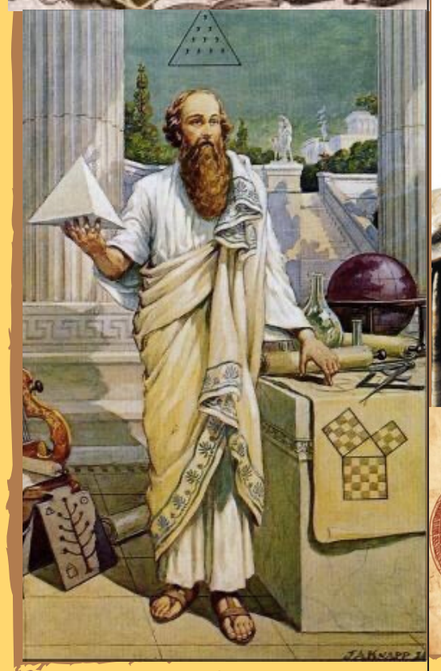
In the Byzantine or Eastern Roman Empire, science played an important role in the transmission of classical knowledge to the Islamic world and Renaissance Italy, and also in the conveyance of medieval Arabic knowledge to Renaissance Italy. The Byzantine scientists preserved and continued the legacy of the great Ancient Greek mathematicians and put mathematics into practice.

Greek science came to Europe through the Islamic world. Tracing origins, we see that Ancient Greek science and philosophy began in the sixth century B.C., and during the next millennium, spread across the Greco-Roman world, producing remarkable discoveries and theories given by Thales, Pythagoras, Hippocrates, Plato, Aristotle, Euclid, Archimedes, Galen, Ptolemy, and many others. Aristotle was amongst the first philosophers who developed a systematic study of logic. The contribution of Aristotle's logic and science became an authority and remained unchallenged, though it took many centuries to notice the flaws of Aristotle's approach to science.

"Ancient Greek science used experimentation to help theoretical understanding while modern science uses theory to pursue practical results"



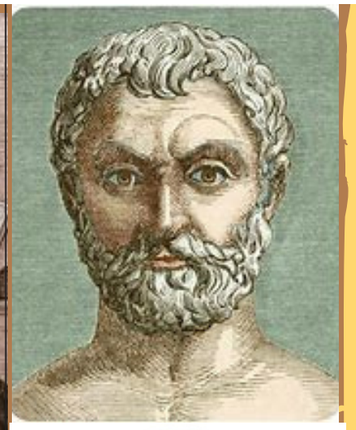


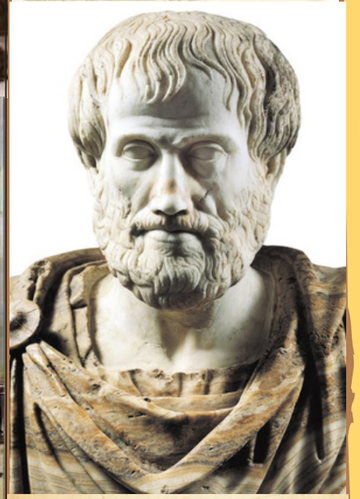






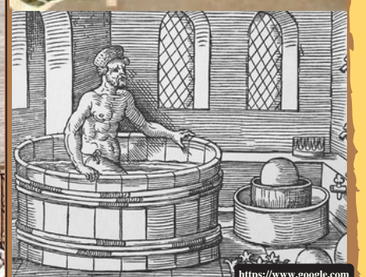












GREEK SCIENCE

- Nancy Mehta, FZH

Early Greek philosophers, influenced by Babylonians and Egyptians, were also amongst the scientists who observed and studied the earth, seas and mountain as well as the solar system, planetary motion and astral phenomenon.

Thales of Miletus, Pythagoras and Aristotle, developed ideas in astronomy, mathematics and logic that influenced western thoughts, science and philosophy. Their findings in the field of astronomy, geography and mathematics made them pioneers in the field of science.

Ancient Greek scientists have discovered many inventions especially in the area of geography, astronomy and mathematics and given below are a few of them:

- **Thales:**

Thales was an astronomer, military engineer, geometer, and logician. Thales discovered the solstice and equinox and is credited with predicting a battle-stopping eclipse. He is also credited for inventing abstract geometry, including the notion that the circle is bisected by its diameter and that the base angles of an isosceles triangle are equal

- **Pythagoras**

He realised that the land and sea are not static.

In the field of music, he stretched the string to produce specific notes in octaves after having discovered the numerical relations between the notes of the scale.

In astronomy, he may have thought of the universe as rotating daily around an axis corresponding to the axis of the Earth. He is often credited for being the first to realise the Morning Star and Evening Star were the same.

- **Hippocrates**

Hippocrates studied the human body and also gave the "theory of four humours" and discovered that there were scientific reasons for ailments. He also diagnosed and prescribed simple treatments like diet, hygiene, and sleep.

- **Aristotle**

Aristotle thought that the Earth must be a globe. Though the concept of a sphere for the Earth already appears in Plato's Phaedo, but he elaborated and estimated the size.

He was the first to scientifically classify organisms into 2 kingdoms.

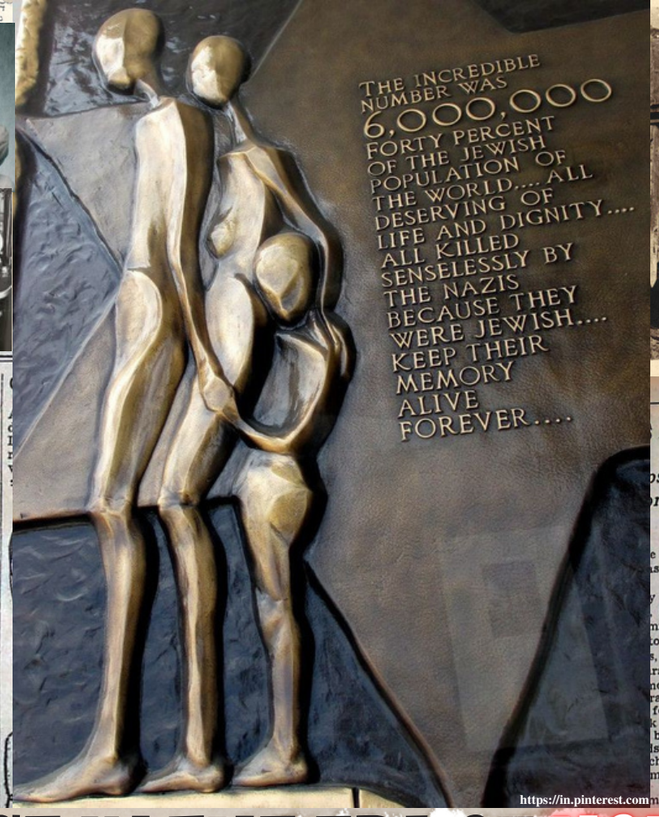
Aristotle classified animals and also earned the name 'The Father of Zoology'.

- **Archimedes**

He discovered the usefulness of fulcrum and lever. He also began the measurement of the specific gravity or density of objects. He is often credited for having invented the screw of Archimedes, for pumping up water as well as an engine to throw heavy stones at the enemy. He also gave the "Archimedes principle".













NEW WARSAW GHETTO DESCRIBED IN BERLIN

Jews May Leave Walled Area Only With Nazi Permit

Wireless to THE NEW YORK TIMES.

BERLIN, Dec. 14—The task of confining all Jewish residents of Warsaw within a ghetto, the boundaries of which have been newly walled for this purpose, now is reported to have been wholly completed. Entrance to and exit from the ghetto are controlled and allowed only upon presentation of a special permission card. The tram communication system has been changed to provide for complete separation of Jews from others.

The ghetto is administered by a Jew, who is a deputy of the district German chief and at whose disposal a Jewish "force for maintaining or-



THE NEW

JEWS IN HUNGARY FEAR ANNIHILATION

Gas-Chamber 'Baths' on Nazi Model Reported Prepared by Puppet Regime

By JOSEPH M. LEVY

By Wireless to THE NEW YORK TIMES.

ISTANBUL, Turkey, May 7 (Delayed)—Although it may sound unbelievable, it as a fact that Hungary, where Jewish citizens were comparatively well treated until March 19, is now preparing for the annihilation of Hungarian Jews by the most fiendish methods. Laughing at President Roosevelt's warnings, Premier Doeme Sztojay's puppet Nazi government is completing plans and is about to start the extermination of about 1,000,000 human beings who believed they were safe because they had

BAGS 5 NAZIS

Lieut. Clar

https://in.pinterest.com

SCIENCE IN THE ERA OF HOLOCAUST

One of the most dreadful eons engraved in the history of the world with traces of sweat, blood, sacrifices, and bawls in every ounce of its reminiscence was that of Nazi Germany, the architect of the holocaust, which is infamous for the genocide of European Jews during World War II. The heinous act included subjects being frozen (alive), infected with tuberculosis, or having their limbs amputated.

We are all familiar with the fact that German pharmacology and expertise in chemical science was prestigious across the world, however, it was tarnished with the rise of Nazi leadership which institutionalized criminal behavior in public health and human research. Nazi's have been known to use medical science as a vanguard to reduce war injuries and loss of manpower, the army was fed with supplements and drugs to immune themselves and be more sturdy and powerful as compared to their enemy lot. The ferocious mentality of Nazis believed that concentration camps were designed for "inferior beings" and "degenerates" who could be used as research subjects and that their lives were of little worth.

At the beginning of the 20th century, an upsurge in the field of eugenics in Europe facilitated the Nazis to implement a disastrous policy called 'racial hygiene. German pharmacology lost all its dignity as Louis Falstein quoted: "the Nazis prostituted law, perverted education and corrupted the civil service, but they made killers out of physicians".

The T4 program aka Aktion T4 or the euthanasia program was about the systematic murder of patients with disabilities in Germany. The program aimed to restore the "racial integrity" of the German nation. Its main purpose was to eliminate people who were " unworthy of life" i.e., those individuals with severe psychiatric, neurological, or physical disabilities were a burden on German society. This program was executed with the use of carbon monoxide in the initial phase, following this, in 1941 the second phase of 'discrete euthanasia' came with the use of lethal injection of drugs such as opiates and scopolamine (anti-nausea medication), or low doses of barbiturates to cause terminal pneumonia. The euthanasia programs resulted in psychiatric genocide, with the murder of lakhs of patients. This was possibly the most brutal crime committed in the history of medicine.

This was not all, even the lives of healthy people who belonged to ostracised ethnic or social groups such as Jews, Gypsies, Slavs, and homosexuals were not spared as they were recruited in concentration camps for human experimentation.

This barbaric act included some of the most unsettling experiments that were executed such as the effect of sulphonamides (antibiotics) on induced gas gangrene, the use of the toxic chemical formalin for female sterilization, the use of vaccines and other drugs to prevent or treat people intentionally infected with malaria, the anesthetic properties of chloral hydrate (a sedative) in amputations, etc.

Albeit all these atrocities, some believed everything was justified by science, even the sadistic experiments carried out in the camps, while others considered themselves patriots and supported their actions as a need of wartime. Others involved themselves in these activities as a means of promoting their professional and academic careers.

A SILVER LINING

For all that had happened, the trauma and the killings that were made in those times, there existed believers of nobility and humanity who dedicated themselves to the sole purpose of saving the lives of thousands of people during the Nazi regime of Europe. One such great personality was the Polish scientist Rudolf Weigl. Weigl is acknowledged worldwide for developing the first-ever effective vaccine against typhus, a disease that wiped away many lives with it during WW II.

On the course of the development of the vaccine, Weigl came up with a system that allowed him to cultivate the Rickettsia prowazeki bacterium, which caused typhus, in the intestines of lice, a forward-looking method at that time, given that such experiments were only carried out on animals such as guinea pigs and rabbits. Weigl specifically chose Jews as his donors who were sent to the concentration camps. They had to sit and wrap a belt containing small cages of lice on which the insects fed. Then, the spread of bacteria through the feces of the lice occurred, which then dispersed by scratching the bite marks.

The records suggest that Weigl saved approximately 5,000 people, along with Jews and members of the resistance. After the production of the vaccine, it was distributed to the public, even those present in concentration camps via the underground network.

In 2003, he was named Righteous Among the Nation and this honor was given by Israel in appreciation and recognition of his service in saving the lives of thousands of Jews during WWII.

- Shalini Raman
SZH







Jewish Children Target Of Nazis

LONDON, Aug. 6.—(INS)—Adding a more vicious and brutal note to its oppression of Jews, Nazi authorities in Paris are rounding up Jewish children and subjecting them to sterilization treatment, the Daily Mirror declared Thursday in a dispatch from Vichy.

Simultaneously with this report, offices of the British section of the World Jewish Congress declared that 1,000,000 of 7,000,000 Jews in the Nazi-occupied nations have been murdered.

CONCENTRATION CAMPS



Sites of Nazi concentration camps.

EXTERMINATION CAMPS
(From The Philadelphia Bulletin)

FOR many months there has been little doubt that the Nazis have been operating extermination camps in Upper Silesia, but official confirmation has just come from two European relief committees with headquarters in Switzerland. They give figures showing that in the two years ending last April more than 1,715,000 Jewish refugees were put to death.

In addition, hundreds of thousands have been executed elsewhere, and many have died under the inhuman conditions prevailing during their removal to the camps. Since April, at least 400,000 Hungarian Jews have been sent to the execution halls.

Extermination has been the prime weapon in Hitler's fiendish plot to control Europe. There has been little difference between the execution chambers using poison gas and the firing squads using bullets. Even famine has been promoted to decimate populations in the occupied lands.

In the darkest days of barbarism, centuries ago, more inhuman treatment of conquered populations would have been hard to find.



Nazis Sprayed Prisoners With Acetone, Then Set Them Afire

Offered Hot Soup As Bait; Escaped Man Tells Of Screaming And Praying Victims

By HAL BOYLE

Thekla, Germany, April 20 (Delayed) (AP)—The charred bodies of 220 political prisoners who were sprayed with flaming acetone and burned and shot to death just before American troops captured this Leipzig suburbs still were sprawled today in postures of agony.

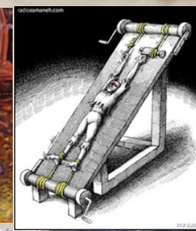
Some lay in the ruins of the con-

ber who managed to short circuit the electrically charged barbed wire enclosure led them to safety.

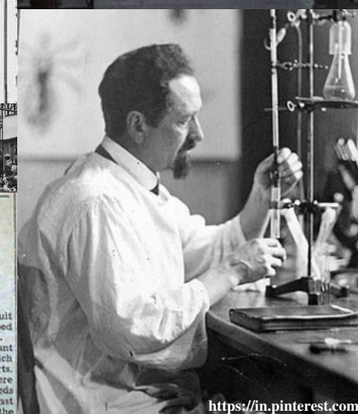
This atrocity took place in plant No. 3 of the Erla works, which made Messerschmitt airplane parts.

From here the Germans were marching prisoners by the hundreds to points farther east until last Saturday. When guards learned the









https://in.pinterest.com

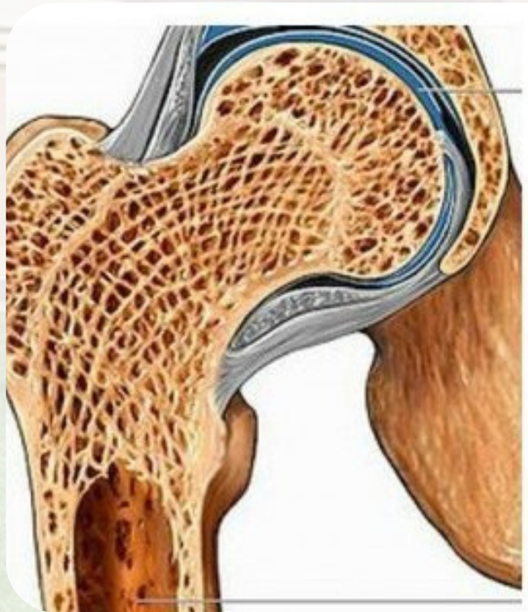
BIOMIMETIC ARCHITECTURE STRUCTURE IN EUROPE

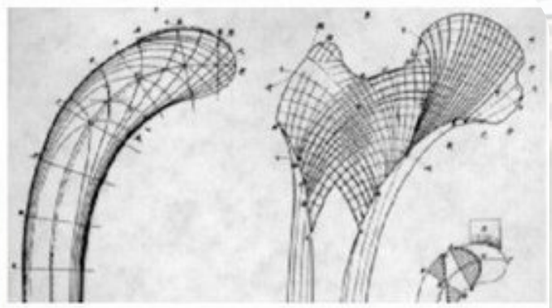
BY: KUNAL RAO, SZH

Nowadays, most of you have heard the term ‘biomimetics.’ It is the emulation of the models, systems, and elements of nature to solve the complex human problem. For solving a problem, inspiration is a must and no one is a better inspiration than mother nature. Once Leyla Acaroglu said ‘The world is designed and yet, the world designed us. We are caught in a dynamic feedback loop between what we create as a species and how our created artifacts make us a species.’

The concept of biomimetic came in 1997 by American biophysicist and inventor ‘Otto Schmitt.’ But, in Europe and some other parts of the world, architecture already shows the use of biomimicry like the Eiffel Tower, Ribbed Vaults in Rouen Cathedral, 30St Mary Axe, etc.

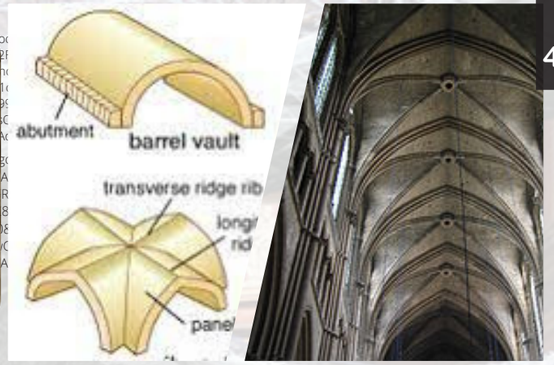
Gustave Eiffel takes inspiration from Femur and Trabeculae bones. The femur was of interest because of its horizontal extension into the hip socket, which enabled the load to be carried by the off-center. The structure of Trabeculae was identical to the lines of stress and compression produced by the supported load. Eiffel used a lattice of studs and braces to support the curved structure of the tower, similar to the way that trabeculae support the curves in the head of the femur. He also used tube-shaped columns and different criss-cross columns and stacks. They provide numerous tiny holes through which air passes and reduce air drag. They also provide strength to the tower-like spongy bones.











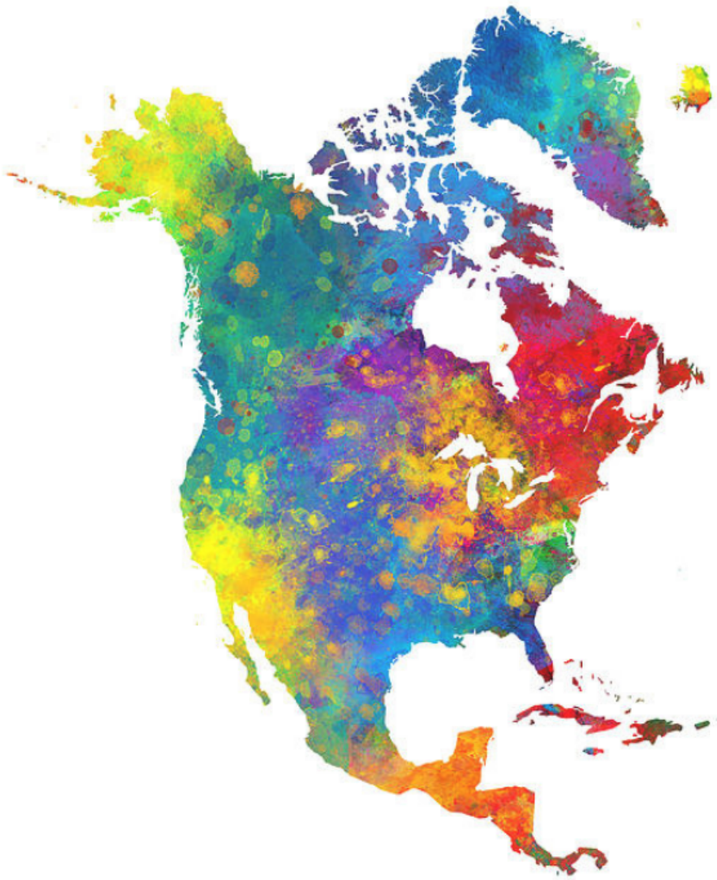
Ribbed Vaults took inspiration from the skeleton of Turtles. The main strength of these vaults is the pointed arch which incorporates higher ceilings and taller windows like in a turtle dermal ossification that strengthens the skeleton. These vaults contain arches in the shape of ribs and are interconnected to each other. They significantly reduce weight.

30 St. Mary Axes is one of its kind that adopts the sustainable and modern technology of biomimicry. It consumes 50% less energy than the prestige air-conditioned offices. Fresh air is drawn up through the spiraling light- wells to naturally ventilate. The light-wells and the shape of the building maximize natural daylight and allow views out from deep within the building. Several complex fluid dynamic studies of local environmental conditions allow natural forces of ventilation to integrate the building with its site. This building uses a ventilation method similar to the one used by sponges and other animals.

All of these examples are based on nature’s own designs. After all, “We are still beholden to ecological laws, the same as any other life-form.”— Janine M. Benyus



NORTH



AMERICA



- North America, the world's third largest continent placed between the Arctic circle and Tropic cancer, exclaims climatic diversity that stems from terrain diversity, which has been divided into the Mountainous West, the Great plains, the Canadian shield, the varied Eastern region and the Caribbean.

- North America is named after italian explorer, Americo Vespucci who was the first to realize that North America was a separate continent.

- Its geographical diversity is also home to a myriad of animals that have adapted themselves to the various climates. It supports six major biomes namely- the Tundra biome, Coniferous forest biome, Prairie biome, Deciduous forest biome, Desert biome, and the Tropical rainforest. Out of these, the tropical rainforest holds maximum diversity within its 4 layers.

- Gray Whales have the longest migration of any mammal, making an annual 12,000-14,000 mile round-trip which stretches almost the entire length of the North American continent.

- North America holds great power when considering Mammals owing to their populous 965 species out of 5416 known species. It is also home to the Lions-mane jellyfish, the world's largest jellyfish, with its tentacles growing upto 60 feet and body span of 10 feet.

- In 2021, extinctions loomed large in the U.S. This September, the Fish and Wildlife Service declared extinctions, which includes 22 animal species (many birds and mussels) and one plant species, is certainly grim.

- James Webb Space Telescope, the largest and most powerful space telescope ever developed, was launched by NASA in December 2021 which replaced the Hubble Space Telescope





RE-THINKING HUMANS IN NORTH AMERICA- THE NEW WORLD

Nishita Singh, SZH



"Fossil footprints found in New Mexico's White Sand National Park, USA; near an ancient lake Otero dated between 21,000 to 23,000 years ago. Published in Journal Science, 23 September 2021."

The latest research shows that humans have lived in North America for at least 23,000 years during the last glacial maximum. Armed with big, creative brains and sophisticated tools, these early humans not only survived but thrived in these harsh surroundings.

These fossil footprints were recovered using practices applied in ichnological studies such as **motion (SfM) photogrammetry** creating 3D models using different computer software. There is no doubt that the gypsum-rich white sands track- markers were not humans. Track horizons are surfaces with one or more tracks on them i.e. footprints while trackways are line footprints left by a single person walking. The tracks were made by a total of 16 different people carrying on their daily life activities near paleolake Otero which is a 1600 sq mile body of water that dried up 10,000 years ago. Measured footprints were used to reconstruct stature by applying Martin's multiplier (0.15X foot length). Average foot lengths and stature indicate that these footprints are probably of teenagers, children.

Radiocarbon dating (14C) was used on macroscopic seeds from the aquatic plant *Ruppia cirrhosa* recovered from seed layers above and below the footprints to establish the age of the footprints. Uranium-series (u-series) dating of gypsum crystals were used to investigate the potential for hard water or freshwater reservoir effect. Some scientists question the reliability of the dates of the footprints as aquatic grass *Ruppia* can draw old carbon dissolved in the wetland environment that will get incorporated into their bodies resulting in old radiocarbon dates. But some scientists consider hard-water effects were minimal for these seeds during the late Pleistocene.

Calibrated 14C age ranges from 22.86 +_ 0.32 to 21.13+_ 0.25 ka with a duration interval of 1380-2875 years, and they follow a stratigraphic order.

When and how humans entered North America is still a fiercely debated topic around the world. Several pieces of evidence suggested that people first occurred in America no earlier than 13,000 years ago. But recent discoveries suggest that people were on this land earlier than archeologists previously thought!

The idea that the first Americans were highly mobile, big hunter-gatherers whose arrival was supposed to be over late Pleistocene time or Ice Age, when vast ice sheet rose, global sea levels fell over 120 meters and exposed a land bridge- **Beringia** – that connected Asia and America and provided a way for their arrival into America. A







A whole zoo of megafauna soon to become extinct roamed this land. This included American elephants, mastodon ground sloths, camels, horses. Feeding on these herbivores were huge lions, saber-toothed cats, and giant bears. A pair of massive ice sheets known as Laurentide and Cordilleran expanded to blanket Canada and the northern United States. But at the frigid depths of the most recent glacial period from 18, 000 years ago lasting until 10,000 years ago when Pleistocene came to an end and earth entered Holocene epoch, the sweeping climatic and ecological changes of North America were happening. The glaciers retreated around 12,000 years ago forming a passageway to travel into unglaciated, lower latitude North America. The Scientist has these first migrations set at 13, 000 – 16,000 years ago with the rise of **Clovis culture**, a group known for their distinctive stone tools.

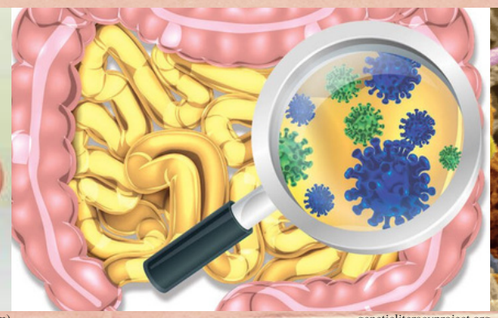
This theory was given by C. Vance Haynes which was extremely popularized.

Several sites predating the Clovis first theory began to emerge. **Mexico's chiquihuite cave** shows stone artifacts that provide new evidence dating human habitation as early as 30,000 years ago. Many pre-Clovis sites suggest that humans lived before 20,000years ago. These conclusions are very disputed and controversial. Other sites like **paisley caves** of Oregon, page-Ladson site in Florida, meadow croft rock shelter in Pennsylvania, buttermilk Creek in Texas all show pre – Clovis human settlement. Meadow croft rock shelter shows pre – Clovis inhibition dating 16,000 years ago. Paisley caves had human coprolites which mean fossilized poop dating 12,750 and 14,290 years before the present. These can also be analyzed for human DNA and compared with a modern indigenous population which helps in reconstructing the genetic history of humans in America. A new theory that has been gaining more attention is the coastal migration theory. It suggests that people originally migrated down the pacific coast into America using boats. These routes are referred to as kelp highways. There is no perfect theory.

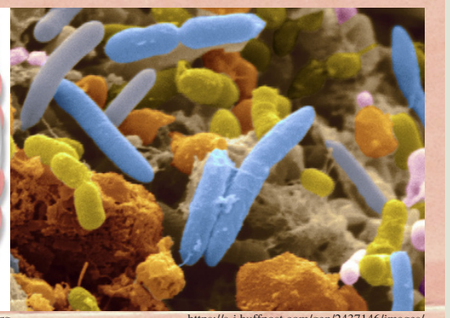
Regardless of who they were and where they came from, the first Americans were highly successful. They transformed undiscovered America into an incredible new world that changed the history of the world.



OIP.fHJaD8sBg5-9JE59deyk5gHaIg (191×220) (bing.com)



geneticliteracyproject.org



https://s-i.huffpost.com/gen/2437146/images/

EXTINCTION EVENT IN THE GUT MICROBIOTA

A LOOK INTO THE ANCIENT MICROBIOME THROUGH A PILE OF POOP

- Shubhi Agrawal
TZH

"Maybe that poop is literally gold," says geneticist Keolu Fox, University of California, when asked about the paleofeces recovered from the Turkey Pen site of Utah. As opposed to popular belief, a pile of poop may have much more to offer than just being, *well, poop.* DNA material reconstructed from these coprolites presents remarkable differences between the gut microbiome of ancient communities and the gut microbiome of modernized humans in the US and Mexico after performing DNA metagenomic analysis.

The gut microbiota contains a mass of bacteria, viruses, fungi and protozoa influencing various aspects of our health. This plentiful flora present in our gut works dutifully with every meal to facilitate digestion, benefit the immune system and confer disease resistance, among its many other values. But this plethora of micro beings may not look so rich and diverse anymore when compared to the gut composition of people living 1000 - 2000 years ago. Microbiologist Aleksander Kostic claims that the evidence provides hints at an extinction event that has taken place in the gut over the past millennium. The species that are lost can not recover.

Previous studies have attempted to create the same comparison using hunter - gatherers and herders of today in place of actual ancient evidence since non-industrialized people are more likely to be like ancient communities. The bacterial diversity of industrialized and civilized people falls short in their comparison. But it was hard to quantify the similarities between the two microbiomes. Further attempts at analyzing ancient gut microbiota couldn't be successful because of the limitation of techniques and challenges in segregating DNA from microbial DNA present in the surrounding soil. What it required was to get a look through a tunnel into the past. This is where the newly found paleofeces behind the rock shelters of Utah came in handy. *An equivalent of a time machine*, as called by biologist Justin Sonnenburg.

A team of researchers relied on radiocarbon dating of the samples stored in a museum. They further rehydrated the pieces and used them to extract longer DNA strands than before. Out of 498 genomes reconstructed, 181 genomes were ancient and associated with the human gut. They had a bit of a resemblance to the non-industrialized microbiome of today. Species linked to high-fiber diets were also present in both. Scientists obtained pieces of food that were confirmed to be maize and beans, similar to the diet intake of early North American farmers. But a stark difference between them was the absence of antibiotic markers in ancient biomes, apart from boasting much more diversity. The research team found 38% of species, unbeknownst to science, which could result from a diverse diet of the people of that period. Examples include species belonging to the genus *Catenibacterium*, *Collinsella*, *Holdemanella* and *Solobacterium*

The varied diet may have been more nutritious that could support a wide range of bacteria. Progress towards an industrialized era caused a shift in the dietary patterns of individuals, a much more reliance on a grocery-store diet. Naturally, this led to a less nutrient-rich diet, thus making it difficult to house a wide variety of bacteria. For example: Bacteria *Treponema* is not found in the modern-industrialized gut microbiome and is scarce in non-industrial lifestyles. But it was present in all the paleofeces, showing that diet may not be the only player in this extinction event. This alteration may also be a result of sanitation and antibiotics but would require further study to reach to a conclusion.

Apart from differences in diet, the ancient microbiome included fewer genes producing proteins that lead to degradation of glycans present in the mucus. This may lead to inflammation and cause diseases. Paleofeces were also found to be rich in glycogen-degrading enzymes. Other than this, a higher number of transposases were also present, which could have helped the bacteria adapt to the changing environment. A modern microbiome is likely to pose minimum changes, owing to a similar diet throughout the entire year.

Humans have evolved to live with a bounty of microbes. Several of them have a positive effect on our health. Though the impact caused by a decrease in their variety and numbers seems under-studied as of now. But the use of coprolites may have paved new ways for exploration. What is gone can not come back, but comprehensive research may lead to better health outcomes in the future, such as dealing with chronic diseases like obesity and autoimmune diseases.

PROTECTING NORTH ATLANTIC RIGHT WHALES USING VOCALIZATIONS

(By Shweta Pagariya, FZH)

Whales use sounds for communication. Mammals, such as whales and dolphins are more dependent on sound for communication and sensation than are land mammals because other senses are of limited effectiveness in water.

Sight is less effective for marine mammals, and so is smell since molecules diffuse very slowly in water as compared to air, but the speed of sound is four times greater in water than in the atmosphere. As sea mammals are so dependent on hearing to communicate and feed, environmentalists are concerned that they are being harmed by the increased ambient noise in the world's oceans caused by ships, sonar, and marine seismic surveys. The most endangered whale species is the North Atlantic Right Whale, with only 368 remaining. The decreasing numbers, low reproduction ability, and increasing human activities are responsible for their poor situation. Tracking of their numbers, migration paths, and habitat is vital to lowering the number of deaths and promoting their recovery. The Right Whales are a very good target because of their obedient nature, their surface feeding behaviors, their tendency to stay close to the surface, and their high blubber content. The North Atlantic right whales are among the most endangered whales in the world, and both species are protected in the United States by the Endangered Species Act.

One of the frequently used methods to monitor the whales is called passive acoustics technology. Whales vocalize low-frequency sounds such as moans, pulses, etc. The type of vocalization that they use to communicate with each other is referred to as an "up-call," which is a short chirp or "whoop" that lasts about two seconds only. These up-calls are narrowband vocalizations with frequency in the range of 50 to 440 Hertz, and these appear to act as signals that bring whales together.

To look at the urgency for efficient detection and monitoring in applied sciences for endangered species, certain analyses are indicating that whales and other marine species are impacted by weather change, also with the change in migration patterns and habitat. Mean detection radius can range from many tens of kilometers for a low-frequency whale call to only a few hundred meters for highly directional and ultrasonic echolocation. This mean detection radius is dependent on various factors, including source-level and frequency of the target signal, the location, directivity, and behavior of the vocalizing animal, local sound propagation conditions, and noise levels. Knowing where whales are in relation to ships is crucial for avoiding these situations, which often go unnoticed.

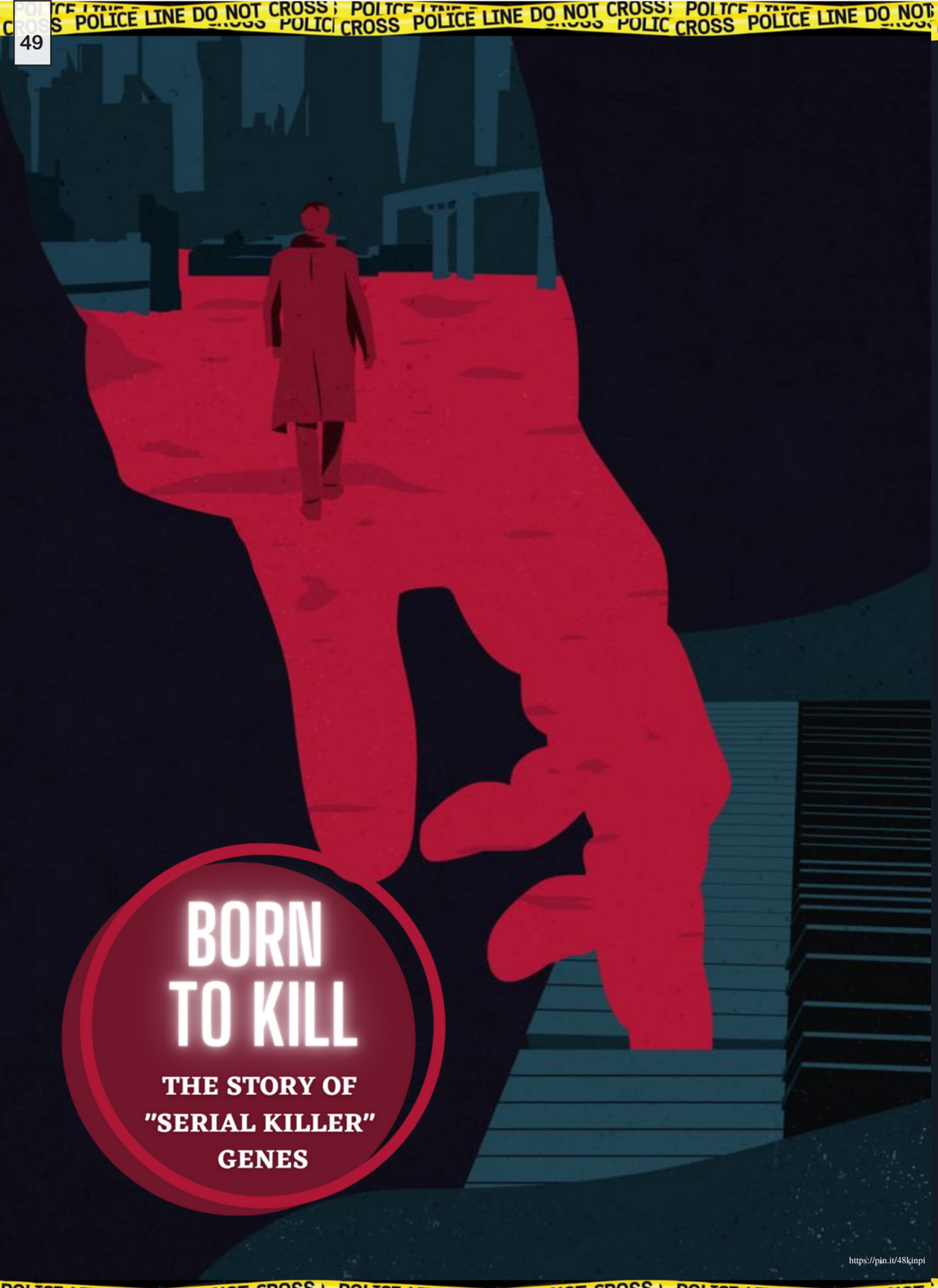
The researchers from Florida Atlantic University used Multimodal Deep Learning (MMDL) algorithms to analyze recordings and determine the presence of up-calls. This system offers a new tool to effectively monitor and assess the importance of these new behaviors in a changing ocean. Researchers have developed autonomous passive acoustic technology that offers significant advances on conventional methods used to monitor and protect endangered whales in the increasingly noisy oceans because Right Whales produce a variety of low-frequency sounds.











Home to almost 68% of the world's serial killers, the US has seen 3,024 serial killers. A serial killer is someone who kills at least three people for odd psychological reasons. The homicide activity occurs in a short period, within a key gap between them.

Three crucial ingredients that make up a recipe for a serial killer include genetic chromosomal changes, a history of child maltreatment, and changes in brain architecture patterns. The amygdala, cerebral cortex, and frontal lobe are only a few of the brain structures involved in controlling emotions, impulses, morality, and aggression. In both the front rostral prefrontal cortex and the temporal poles, sociopaths/psychopaths often have much less grey matter. Such anatomical anomalies are frequently accompanied by reduced brain activity in these important areas, resulting in exaggerated egocentric or manipulative tendencies.

Scientists discovered mutations in specific genes that are linked to a tendency of aggression. Significant anatomical changes were observed during the PET scan and MRI scan of the brain. SCL6A4 and other genes implicated in serotonin pathways have been investigated for their role in impulsivity and substance misuse. Serotonin is a neurotransmitter that has been linked to a variety of processes in the brain, including mood regulation and the firing of the amygdala in the frontal lobe. The HTR2B gene, for example, codes for one of the numerous serotonin receptors. Bevilacqua et al. discovered in 2010 that a codon in the HTR2B mRNA that marked the end of translation (commonly known as the stop codon) was linked to substance misuse and committing impulsive crimes such as homicide and arson risk increase. However, no conclusions could be drawn about whether the gene caused a predisposition to substance abuse, which then led to impulsive, criminal behavior, or whether it caused a predisposition to impulsivity, which then led to a cascade of substance abuse and criminal behavior — a problem known as "direction of causality."

And then we also have the MAOA gene, our star-player, popularly known as the 'warrior' gene produces the enzyme monoamine oxidase-A, which is involved in the breakdown of neurotransmitters like serotonin. Individuals with MAOA gene mutations linked to a poor dopamine turnover rate have been proven to be more aggressive than their peers. The MAOA gene produces the monoamine oxidase-A enzyme, which is involved in the breakdown of neurotransmitters like serotonin. Individuals with MAOA gene mutations linked to a poor dopamine turnover rate have been proven more aggressive than their peers. A mutation in the CDH13 gene (which has previously been linked to ADHD and alcoholism) has also been attributed to showing socially undesirable behaviors. Predictably, criminals who show both the mutations are more likely to be violent repeat offenders.

According to the author and historian Peter Vronsky, some times in American history were ideal for establishing the foundation — and the terrible childhoods — of future serial killers. There was World War II after World War I, and the Great Depression turned American life upside down. There were a few things that happened around the war years that contributed to America's golden age of serial killers, starting with a phenomenon that was a repeat of what happened during World War I: men with untreated mental illness returning from the war to try to start a family while dealing with everything they'd seen and done — alone.

Neuroscience breakthroughs are changing the way criminals are prosecuted in court. Brain scans and DNA testing have revealed fresh details on how some criminals differ from law-abiding citizens. Brain and genetic differences may predispose them to aggression. While I am not sure if there is a correct answer to the topic of how much genetics should be factored into our legal system, it should not stop us from arguing the pros and cons. Facilitating discourse, discussion, and more research into the genesis and intricate interplay of human behaviors in the context of our social systems will be critical to our advancement as a species as contemporary civilization advances.

- Ritika Semwal
TZH

SOUTH



AMERICA



- **South America is the fourth-largest continent in the World. It extends from the Gulf of Darién in the northwest to the archipelago of Tierra del Fuego in the south.**
- **South America is a land of extremities. On one hand, it houses The Amazon river-the World's largest river, and on the other hand, it is also home to the World's driest region- the Atacama Desert.**
- **Brazil is responsible for the greater part of the amazon forest, which regulate the climate and provides rain to much of the climate and provides rain to much of South America. It was a world leader in satellite monitoring of land use change, in situ biodiversity monitoring, reduction in tropical rainforest deforestation, protection of indigenous land and a model for other developing nation.**
- **In many of the wettest parts of Amazon Rainforest , photosynthesis and biomass tend to increase with increased atmospheric dryness, despite the associated reductions in canopy conductance to CO2.**
- **Some of the endangered species of South America include Glaucous macaw, Blue-throated macaw, White-bellied spider monkey, Carabaya stubfoot toad, San Martin titi monkey, Amazon giant glass frog, Rio Branco antbird, Belem curassow, Orinoco crocodile, etc.**
- **Some endemic species of this region include The Maned Wolf- Long Legged , Peaceful Spix's Macaw (The Rarest Of it's Species), Lion Monkeys (The Unique Inhabitants Of The Atlantic Rainforest), Pato Mergulhao (Ambassador Of The Clear Rivers), The Poison Frog (*Aparasphenodon Brunoi*), The Tucano (Toco In The Savannah Of Brazil), Tufted Monkey's (The Perfect Roommate).**
- **The South America low level jet [SALLT] is a climatological feature with a critical role in the spatiotemporal distribution of precipitation in South America.**







COLUMBIAN EXCHANGE OF DISEASES

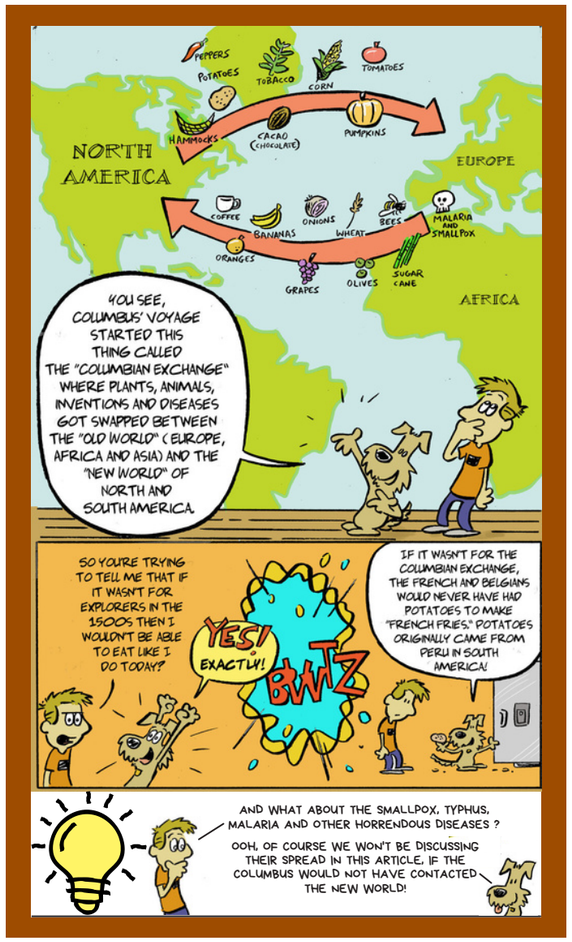
Columbus (along with his team) was the first Old World (Afro-Eurasia) contact with the New World (Caribbean, Central America, and South America). His expedition made landfall in America on one of the islands now known as Cuba and Hispaniola. He then made subsequent expeditions to explore America more. He named the indigenous people he encountered Indians. With his expeditions, a whole new period had started that laid the foundation of the modern New World.

Columbian Exchange was the global exchange of spices, knowledge, commodities, plants, animals, technology, and most importantly, diseases between the New World and Old World. All Old World infectious diseases like smallpox, measles, whooping cough, chickenpox, bubonic plague, typhus, influenza, scarlet fever, tuberculosis, diphtheria, and sexually transmitted diseases were introduced. Initially, the spread of diseases was slow because the Europeans were not actively or visibly infected due to the inherited immunity after centuries of exposure in Europe. Europeans carried these diseases in a dormant state, were infected but asymptomatic, or had mild symptoms. Because indigenous populations had no previous contact with Old World diseases, they were immunologically defenseless. This disadvantage had a terrible impact and devastated their population. It is estimated that in the first centuries of European colonization, about 80%-90% of the indigenous population diminished. Colonist violence towards indigenous accelerated the loss of lives.

Since there were numerous outbreaks at once in the same population, they were not properly recorded. Many epidemics with multiple infections overlapped, making it difficult to know the exact cause of mortality. Because indigenous societies were not used to these infections, they also didn't have the medical infrastructure to care for the sick as the Europeans did. Smallpox was one of the main diseases that caused widespread mortality resulting in sweeping epidemics and constantly affecting the same tribes. Four different epidemics broke out among the Plain tribes between 1837-1890. After learning of 'white man diseases,' they avoided contact and traded goods with Europeans. It killed from one-third to half of the native population of Hispaniola in 1518, which was the first well-documented epidemic after the Columbian exchange and soon spread to Mexico, killing millions of natives.

Before the Columbian exchange, the New World was not disease-free and pristine. Syphilis was one of the few but the most famous diseases that spread from the New World to the Old World. It was spread by Columbus and his crew, who acquired it through natives of Hispaniola through sexual contact. Upon returning to Spain, they exposed the local prostitute population to this, which amplified disease transmission. Within five years of arrival, the disease was epidemic in Europe. The first documented outbreak was noted in 1495 in France. It may have been transmitted from Spanish mercenaries serving King Charles.

- SUPRIYA SINGH, SZH



ALPACAS

A FUTURE WEAPON AGAINST CORONAVIRUS

SONIYA, SZH



AMAZON FIRES

IS THIS A WAKE-UP CALL?

- Anushka Puri, SZH

With the advent of agriculture since the Neolithic period, human action has generated fires that, as long as they are regulated, maintain agricultural activity, while natural flames keep the environment in balance. However, this practice has lately become the focus of political, social, and economic debate, as the images and footage of the flames sweeping through the Amazon rainforest captured the world's attention on August 10th, 2019. Fires were seen blazing on fields where the forest had already been removed for agriculture.
The Amazon is known as Earth's "lungs" because its vast rainforests release oxygen and store carbon dioxide, a heat-trapping gas that is a contributor to global warming.

Did these fires occur naturally or by climate change, or was it caused by human actions?

No, Fires do not occur naturally in the Amazon rainforest. These fires were not even caused by climate change, according to a study published in the peer-reviewed journal Ecohydrology led by University of Kansas researcher Gabriel de Oliveira, the Amazon fires were set on purpose by farmers and ranchers to convert forest into land suitable for crops or animal slaughterhouses. Climate change, on the other hand, has the potential to aggravate fires. Trees are vulnerable because they can store carbon dioxide, which is otherwise wasted when they are burned. Furthermore, burning trees releases more carbon into the atmosphere.

How do these fires affect wildlife?

Amazon rainforests shelters some of the world's most fascinating flora and creatures, from pond-hopping poison frogs to spotted jaguars slinking around in the dark of night. According to the World Wildlife Fund, it is home to 10% of the world's species and around 2.5 million bug species scurrying through the leaf litter. According to National Geographic, it has over 1,300 bird species, 3,000 fish species, and 430 animal species.
Because the rainforest burns slowly, big mobile animals have plenty of time to leave, such as by burrowing, going to water, or relocating to other places. Most animals can't just go into another's area without repercussions, whether it's due to a competitor's aggressiveness or a shortage of resources like food and shelter. In 2019, fires ravaged the habitat of the Mura's saddleback tamarin, a newly identified species. Litter-dwelling invertebrates, several birds, small mammals, and snakes are among the animals that are usually killed by fires."

Amazon burns, and so do plants.

The Amazon rainforest is home to about 40,000 different plant species. Because fire is such a novel element in the Amazon, the forest and the species within it have not developed to survive it. Tropical trees don't have the thick bark that hat temperate fire-adapted species like sequoias and pines do. Seeds that are exposed to high temperatures in the soil may lose their capacity to germinate.

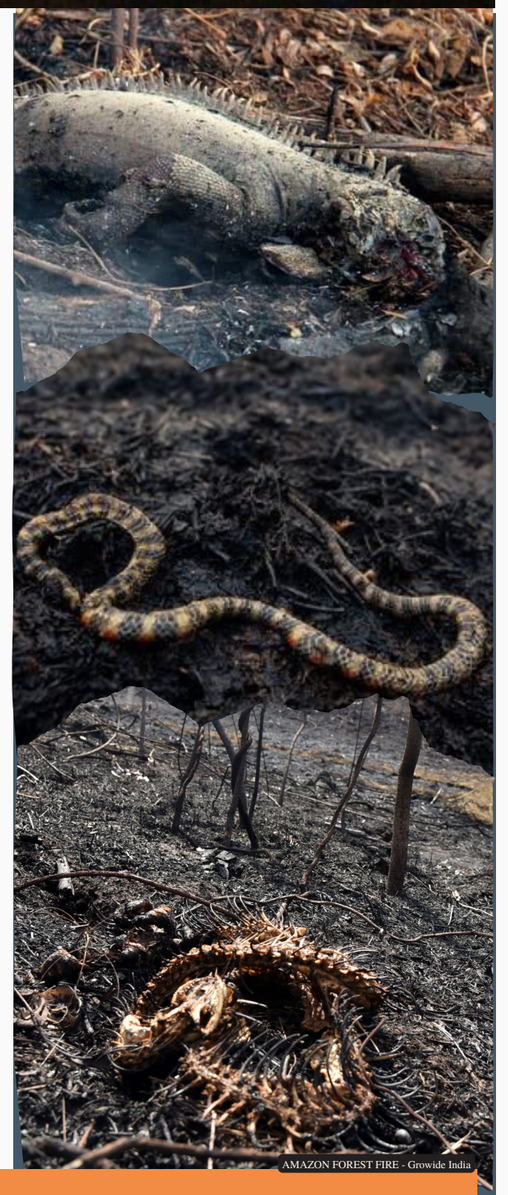
While larger trees may not be destroyed right once, fire damage to a trunk might result in a fatal wound, enabling pathogens to enter. After that, it takes years for these trees to perish. However, when they succumb, they open up the canopy, making the remaining trees more vulnerable to wind storms. When giant trees fall, the dark rainforest understory is exposed, posing a serious threat to the biota that has developed in the shadow.

How do these fires affect local public health?

The Amazon rainforest fires constitute a large-scale exposure to air pollution, lasting 3 to 5 months on average, with particulate matter (PM) concentrations reaching from 400 to 600 g/m3, surpassing the WHO's recommended concentration guidelines by 8 to 12 times. Burning biomass generates a substantial number of polluting particles, the most prominent of which is particulate matter, which has a high potential for direct effect on the respiratory system, particularly in vulnerable groups such as children, the elderly, and individuals with lung or heart disease.

Is it too late?

Some experts believe the Amazon is approaching a tipping point when precipitation begins to decline. If enough rainforest is destroyed and cannot be recovered, the region will become a savanna, which stores less carbon and so reduces the earth's natural "lung capacity."The loss of wildlife, deteriorating local population health, particularly respiratory difficulties, and psychological illnesses have all been exacerbated by the Amazon Rainforest fires. This is a wake-up call for us to improve forest fire monitoring and prevention, both for the preservation of local fauna and flora and the potential repercussions on the population's health.



AMAZON FOREST FIRE - Growide India



INTOXICATING KEEPERS

Dreaming of deliciously sweet dandelions
But filling up senses, is the ash from the rainforest fire.
The melody merges with the cries,
Of souls being burnt alive
The fire rises
And the music to drown the deaths is on the climb.
Speakers, stadiums, cinemas are alive
Thrive
Blinding, beloved as the cure
The river passed away an hour ago
Soon the trees follow
And now the birds, beasts, bewitched
Hollowed, howled
But were drowned by the clouded cheers
“Love me” if anybody around me appears to hear me
Whispered the rainforest to me

- Ranjanee Aron, SZH



CLUES TO MARS' LIFE ON EARTH'S ATACAMA DESERT

~Dhwani Goel, FZH

Is life possible on planet Mars? This is the most intriguing question for scientists these days. Many theories are published, many have been disregarded. One of these is known to be “Clues to Mars life on Earth's Atacama Desert." It is a desert plateau located in South America, Chile. It is the oldest desert on earth. Some Scientists have noticed that the inner core of the desert has been hyperarid for roughly 15 million years and is largely devoid of plant and animal life. Therefore, scientists hope that studying the dry, dusty conditions of Atacama will reveal secrets about the key to life on Mars. As said by Henry Sun, an astrobiologist at the Desert Research Institute in Las Vegas, Nevada, “It is not the biology that makes scientists eager to study the Atacama Desert, it’s the lack of biology."

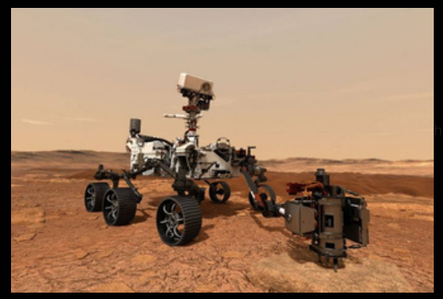
Mars is dry, dusty, and desolate. It shares many similarities with the earth’s Atacama Desert. In the Atacama Desert, the Yungay region is a well-known Martian analog. Scientists have been studying this earthly region for years to find clues to possible microbial life on Mars, either now or in the past.

Researchers at Cornell University and Spain’s Centro de Astrobiologia have announced new findings that could have implications for microbial life on Mars, the red planet. The researchers have found that microorganisms thrive in the clay-rich, shallow soil layers in the Atacama Desert. This might imply that microbes, either living or fossils, could be found in similar clay layers on Mars. According to the reports, the surface of the soil in the Atacama is extremely dry, but there is a layer of wet clay about a foot below. That clay is home to microbes, protected from the harsh conditions above. The researchers suggest that something similar may have occurred billions of years ago, or it still may be occurring- on Mars. If microbes still exist today on the red planet, the latest possible Martian life may be resting there.

In addition, the researchers have found at least 30 previously unknown salt-loving species of archaea bacteria and biosignatures of cyanobacterium, which supports the idea of primary carbon fixation.

If any of the microbes or their remaining parts are present in such shallow clay layers on Mars, then they could easily be detected by rovers. However, two new rovers will be sent to Mars to search for possible biosignatures; NASA’s “perseverance” which already landed in February 2021, and ESA’s “Rosalind Franklin,” which will land in 2023. Both the rovers will examine the clay layers of Mars.

Although the exact environmental conditions are largely unknown, similarities in mineralogy and soil of the Yungay region and Martian terrains indicate similar conditions of Atacama Desert and Mars. Scientists concluded that the discovery of such a vibrant ecosystem of microbial life in one of the most inhospitable places on earth provides clues about how and where to search for life on Mars.



Artist’s illustration of the Perseverance rover on Mars. It will land in Jezero Crater, which contains ancient lake sediments and clays that could hold hold evidence of ancient life. Image via NASA/ JPL-Caltech.

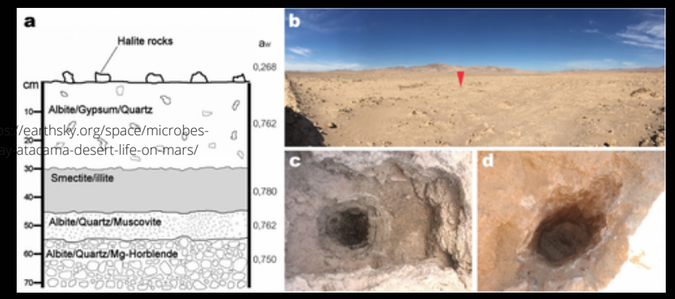


Diagram of soil layers and photos of the pits dug for samples in the Atacama Desert. Image via Azua-Bustos et al./ CC BY 4.0.

https://earthsky.org/space/microbes-clay-atacama-desert-life-on-mars/

AROUND THE WORLD



Scientific Breakthroughs



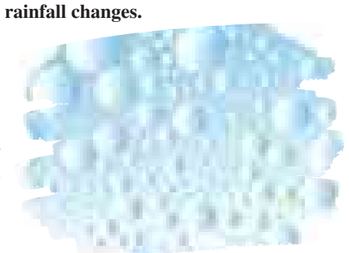
Tuskless elephants (Photo: AP)

Humans may affect animal evolution

Human activities may be having an impact on how animals evolve or have been evolving. Poaching of African elephants for their tusks observed an increase in the population of tuskless African elephants. Apart from this, humans also affect the evolution of mammals indirectly. Recent studies have found that animals are changing their body shape as a result of climate change. Bigger wings can be seen in bats and longer ears in the case of rabbits. Around 77 species living in the dense forest of Amazon showed longer wings as well. These changes are mainly being attributed to the rising temperatures and rainfall changes.

Glass Nanobots Absorb Toxins

A nanobot developed from glass is being employed to absorb pollutants from contaminated water. It's working is similar to a sponge. Sponges bind contaminants and expand in size but unlike sponges, nanoparticles do not absorb water. This new technology can be very useful in decontaminating petroleum spills and other precarious chemicals from water channels.



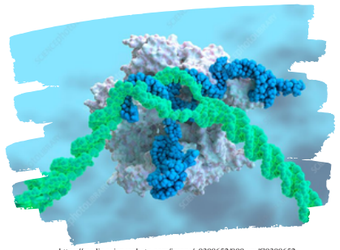
https://th.bing.com/th/id/OIP.W2S1rzNEkKXSxXCEZuSD6gHaHQ?w=100&h=98&c=7&r=0&o=5&pid=1.7



https://cdn.newsapi.com.au/image/v1/a9f8b7ac290b40f64a0630c39067969c?width=320

Development of artificial titanium heart

BiVACOR, an artificial titanium heart, has been developed by an Australian research team. It works on the principle of spinning disc technology. The working is different from that of a real heart. A circular pump is suspended between the magnets in this designed heart which aims to employ a better mechanism to pump blood across the body. So far, the testing has only been done on animals and human trials are awaited.



https://media.sciencephoto.com/image/c0308652/800wm/C0308652-CRISPR-Cas9_gene_editing_complex_, illustration.jpg

CRISPR -Cas9 Technology

CRISPR-Cas9 technology was first used in humans to correct genetic predisposition to blindness. Effective treatment for bone cancer in dogs is used by immunotherapy researchers who are conducting research trials on human brain cancer. A recent development has taken place in case of gene editing. (June 2021) CRISPR- Cas9 gene editor was injected directly into the bloodstream of the patient suffering from transthyretin amyloidosis. The treatment turned out tk be successful.

Building Human Organs

What was once considered science fiction has turned reality! The latest invention of a bioprinter has made it possible to print 3D organs and the credit goes to Oganovo, a company based in San Diego, California. This biotool, a product of partnership between Oganovo and Invetech has managed to grow blood vessels and is expected to construct arteries within 5 years.



https://d.ibtimes.co.uk/en/full/1446651/3d-bioprinting-human-tissue-organovo.jpg



Image credit: Netherlands Cancer Institute.

Tubarial glands

A new tiny organ has been recently discovered accidentally in the human body. They are located in the upper region of the throat. Scientists believe that they play a role in lubricating and moistening the oropharynx and nasopharynx regions.

- Shubhi Agrawal, TZH
Abhijeet, FZH

A DIVE IN THE DEPTHS

- Tanya Goel, SZH

To go beyond and find the truths about what lies in the deep oceans, one has to leave the comfort of their shores and islands.

It is a well-known fact that Earth has her numerous extraordinary phenomena from the mountain ranges to terrains, plains and even the oceans. But the peculiarities just keep on increasing as one starts going deep into the waters. The organisms that thrive in the bottom look like they came straight out of the movie 'Aliens v/s Predators' because a normal person like you and me wouldn't be able to differentiate whether that organism is a realistic creature or just some computerised soul or an alien which came from another planet.

So, I suggest you all to buckle up as it's going to be bumpy ride while diving into the wonderland of these magnificent oceans for learning about those fascinating animals.

It is believed that till now only two percent of our oceans have been discovered and only this two percent has such mind blowing and unbelievable animals so what would happen when all of the oceans' mysteries would unravel. When that happens, the Earth would absolutely be a different place as we know her today.

Northern Stargazer



https://earthlingnature.wordpress.com/2021/05/14/friday

For all the Egypt-Mummy devotees, this fish is a must know. As the name suggests, Northern stargazers actually look like they are gazing up at he stars of the North Pole with both of its eyes on top of the flat forehead. With white spots all over its black brownish body, it gives an appearance of a dead walking mummy which came straight from its grave without the white bands.

Its flat body with brownish texture helps the fish to ambush prey by burying deep in the sand and camouflaging itself.

Pelican Eel

Think how weird it is when a fish living deep in the ocean is rarely spotted by humans but is often seen being caught in fishing nets. Well, it's a possibility and the Pelican Eel is one of them. If you're thinking that since this eel has a name of pelican then it ought to have some relation with pelicans. Rightly guessed, it does but not blood relations though! It has a pouch-like lower jaw which gives it the impression of a pelican. The lower jaw being hinged at the base of the head with no body mass, makes its head look unreasonably large. A mesmerizing trick shown by this eel is that it can devour a prey twice its size.



https://images.app.goo.gl/SBoyAYNcnacV9E3A9

Fangtooth



https://images.app.goo.gl/CtpR6tfLYYAZ7Jdc8

The pelagic fangtooth are found as far as 5,000m or 16,000 ft down in the tropical and temperate waters of eastern and western Atlantic Ocean, Indian Ocean and Pacific Ocean and they are included with the deepest-living fish.

According to BBC's 'Blue Planet', fangtooth has the largest teeth of all animals of the ocean. The teeth are proportionate to its body size and are so enormous that the fish is unable to close its mouth.

And an amazing feature of this fish is its glowing nature!

Tomopteris Worm

Whenever we hear or see the word 'worm', creepy crawlies slimy things come into our minds which are not fun to look at, but Tomopteris Worms are these magnificent shiny blue abyssal polychaetes that never touch the seafloor. One of the most fascinating features of these segmented worms is that they exhibit yellow bioluminescent mucus that is atypical in the deep sea and scientists are still figuring out why these worms show this extraordinary phenomenon.

Fun Fact – Tomopteris don't actually crawl, but it seems like they're finding their ways and moving forward while dancing!



https://images.app.goo.gl/QTPC6mTqkBX47xSx5

Blood Belly Comb Jelly



https://www.montereybayaquarium.org/animals/animals-a

Just as the name suggest, this comb jelly has a bloody belly which disguises a prey inside to draw other preys towards it. Even though this comb jelly is so brightly coloured but, in its habitat, it is 'invisible' to predators as in the deep sea, these appear to be dark and they blend in the background. These are found at the depths of 800m to 1120m with their range spreading from California to Canada to Japan. These fairy lights that make the comb jellies so shiny and shimmery are nothing but hair-like cilia which helps the jellies to move forward!

Blobfish

This underwater grumpy fish, Blobfish is found in the deep waters of Australia, Tasmania, and New Zealand at depths of 600 to 1200 m (2000-3900 ft). Its flattened and broad head with large and widely separated eyes gives it a look of blob, something that is shapeless thus, its name Blobfish. As strange this fish looks, its egg laying is also a strange action. Blobs are known to fan their eggs after laying them to keep them free of sand which is reported as an unusual behaviour for deep water fishes who are more neglectful in terms of parenting the offspring.

Sea pens, crustaceans, sea cucumbers, gastropod molluscs are prey to this creature while this fish itself serves as a host to skin parasites of copepods *Chondracanthus yanezi*.



https://images.app.goo.gl/uKVZb2dW9YPWC8Jf7

Phronima Amphipod



https://images.app.goo.gl/UG2zT3VXh2ah1KKd8

This amphipods' behaviour is not as simple as its name. On the contrary, it is somewhat very peculiar and weird. These amphipods have a transparent body and their correct name is 'Parasitiods' as they act as parasites to Salps. Rather than continuously feeding on the host, the female phronimas attack the salps, using their mouths and claws they hollow out the gelatinous shells of Slaps, and then use these shells to lay their eggs and take care of their new ones! Scary right? Well, this strange activity ought to be found someplace specific? But they are found at depths of 800m in every ocean except for Polar Regions.

Fun Fact – The movie 'Aliens' was inspired by Phronima Amphipod!

Strawberry squid

Everyone one of us is pretty familiar with the vampire squid and we know that it doesn't suck blood or is not a vampire. Similarly, the strawberry squid doesn't eat strawberries but the dots that are present on its surface or body, gives it the look of Strawberries!

Another curious feature of this squid is that it has asymmetrical eyes. Yellowish, large, tubular eye towards the surface helps the squid spy the shadow of its prey against the dimly lit waters. Another blue eye being half the size of yellow one looks downward for glimmers of light.



https://www.whoi.edu/multimedia/a-pop-of-red-in-the

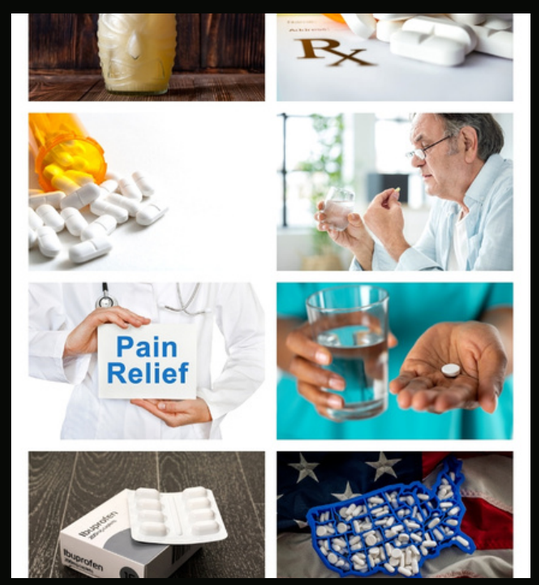


Dominik Mischkowski

"Empathy is seeing with the eyes of another, listening with ears of others and feeling with the heart of another." – Alfred Adler

Empathy is the ability to sense, relate and understand others' emotions. People are usually conscious of their own emotions and feelings, but picturing themselves in someone else's position and feeling for them might be a little hard. The act of putting ourselves in another man's shoes and walking an extra mile allows us to sympathize with others.





DO PAINKILLERS MAKE US LESS EMPATHIC?

SUPRIYA SINGH , SZH

Empathy is a really important ability for us to function as a society because we, humans, are social beings. It helps us to fabricate social connections and these social connections are necessary for a person's psychological well- being. This ability played a crucial role in our evolution because we needed to be sensitive to the needs of our offspring, and our ancestors performed better in groups. This ability increased over time as our ancestors learned that working in groups was essential for survival.

Now skipping over to the modern times where we still interact in groups like in the workplace, we spend endless hours in the office, devoting our time to our work so much so that we often ignore ourselves mentally and physically. Whenever feeling slight pain or discomfort, we immediately take a painkiller and go back to work without giving our body enough rest. Doctors are warning that we are taking medication far too often, which could have an adverse effect on our bodies.





Paracetamol, also known as acetaminophen, is an active ingredient in Tylenol, the most popular painkiller used in the U.S. It is used to treat mild pain and also fever.

In 2016, Mischkowski et. al conducted an experiment where they gathered 76 participants for experiment 1 and 107 participants for experiment 2. These participants were randomly assigned to consume liquid containing 1000mg of acetaminophen or a placebo. Participants were only told that they would consume a liquid containing acetaminophen or a placebo. Both participants and experimenters were blind to drug conditions.

In experiment 1, participants were subjected to empathy scenarios where participants rated eight short scenarios describing protagonists experiencing different physical pain or social pain. The order of scenarios was randomized for each participant. After that, participants were asked to rate the pain of each protagonist from 1 to 5. In experiment 2, participants were subjected to empathy scenarios followed by noise pain where participants endured four blasts of 2s white noise randomly through headphones, then they were asked to rate each blast on a scale of 1-10. After the noise pain test, participants watched two other participants cast out a third participant in a Cyberball computer game. Then they were asked to rate perceived pain on a scale of 1 to 5 for each player.

In these experiments, Mischkowski et. al saw that the acetaminophen takers had less activation in the anterior insula and the anterior cingulate cortex, which are related to empathy, emotional awareness, and motivation.

With people being less empathic in recent times, a steep rise in narcissism among the younger generations can also be seen. This is making people more lonely now than ever because like mentioned before humans are social animals and we work best in groups. Scientists are hoping that we as a society will again reclaim this basic survival skill soon.

Zoonotic diseases

- Tanvi and Ayushi Sinha

The World Health Organization (WHO) has defined **Zoonotic diseases** as those diseases and infections which are naturally transmitted between some vertebrate animals and humans. These zoonotic diseases can be classified further into 5 types such as (i) **Viral** - rabies (ii) **Bacterial**- Anthrax (iii) **Rickettsial**- tick typhus (iv) **Protozoal** -toxoplasmosis and (v) **Fungal** - cryptococcus etc.

Zoonotic diseases are caused by viruses, bacteria, parasites, and fungi, and these can cause many different illnesses or diseases in humans and animals ranging from mild to serious. They can even be fatal in some cases. Nowadays, every house in the world has a pet animal, facilitating easier transmission of the disease. People may touch their pets regularly or come in contact with their saliva. Scratches made by animals may even prove to be infectious.

Some of the major public health zoonotic diseases in India include Rabies, Brucellosis, Toxoplasmosis, Cysticercosis, Echinococcosis, Japanese Encephalitis (JE), Plague, Leptospirosis, Scrub typhus, Nipah, Trypanosomiasis, Kyasanur forest disease (KFD), and Crimean-Congo hemorrhagic fever.

The latest addition to the list of Zoonotic Diseases is **COVID-19**. **Coronavirus disease 2019** (COVID-19), discovered in December 2019 in Wuhan, China, is caused by a virus named **SARS-CoV-2**. It is part of the coronavirus family, which includes common viruses that cause a variety of ailments from headache and cold to more severe diseases like severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS).

As genetic changes to the virus happen over time, the SARS-CoV-2 virus began to form genetic lineages referred to as "variants," sometimes having different attributes that change how fast the virus spreads, the severity of illness it causes, or the effectiveness of treatments against it.

Like many other respiratory viruses, coronaviruses spread quickly through droplets that you project out of your mouth or nose when you breathe, cough, sneeze, or speak. It most often causes respiratory symptoms that can feel very much like a cold, flu, or pneumonia and may attack your lungs, respiratory system, and other parts of your body.

ALL VARIANTS TILL DATE

WHO label	Pango lineage	GISAID clade	Nextstrain clade	Additional amino acid changes monitored°	Earliest documented	Date of designation
Alpha	B.1.1.7	GRY	20I (V1)	+S:484K +S:452R	United Kingdom, Sep-2020	18-Dec-2020
Beta	B.1.351	GH/501Y.V2	20H (V2)	+S:L18F	South Africa, May-2020	18-Dec-2020
Gamma	P.1	GR/501Y.V3	20J (V3)	+S:681H	Brazil, Nov-2020	11-Jan-2021
Delta	B.1.617.2	GK	21A, 21I, 21J	+S:417N +S:484K	India, Oct-2020	VOI: 4-Apr-2021 VOC: 11-May-2021
Omicron*	B.1.1.529	GRA	21K, 21L 21M	+S:R346K	Multiple countries, Nov-2021	VUM: 24-Nov-2021 VOC: 26-Nov-2

The impact of zoonotic diseases on human health is evident with the current global pandemic. There can be many factors leading to the emergence of zoonotic disease in the human population. Humans and animals reside in close vicinity of each other. There need to be interventions that can promote safe rearing and breeding practices. After the recent pandemic, the prime focus of health authorities should be to facilitate early diagnosis and treatment to prevent such a major outbreak in the future.

A PHYLOGENETIC ENIGMA, SZH

FLATFISH

- ANUVRINDA SHARMA



> “
> In all things of nature there is something marvelous
> ”
> - Aristotle

“In all things of nature there is something marvelous”- Aristotle

Flatfish, a genus of pieces, following a cosmopolitan distribution, are not exactly regarded as marvelous, that is when spoken about the fish in itself and not the dish cooked up by our chefs, but on the other hand, this genus of fish holds its position as the only group of pieces that exhibits an asymmetrical body plan.

The genus Pleuronectes homes more than 400 species of flatfish, each being special in their own ways. It holds a great market and are very well suited for land-based farming as they can be grown in a variety of tank types. Few have also been observed to show positive rearing results, including the European turbot and Atlantic halibut, which can be reared at very high densities. Over-rearing and overfishing have also led to a massive decline in their population affecting them genetically and in numbers.

Culturally speaking, in Jewish tradition and their legends, flatfish, also known as Moses’s fish, were believed to be split in half when the prophet separated the waters of the Dead Sea. Another belief stands stating that, distracted, the prophet burnt them on one side while cooking them. In other verses, it is believed that St. Peter was burned by the flatfish. Further, in Roman beliefs, the sole was also referred to as the ‘sole of Jupiter’ owing to its shape.

Flatfish are characterized due to their asymmetrical skull wherein; both their eyes are present on one side of their head owing to an incomplete orbital migration. In many species of Pleuronectiform, larva don’t attain the attain the name “flatfish” until they morph into adults due to their symmetrical body structure. As they advance in their development, specifically, when they lose the swim bladder, they undergo a surge of morphological shifts and changes, contorting them into a seemingly strange animal. Major modifications that occur are, a complete sideways-oriented flattening of their body, along with a pigmented and developed upper side and an asymmetrical skull wherein the two eyes are together and inclined with respect to the twisted mouth. Further, as far as fins are concerned, they have a less developed, whitish lower side. Thus, they are very well adapted to a way of life as adults in the depths of the ocean, owing to the unique structural morphogenesis they undergo, allowing them to move, feed and defend themselves adequately in their natural environment.

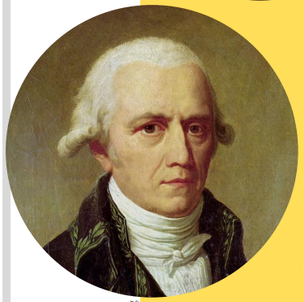
This morphogenesis is also responsible for rousing debate on their incomprehensible phylogenetic lineage due to the absence of a link connecting them to their symmetrical relatives. To provide answers for the same, many recent fossil discoveries helped answer recurring questions about flatfish evolution

Scientific theories attributed to this animal’s phylogenesis were given by many scientists, each with a different approach and perspective. It started with Lamarck, who proclaimed that fish, owing to their ‘need’ to be ever vigilant to their surroundings, experienced an alteration in their body plan. He stated that the use and disuse of some organs, like the eyes and ventral-fins, respectively, in response to their bodily adaptations, could have led to their unique arrangement. Subsequently, about fifty years later, Darwin partly acclaimed this explanation in his ‘The Origin of Species’ with a certain push towards natura selection. He stated that the accumulation of unconstrained variations towards asymmetry, in initially symmetrical and progressive fish, could have been a causative factor in structural architecture of the flatfish. In the coming years, these ‘gradualist’ theories were criticized by many, including St. George Mivart, who argued that inchoate transformations leading to asymmetry, would be detrimental for the animal rather than being categorized as beneficial. He explained the same stating that an intermediate eye position, that places itself between symmetry and asymmetry, would not prevent the possibility of it rubbing against the background and would also not be of much visual assistance to maintain vigilance. Thus, the embers of this controversy remained very much up in the air. Further, Richard Goldschmidt, a geneticist in 1933, argued that flatfish were a perfect portrayal of what he called “hopeful monsters” owing to the genealogical mutations leading to a morphological alteration in their developmental stages, resulting in adults giving rise to contrasting larval forms.

Due to groundbreaking planetological discoveries, we have a much clearer picture of the flatfish phylogenetic tree. Recent paleontological discoveries include fossil flatfish from 45 million years ago, showing intermediate morphological characters, i.e., in intermediate positions between symmetrical and symmetrical arrangement. This concluded that, that such



St. George Jackson Mivart

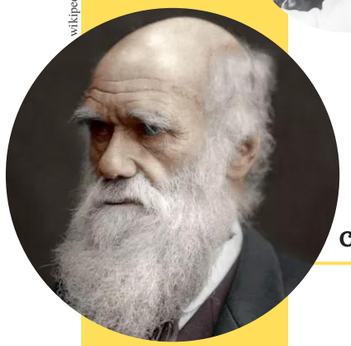


Jean-Baptiste Lamarck

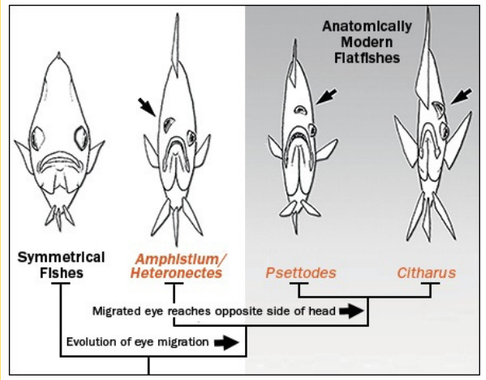


Richard Goldschmidt

wikipedia.org



Charles Robert Darwin



This image illustrates the simplified family tree showing the gradual evolution of flatfish eye asymmetry.

forms were viable and, that the process of evolution from symmetry to asymmetry went through intermediate stages and thus, wasn’t abrupt. Conversely, comparative anatomical studies carried out on the asymmetry of the different species of flatfish, and their phylogenetic construction has also made it possible to study the origin of the asymmetry in greater depth. We are all very well versed with the fact that not all flatfish species are equally asymmetrical. Some are ‘twisted’ to the right side, e.g., common sole or flounder, and others to the left side, e.g.-turbot. There are also species, like The Senegalese sole, whose individual specimens display polymorphism, i.e., most specimens are right orientated and few are orientated the opposite way. The roots of the flatfish evolutionary tree have been claimed by the Thornback turbot species, being the oldest species currently existing and portraying an equal frequency of dextrose and sinistrorsal specimens. Further, they are also the species of flatfish with the least level of asymmetry. Thus, the discovery of this species helped conjugate the theory wherein the appearance of early asymmetry was believed to be due to environmental constraints and variations, i.e., as an adaptation and, subsequently this characteristic was passed down genetically to other species putting flatfish of today in the category of ‘asymmetrical fish’.

On similar lines, recent research carried out on Amphistium and the new genus Heteronectes, both being genus of spiny-finned fish living in the Eocene epoch of Europe, are believed to be the most primitive pleuronectiforms known. This was based on the observation the orbital region of the skull exhibited strong asymmetricity but also retained primitive characteristics of unknown extant forms. The most remarkable feature in both Ampistium and Heteronectes was that post-metamorphic individuals showed incomplete post-orbital migration., eyes remained on both sides of the head and thus, these genera took their place as an intermediate between living Pleuronectiforms and other symmetrical fish. This also helped strengthen the fact that flatfish evolution was gradual in nature.

Thus, while Flatfish phylogeny still holds a debatable position in the scientific community, yet it serves us with natures proportion of absurd and amazing, and proves how evolutionary cascades over time led to the intricate construction of the phylogenetic tree which till date homes many undiscovered links that could help us delve further into the insatiable world of Pleuronectes.

RANK HOLDERS

1



Akansha Saxena

THIRD YEAR

2



Amit Bhatt

THIRD YEAR

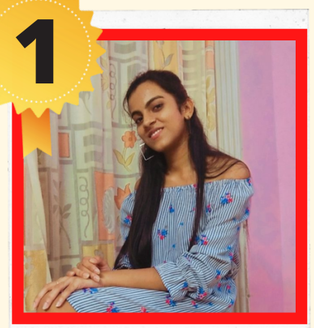
3



Nirmegh Basu

THIRD YEAR

1



Chandni Mysa

SECOND YEAR

2



Garima Sachan

SECOND YEAR

2



Palak

SECOND YEAR

1



Tanya Goel

FIRST YEAR

1



Muskaan sharma

FIRST YEAR

2



Preetika Sinha

FIRST YEAR

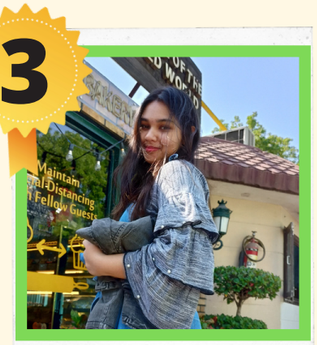
2



Shubhi Agrawal

SECOND YEAR

3



Ishita Anand

SECOND YEAR

3



Muskan

SECOND YEAR

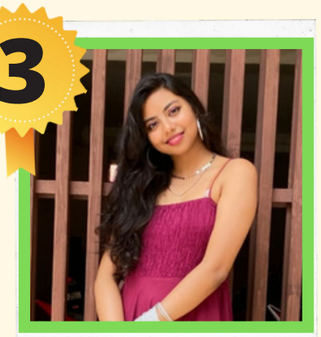
2



Gaurav Dutta

FIRST YEAR

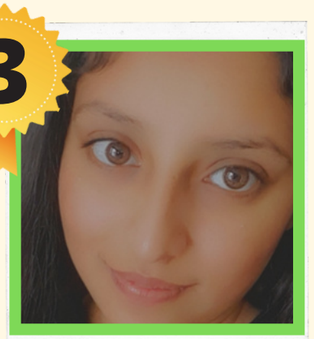
3



Nishita Singh

FIRST YEAR

3



Prabhjot Kaur

FIRST YEAR

3



Ritika Semwal

SECOND YEAR

3



Vipasha Soni

SECOND YEAR

3



Bibham Tiwari

FIRST YEAR



★ECA Achievers★



Retika, TZH

EMPATHISE, PRESIDENT



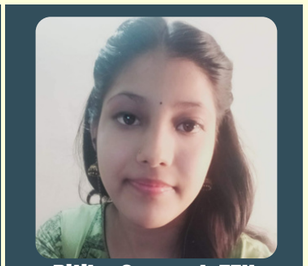
Garima, TZH

EMPATHISE, VICE-PRESIDENT



Dhritismita Pathak, TZH

GIRLUP PANKH, TECHNICAL HEAD



Ritika Semwal, TZH

GIRLUP PANKH, MEMBER OF OUTREACH DEPARTMENT



Kanika, TZH

GIRLUP PANKH (VICE PRESIDENT) , EMPATHISE (SUPPORT GROUP HEAD)



Jeevanesh Sawhney, SZH

COORDINATOR, EFFULGENCE; MEMBER, CONQUIZTADORS



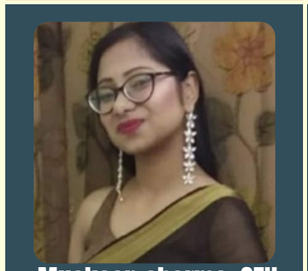
Preetika Sinha, SZH

MEMBER, ENGLISH DEBATING SOCIETY ; GENERAL SECRETARY, NSS



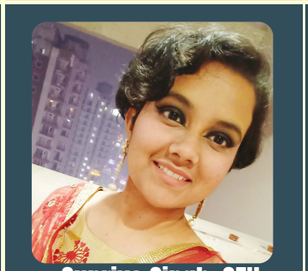
Gaurav Dutta, SZH

SCIENCE COORDINATOR, EXORDIUM; MEMBER - GLOBAL YOUTH (SVC CHAPTER, IRYF)



Muskaan sharma, SZH

MEMBER, NSS



Supriya Singh, SZH

VERVE DANCE CREW, CORE MEMBER



Dhwani Goel, FZH

CRESCENDO (MEMBER)



Debjeet Ray, FZH

MUSIC PRODUCER (CRESCENDO), GRAPHICS TEAM (EMPATHISE),



Shivangi Choudhary, FZH

EXORDIUM (MEMBER)



Shivangi Gupta, FZH

EMPATHISE(OUTREACH TEAM)



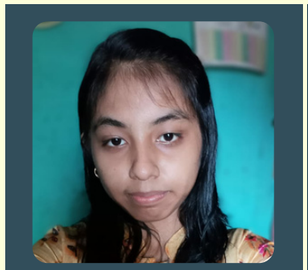
Abhijeet, FZH

EFFULGENCE (MEMBER)



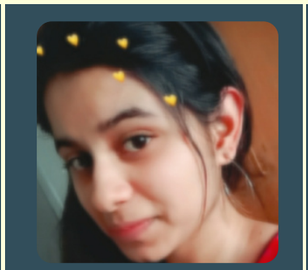
Kanishka Bonal, FZH

SYF (MEMBER/CONTENT WRITER) ENGLISH DEBATING SOCIETY (MEMBER) EXORDIUM (MEMBER)



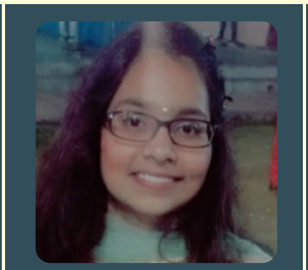
Nishita Roy, FZH

ECOCLUB (CREATE AND RESEARCH TEAM)



Gunjan Sharma, FZH

NRITYAANGNA (MEMBER)



Anshu, FZH

EXORDIUM (MEMBER)



Shweta Pagariya, FZH

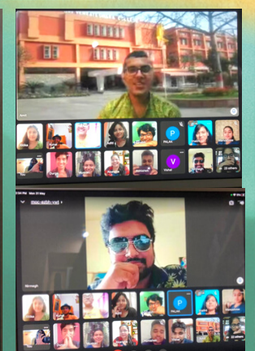
NRITYANGANA (MEMBER)

e-FAREWELL 2021



Farewell 2021 was an endearing parting event for our beloved seniors. With great warmth and emotion, juniors organized a virtual gathering for their favorite seniors. Decorated with 90's Bollywood themes, seniors looked back in time. Various fun-filled games were arranged, making the evening much more winsome. A video was played capturing the memories of the past three years, like a memory box. Every senior received a present in the shape of an e-card harboring genuine words of affection. Teachers only had good things to say about them, with personally written messages for the going-away batch. The department came together to bid them adieu and wished them for their future endeavors as they enjoyed being a part of this college for one last time.







ZOOFLIX

- Aditya Singh & Shivangi Choudhary, FZH

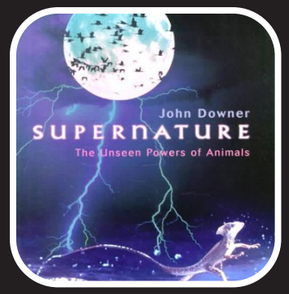


The Blue Planet

The blue planet is a BBC nature documentary narrated by famous naturalist David Attenborough. Our planet is 70% water. However, most of the ocean life remains an enigma. It is an eight-episode series that reveals the mystery of marine creatures and their behavior. The documentary also brings lots of stunning footage of creatures living in deep seas. A documentary worth watching for nature enthusiasts!

Supernatural: The Unseen Powers of Animals

Many of you think humans are the most superior among all the species, but this documentary may change your mind! It brings you the unique characters that animals possess. Recent scientific studies show sharks can sense the human aura, while dolphins can use ultrasound to see the human embryo in the uterus. Some frogs have dominated the cryogenics and can freeze in six months. On the other hand, some lizards weep blood, and some can even walk on water.





The Rare and Exotic Animals: "White Lions"

This documentary is about two lion cubs who are born with a rare color gene that makes them look white. These "white lions" are thought to be indigenous to the Timbavati region of South Africa. They had fewer chances of surviving in the wild because they were easily distinguishable from a distance to hunting predators (mostly hyaenas). Like this, there are many more examples that show how white lions cannot survive in the wild.

Seaspiracy (2021)

"The single best thing I can do every day to protect the ocean and marine life is simply not to eat them."
Tabrizi, for whom the clink of coins or the rustling of notes, just didn't matter. He knew life couldn't be bought. He knew that when our seas die and there is no air left to breathe, how many blue chips you hold wouldn't make a difference. Seaspiracy uncovers the real truth.



ARE YOU STILL SURFING?

Zooflix is the ultimate chill zone for all the science buffs out there!
Here, take a look at these amazing documentaries:

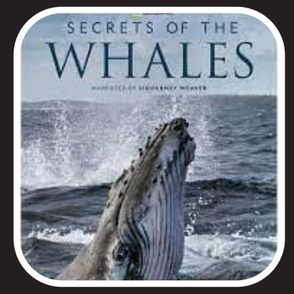


Equator's Wild Secrets (Since 2019)

Directed by Lorne Townend, Stefan Booth as the narrator. Life along the equator is spectacularly diverse. Equator's wild secrets explore the ecosystems and animals which call this place home.

Secrets of the Whales (Since 2021)

Directed by Brian Armstrong, Sigourney Weaver as the narrator.
Armstrong says, "We had a lot of success, though, with the young (whales), which stay at the surface while the adults go down to hunt. And the young are equally as curious." Filmed over three years in 24 locations, throughout this epic journey, we learn that whales are far more complex and more like us than ever imagined.





Chasing Corals (In 2017)

Directed by Jeff Orlowski starring Richard Vevers, this documentary includes divers, scientists and filmmakers who set out on a journey beneath the waves to identify the reasons for disappearance of coral reefs. "Coral reefs will not be able to keep up, they will not be able to adapt, and we will see the eradication of an entire ecosystem in our lifespan."

The Secret of Amazon: Earth's Mightiest River

See how Earth's mightiest river Amazon is a home of many natural wonders supporting over 7 million people settled along its banks. The documentary highlights how human interference is slowly interrupting its natural flow resulting in seasonal flooding of banks and forest flooding. The river is also home to Boto dolphins which are super intelligent and have 40% larger brains than humans. Watching this documentary will surely reveal to you the staggering biodiversity that the Amazon basin has.



I wonder where I belong

- Shalini Raman, SZH

Gazing at the creamy clouds
Cuddling the sun as if its own
Giggling at the gossiping birds gliding in the niche
I wonder where I belong..

Watching the grass letting the dew settle on itself
Crawlies making love
Listening to trees sharing secrets as they rustle
I wonder where I belong..

I overhear the teabag fighting with the hot milk,
And then I peep into the backseat smiling at the ants over their festive biscuit feast
Offering the chocolate a shoulder crying over melting
I wonder where I belong..

I have forgotten what's it like to be belonged
For all I remember, is losing
I can't help but live in the present, a supposed fallacy
For all I wonder is where I truly belong..

क्या है ज़िंदगी?

- Kanika, TZH

परबत-ए-ज़िन्दगी का सलीका
भी कुछ अलग अनोखा है
जितनी उचाई पर हो यहाँ
गिरने का डर भी उतना ही होता है

रौशनी-ए-ज़िन्दगी का
भी अजीब एक लहज़ा है
जितना तेज़ उजाला हो
हटते ही उतना अँधेरा है

झरना है ज़िन्दगी
जिसके अंदाज़ निराले हैं
ऊपर से गिर कर भी
हसीं इसके नज़ारे हैं

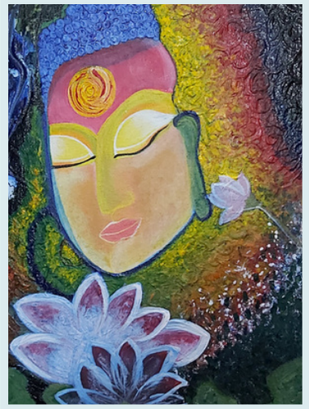
भीड़ है ज़िन्दगी
एक अकेलापन है यहाँ
ख़ामोशी का शोर है
शोर खामोश है जहाँ

Future you

Exactly when, you thought you lost
There was a destination waiting for you
Exactly when, you thought you can't
There was a last ray shining in you
Exactly when, you thought this will end
There was a beginning starting for you
Exactly when, you thought you'll cry
There was a face smiling for you
Exactly when, world seem so false
Somewhere there was loyalty only for you
So, before you decide something in this moment
Just think of a brighter YOU!

- Kanika, TZH

CREATIVE CORNER



Simran Prajapati. T3H



Isha yadav.F3H



Shalini Raman. S3H



Palak. T3H



Anushka. S3H



Shubhi Agrawal. T3H



Himanshu.T3H



Himanshu.T3H



Ritika Semwal.F3H

Into the Wild



Merops orientalis
(Green Bea Eater)
Jeevanesh Sawhney, SZH



Nephila
(Golden orb web spider)
Jeevanesh Sawhney, SZH



Psilopogon haemacephalus
(Coppersmith barbet)
Dhritismita Pathak, TZH



Syrphidae
(Hoverfly)
Srianshu Kumar Panda, SZH



Chalcophaps indica
(Emerald Dove)
Jeevanesh Sawhney, SZH



Eurema hecabe
(Common Grass Yellow)
Jeevanesh Sawhney, SZH



Euthalia nais
(Baronet)
Jeevanesh Sawhney, SZH



Lophura leucomelanos
(Kalij pheasant)
Jeevanesh Sawhney, SZH



Conocephalus melaenus
(Black kneed meadow katydid)
Srianshu Kumar Panda, SZH



Veronicellidae
(Leatherleaf slug)
Ritika Semwal, TZH



Tramea onusta
(Red saddlebags)
Dhritismita Pathak, TZH



Athene bram indica
(Spotted owl)
Jeevanesh Sawhney, SZH



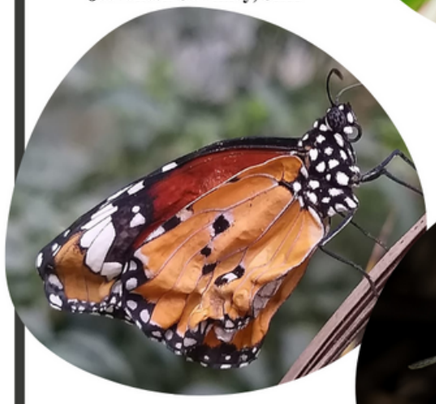
Pycnonotus leucogenys
(Himalayan bulbul)
Jeevanesh Sawhney, SZH



Agapostemon splendens
(Green metallic sweet bee)
Srianshu Kumar Panda, SZH



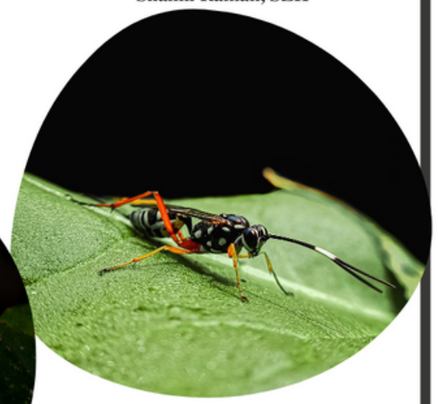
Bucerotidae
(Hornbill)
Shalini Raman, SZH



Danaus chrysippus
(Plain tiger butterfly)
Simran Prajapati, TZH



Leptosia nina
(psyche)
Jeevanesh Sawhney, SZH

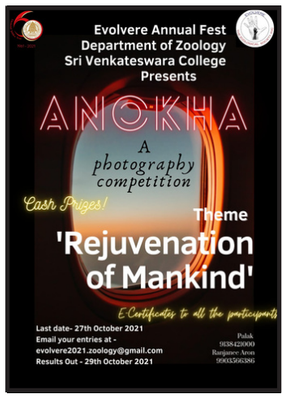


Icheumon promissorius
(Parasitic wasp)
Srianshu Kumar Panda, SZH

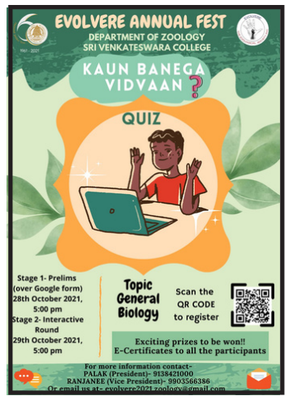
Into the Wild

EVOLVERE
e-Fest 2021



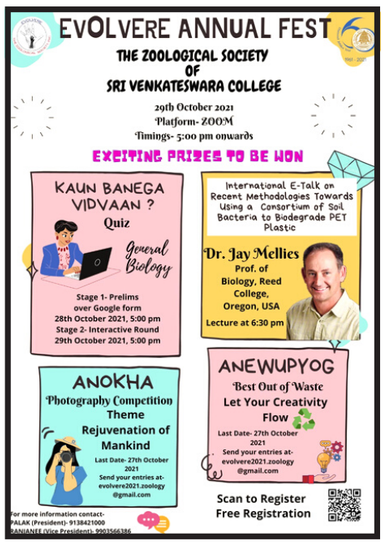


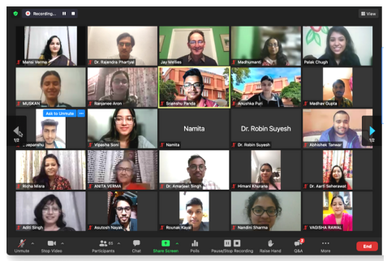


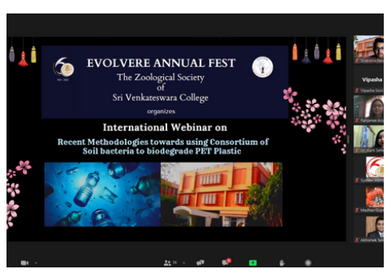


The Zoological Society of our Department 'EVOLVERE' organized their e-Annual Fest on 29th October 2021 virtually on the Zoom platform. The event encompassed an international webinar on 'Recent Methodologies towards using a Consortium of Soil Bacteria to Biodegrade PET Plastic' with the gracious presence of eminent speaker Dr. Jay Mellis, Prof. of Biology, Reed College, Oregon, USA. The webinar focussed on the potential of a consortium of soil bacteria to degrade PET Plastic. Competitions like Quiz (Kaun Banega Vidvaan), Photography (Anokha) and Best Out of the Waste (Anewupyog) were some of the key highlights of the fest which instilled a sense of zeal and enthusiasm amongst everyone present there.





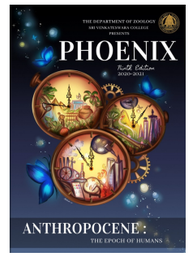








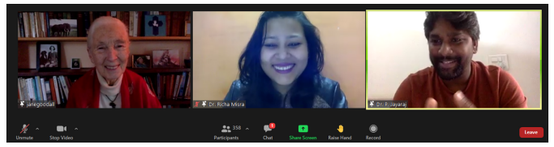
PHOENIX
Release 2021

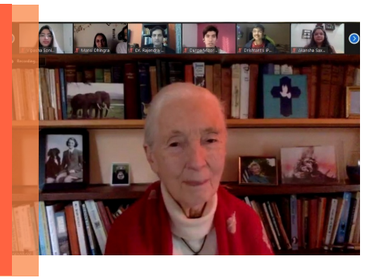




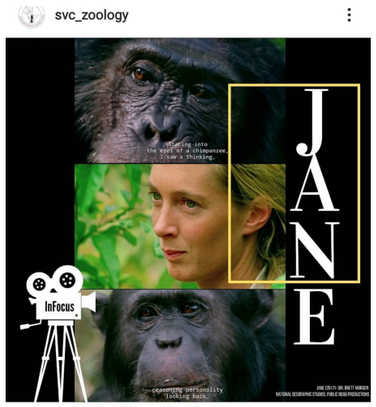


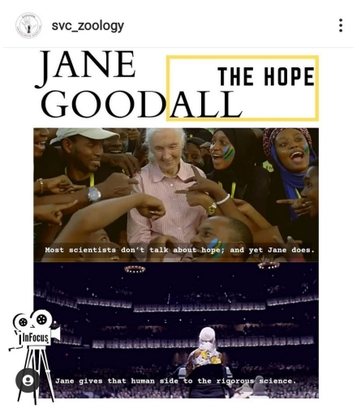




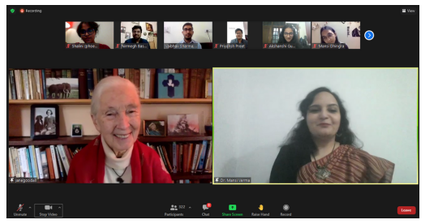


"Our Departmental Magazine 'PHOENIX' is the perfect realm where creativity meets science, and thus, the annual release of Phoenix has always been a fascinating affair for the Zoology Department.
PHOENIX 2021 Release which took place virtually on 16 February 2021 was one such engrossing event graced by the presence of Dr. Jane Goodall, the UN Messenger of Peace. The release of the Ninth Edition of Phoenix which encapsulated the tale of humans on earth with the theme of 'Anthropocene-The Epoch of Humans' met with a magnanimous climax with Dr. Jane Goodall's enchanting talk on 'Reasons for Hope'."

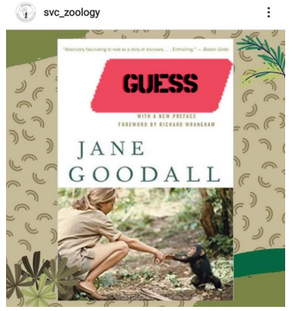


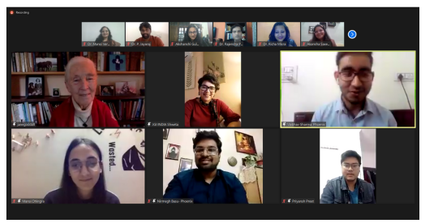








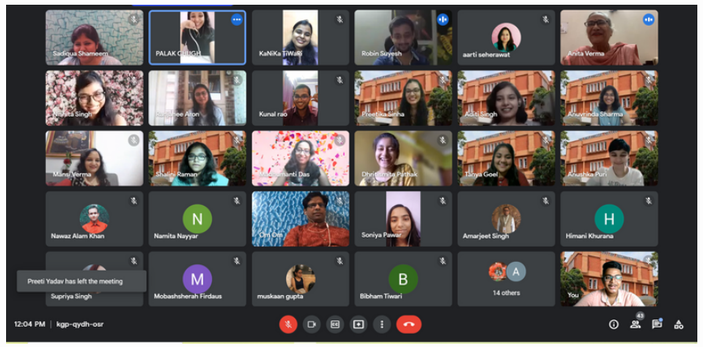




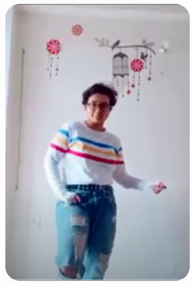
e-TEACHERS' DAY - 2021

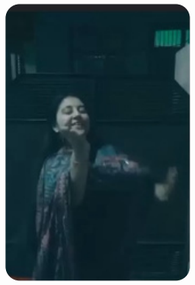


Someone has rightly said that "The place of teachers come before that of God." We feel utterly grateful to have had an opportunity to learn and grow under the guidance of a splendid lot, like that of our department's faculty. Cherishing their love and hard work for us, a virtual celebration was organized on account of Teachers' Day on 5th September.











It was a scintillating experience for everyone, as we witnessed laughter, giggles, and most importantly, beautiful smiles on everybody's faces. It was as though we escaped somewhere together for a couple of hours from online classes and assignments and were just enjoying those moments where teachers played games, sung songs, watched some lovely performances, shared some embarrassing instances. Students had prepared beautiful cards for all the teachers that were then read out to them. The most touching part was watching the memory lane video that filled everyone's heart with nostalgia.



REPRODUCTIVE HEALTH IN THE NEW AGE

CHALLENGES IN THE MODERN WORLD

JUNE 26, 2021



While reproduction has always been an ever-existing part of our lives, reproductive health holds a shambolic stance in this equation. Thus, keeping in mind the fact Reproductive health being an ever-pertaining topic, especially in today's times, a webinar on the same was held on 26th of June 2021, which deliberated on reproductive health and challenges faced by people in the new world. The guest speaker responsible for riveting the audience and educating them on the subject, was Professor Rita Singh, from the Department of Zoology, University of Delhi.

As an added stimulant to further engage the audience, a poster-making competition, on- "Lifestyle associated problems and solutions for reproductive health and wellness: Awareness, environmental issues, and strategies" was held on the same day. Students of all disciplines showed active participation, along with explosive creativity, which could be very well observed in the pieces submitted.



Wildlife Symposium 2021



An adventurous symposium on the theme 'Wildlife Conservation: Challenges, Efforts, and Scope' was organized by the Department on 20th March 2021.

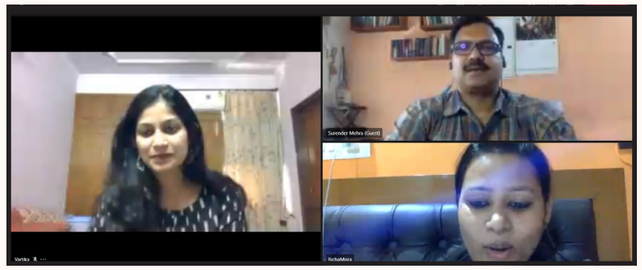
The event consisted of e-talks on 'Challenges in Wildlife Conservation and Management' by the remarkable speaker Mr. Surender Mehra, IFS, D.I.G, National Tiger Conservation Authority & Former Field Director, Corbett Tiger Reserve.

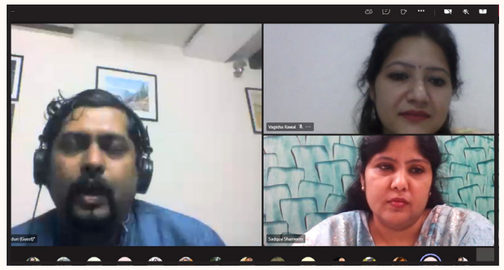
The seminar also focused on the essence of 'Birds of India: Spotting, Identification, and Habitat Distribution' by the astounding professor Dr. Asani Bhaduri, Assistant Professor, Cluster Innovation Center, University of Delhi.

The core of the talk was compacted on 'Wildlife Conservation: Challenges, Efforts, Scopes' that was also associated with a virtual tour of the marvelous 'Aravalli Biodiversity Park' by Ms. Balwinder Kaur, Nature Education Officer, Aravalli Biodiversity Park.

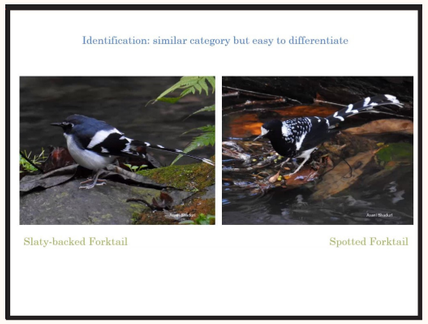
That's not all! To make the session more memorable a sensational activity was arranged in which the participants sent the photos with a title and story escorted with the click. The activity boosted the zealous participation of students and managed to maintain the curiosity of many souls.









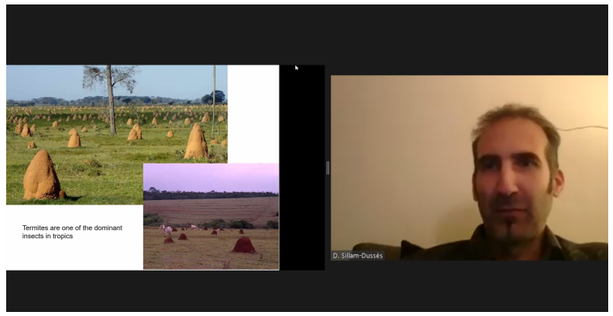




TERMITOLOGY SYMPOSIUM

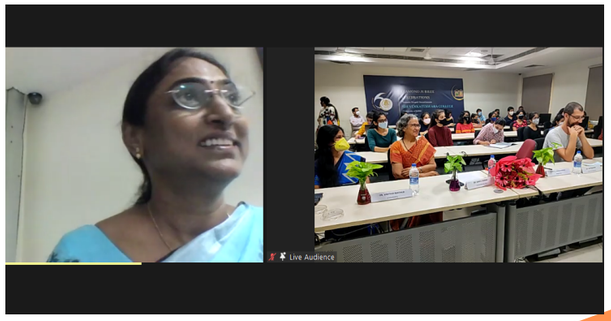
The Department organized an International Symposium on Recent Methodologies and Advances in Termite Research on 28th September 2021 in a hybrid mode. The event was graced by the eminent speaker Dr. Jan Sobotnik, an Associate professor at Czech University of Life Sciences, Prague, who delivered an astounding talk on "Recent advances in Termitology: My contribution to the termite science."

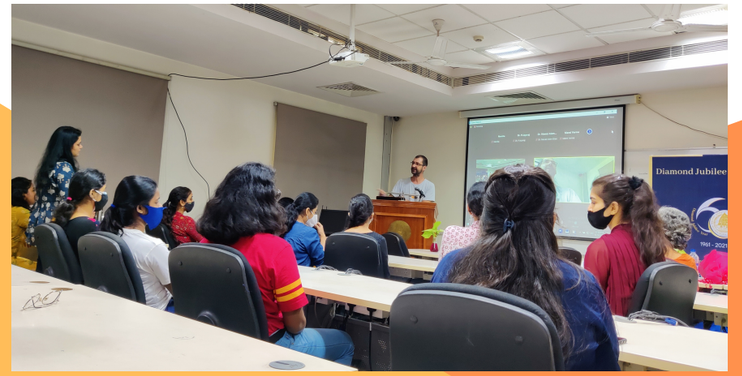




To add to this informative event, Dr. David Sillam Dusses, an Associate professor from Sorbonne Paris North University, France, joined us virtually for a compelling discussion on "Sophisticated reproductive strategies enabling termites to be among the dominant insects in the tropics." The event was a huge success, with people turning up both physically and virtually to arouse their curiosity about these tiny insects.









RESEARCH AT SVC ZOOLOGY

PUBLICATIONS

Dr. Richa Misra published 3 research articles, titled " A Cross-Sectional Questionnaire Based Study to Evaluate Subjective Sleep Quality among Undergraduate Students in India.", "A review emphasizing on utility of heptad repeat sequence as a tool to design pharmacologically safe peptide-based antibiotics" and "Comparative Genomic Analysis of Mycobacteriaceae Reveals Horizontal Gene Transfer-Mediated Evolution of the CRISPR-Cas System in the Mycobacterium tuberculosis Complex".







Dr. Perumal Jayaraj published 4 research articles, titled "Analysis of invasive properties of retinoblastoma and uveal melanoma xenograft using chick chorioallantoic membrane", "Investigation of the role of cyclooxygenase-2 in squamous cell carcinoma of the eyelid using immunohistochemistry", "Chicken chorioallantoic membrane assay as an in vivo model to study ocular malignancies and efficacy of nanoparticles" and "Avian chorioallantoic membrane assay: alternative animal model to study ocular malignancies"

Dr. Mansi Verma published 4 research articles, titled 'Phytocompounds of Rheum emodi, Thymus serpyllum, and Artemisia annua Inhibit Spike Protein of SARS-CoV-2 Binding to ACE2 Receptor: In Silico Approach.', "Comparative Genomics and Integrated Network Approach Unveiled Undirected Phylogeny Patterns, Co-mutational Hotspots, Functional Crosstalk and Regulatory Interactions in SARS-CoV-2", "Microbial World: Recent Developments in Health, Agriculture and Environmental Sciences: An Annual Conference Organized by Association of Microbiologists of India and Indian Network for Soil Contamination Research." and "The Alphabet of the Elementary Microbiology: Revisited."









Dr. Rajendra Phartyal and Dr. Mansi Verma published book chapters titled 'SARS-CoV-2 Mutations: An Insight. In: Ahmad S.I. (eds) Human Viruses: Diseases, Treatments and Vaccines.' and ' Introduction to Flaviviruses and Their Global Prevalence. In: Ahmad S.I. (eds) Human Viruses: Diseases, Treatments and Vaccines.'



Dr. Himani Khurana published 2 research articles, titled 'The genus Sphingopyxis: Systematics, ecology, and bioremediation potential – A review' and 'Gut milieu shapes the bacterial communities of invasive silver carp.'





Dr. Namita Nayyar published an article titled "Transformation of ε-HBCD with the Sphingobium Indicum enzymes LinA1, LinA2 and LinATM, a triple mutant of LinA2"



TALKS DELIVERED

Dr. Richa Misra gave lectures in Annual International Conference of AMI and INSCR in association with TERI, Dept of Zoology, University of Delhi, IARI, INSA and a lecture during short-term online course on Bioinformatics organized by Dept. of Botany and Zoology, Miranda House, University of Delhi.

Dr. Mansi Verma gave talks at the 2nd International Conference organized by Indira Gandhi Delhi Technical University for Women , 6th Annual International Conference of INSCR organized in association with the Department of Zoology (DU), Acharya Narendra Dev College (DU), Deen Dayal Upadhyaya College (DU), Gargi College (DU), Kirori Mal College (DU), PG Department of Zoology (MU), Maitreyi College (DU), Ramjas College (DU), Sri Venkateswara College (DU), C.M.P. College (AU), SGTB Khalsa College (DU), COCAS (PU) & PhiXgen Pvt. Ltd., Gurugram and in 61st annual international conference of AMI and 5th annual conference of INSCR in association with University of Delhi, IARI, TERI and INSA.

AWARDS

Dr. Mansi Verma received Bill and Melinda Gates Abstract award 2021 for World Microbe Forum, organized by ASM and FEMS in 2021.

Dr. Perumal Jayaraj and his team secured First prize for presenting a poster at International Conference on Nanoparticles: Biomolecules for Human Health (NBHH-2021) and won the title of 'Best Oral Presentation' at "HEALTH 2021 Virtual International Conference on "CANCER BIOLOGY: Advances & Challenges" hosted by Deshbandhu College, University of Delhi.

STUDENT ACHIEVEMENTS

Palak Chugh presented a poster as co-author on 'Chick Chorioallantoic Membrane Assay To Study Invasiveness of Retinoblastoma And Choroidal Melanoma Using Patient-Derived Xenograft' at Virtual International Conference on CANCER BIOLOGY : Advances and Challenges' and also presented a poster in 'International Conference on Emerging Trends in Biological Sciences (ICETBS 2O22)' organized by Department of Biological Sciences, P.D. Patel Institute of Applied Sciences, CHARUSAT. Palak Chugh secured 2nd prize in the Logo Design Competition for the Diamond Jubilee Year of Sri Venkateswara College, University of Delhi.

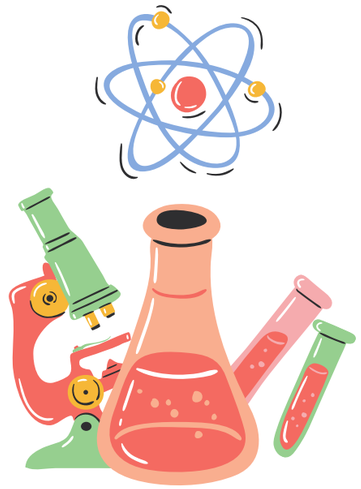
Muskaan Gupta presented a poster on 'Chick Chorioallantoic Membrane Assay To Study Invasiveness of Retinoblastoma And Choroidal Melanoma Using Patient-Derived Xenograft' at Virtual International Conference on CANCER BIOLOGY : Advances and Challenges' and won the title of 'Best Oral Presentation' of paper.



SRI VIPRA

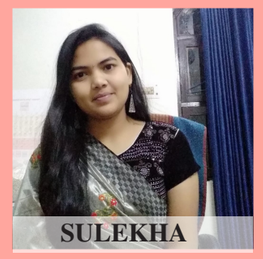
S. No.	PROJECT TITLE	MENTOR	No. of students
1	Study of genomic variants in Helicobacter pylori and associated cancer specific genes using genomic analysis tools	Dr. P. Jayaraj Dr. Namita Nayyar	11
2	In silico screening of phytocompounds for curing dengue	Dr. Mansi Verma	9
3	DNA isolation and analysis of sequencing data of bacterial genomes using bioinformatics tools	Dr. Himani Khurana	12
4	Study of the effect of restrictions (lockdown and online classes, reduced mobility) due to COVID-19 on preteen children	Dr. Anita Verma Dr. Rajendra Phartyal	6
5	The basics of scientific writing- structure, content and organization	Dr. Ajaib Singh Dr. Om Prakash	10
6	Reality of COVID-19: Vaccination, Mortality and post COVID complications	Dr. Aarti Seherawat	8

The Department of Zoology at Sri Venkateswara College has always been involved in quality research. This year despite restrictions and lockdown, the department faculty has mentored 56 students in 6 projects under the aegis of SRI-VIPRA (Sri Venkateswara Internship Program for Research in Academics).



THIRD YEAR Zoology Hons. (TZH)

Now showing


SULEKHA


DHRITISMITA


ANUJ


ISHITA


RITIKA


CHANDNI


RETIKA


KANIKA


SUMAN


MUSKAAN


GAURAV


SALONI


MUSKAN


VIPASHA


ANJALI


ESHA


HIMANSHU


SHUBHI


DOHA


SIMRAN


ABHISHEK


SHREYA


GARIMA


PALAK


VIDHI

Currently playing

SECOND YEAR

Zoology Hons.

(SZH)


SHALINI


RANJANEE


RIYA SINHA


PREETIKA


PREETI


KUNAL


KANAK


JEEVANESH

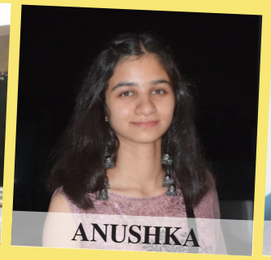

GAURAV


BIBHAM


ASHUTOSH


DEEPANSHU


BHAVISH


ANUSHKA


ADITI


ANUVRINDA


ANSHITA


ANUSHKA

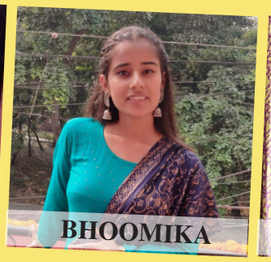

VARNIKA


TANYA


SUPRIYA


SRIANSHU


SONIYA


BHOOMIKA


NIKHIL


PRABHJOT


PRATIBHA


PARITOSH


NISHITA


MUSKAAN


MOBASHSHERAH


MDPARWEZALAM


MAHIMA


MADHUMANTI


MADHAV


ABHIJEET


ADITYA


ANSHU


ANUSHKA


DEBJEET


SHIVANGI


CHETNA


MANTOSH


AYUSHI


MAYANK


GUNJAN


JASLEEN


ISHA


KANISHKA


MAHENDRA


TILAK


VRISHIKA


DHWANI


SHIVANGI


TANVI


SHWETA


NISHITA


POOJA


PAWAN


NANCY


YUVRAJ


KRITIKA


SIMRAN


KHUSH

Scene:

FIRST YEAR

Zoology Hons.

(FZH)

















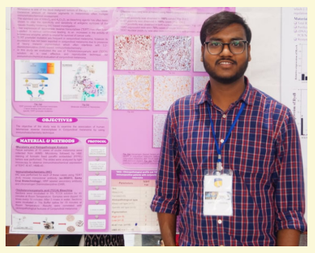
LET'S BRING BACK THE OLD TIMES















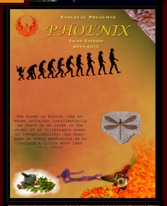




...10 Glorious years of Phoenix





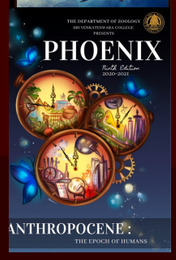












SOME MESSAGES FROM

Our Phoenix Alumni



Avantika Ghosh
Chief Editor, 1st edition & President

"We had a great time starting and working on the first edition of Phoenix. It was a lot of fun every step of the way, from deciding the name of the magazine to its contents. The idea behind Phoenix was to communicate amazing research being conducted around the world and to showcase the achievements and talents within our department. "



Mrigya Kaushik
Editor-in-Chief, 6th edition

"I loved my time with phoenix, not at that time exactly, but now in retrospect. So now looking back I see how I learnt from the experience. I learnt how to work with a team, how to delegate tasks and how to meet deadlines. Thank God, I had my co-editor, Ananya to help me through it. Also, I never had to worry about graphics, because Akhil (the creative editor), took care of it all."



Sukanya Bhuyan
Editor-in-Chief, 7th edition

"Phoenix has always been a medium for students to express their creativity and ideas. And I am so grateful for being a part of such an excellent magazine. Not only did it help me grow as a writer and an editor, but it also helped me shift out of my comfort zone, from the identity of a shy kid to a chief editor, and develop many new skills like designing layouts and planning and organizing events. "



Ankita Saha
Editor-in-Chief, 8th edition

"As I reminisce about the past, I realize Phoenix was more than just a yearly magazine to me. I entered college as a clueless kid, and working for Phoenix played a huge part in shaping my personality. It helped me unlock my potential, allowed me to work with people I truly admire, and learn things I couldn't have otherwise, but most importantly, it gave me friends for life. I congratulate the team for fighting against all odds and not letting anything get you down, even the pandemic. It's surreal to witness Phoenix celebrate its tenth year and I hope it can continue to shine and prosper for a thousand more."



Anushka Saxena
Editor-in-Chief, 5th edition

"When you are making the magazine, you have this insurmountable pressure, with every day a new challenge that you are trying to work out. But reminiscing back to it today, I have to say, this experience gave me some of the fondest memories I have of my undergrad. You become part of this community, this team, and every day becomes an adventure that you get to experience with some of the best people there are, you make these memories that bring a smile to your face "



Rishabh Yadav
Editor-in-Chief, 9th edition

Working on phoenix was one of the best things to happen with me in college. It was humbling to have the opportunity to shape the disorganized mass of raw ideas, both written and visual, into something which was bigger than the sum of its part. There were challenges, frustrations, and tiring moments but all of it made the moment when I held the printed copy in my hands that much more overwhelming. I've made some of my best friends, working together on the magazine, seniors, juniors, and batchmates. I leave with the hope that those who work on the magazine in the future keep dismantling the barriers between science and humanities, and make the magazine the go-to for something new.



Akshanshi Gulati
Designer-in-Chief, 9th edition

"One of the most fun and memorable times of my college life was working on phoenix, it is something I will remember for the rest of my life.Those sleepless nights and burnt out days are funny memories now.I enjoyed working on the magazine for three years! I made some of my best friends along the way. I would advise to enjoy the process, give your best, because it's definitely worth it in the end.



Harshita Rupani
Designer-in-Chief, 8th edition

"Working for the magazine was an amazing opportunity to express my creativity and interact with a bunch of extraordinary people. The process of bringing people's articles into life using graphics and visuals was truly meaningful and gratifying for me. My favourite memory of my time at Phoenix was sitting in the cafeteria with the editors and designers and bonding with them over countless revisions and edits."



Mandeep Gulati
Creative Head , 4th edition

"It was the 4th edition & being a creative person, I wanted to create something distinctive & unique so I decided to create & design a handmade cover page. With my zeal to create something creative and my team's constant efforts and support, we created the 4th edition of Phoenix which was highly appreciated by all the stakeholders involved."

Manasa Sri
Chief Editor,
1st edition

"As the founding members of both the magazine and Evolvere- the Zoological Society, Avantika and I had an interesting final year. We had a lot of fun working late nights, developing and curating the diverse topics that we wanted to put into the magazine. Our main aim was to create engaging, humorous, and informative content. We worked as a team to make the magazine a reality and the journey was dotted with learning new skills, troubleshooting, and a lot of fun."

RESOURCES

01-02

https://www.one.org/international/
https://pantheon.world/profile/occupation/biologist/country/south-africa
https://images.app.goo.gl/srf5yS1creWCjj9RA
https://images.app.goo.gl/wcBXP96KFzxU6AMu7
https://images.app.goo.gl/nVDqtpZsu9UHJHYS9
https://images.app.goo.gl/LFyX7ASe9ibukirs8
https://images.app.goo.gl/e7sv8Fiy6qD6euki9
https://images.app.goo.gl/5VysSsPkkS2oJivf7
https://images.app.goo.gl/fKUUfpKN9JbBiBW9A
https://images.app.goo.gl/LLdDwt2BkRLYban89
https://images.app.goo.gl/n3ToZhq3cgzGV3GB6
https://images.app.goo.gl/JCSYtyPks1eVoXPcA
worldatlas.com
https://www.awf.org/wildlife-conservation/all
africa-watercolor-map-michael-tompsett
https://www.pexels.com/ {CREATIVE COMMON]

11 - 12

https://images.app.goo.gl/yUotUqp1gCqvxRA
http://www.stem.org.uk
https://www.fs.fed.us/database/leis/parts/bryophyte/cerpur
https://www.alamy.com/stock-photo/antarctic-pearlwort.homl
https://www.thesproceest.comvicollsh shutbread recipe-3060796
wwww..com/enigamborg starts to break up in the south atic/a 5499/40
https://www.sciencedirect.com/topics/agricultural-and-biological-sciences
https://en.m.wikipedia.org/wiki/Wandering_albatross
https://www.nationalgeographic.com/anima/s/birds/facts/empero-penguin
https://images.app.goo.gl/k6SufpLrk78M/SWIES
https://today.uconn.edu/2021/07/opening-protected-area-off-new-engand-coast-to-commercial fishing compromises protections/
http://blog.nelenglarot.com/2016/23/16/scotts ut at copo varer
https://commons.m.wikimedia.org/https://today.uconn.edu
https://en.m.wikipedia.org/wiki/Plecoptera
https://explore.quarkexpeditions.com/blog
https://www.britannica.com/animal/Notothenioide
https://www.inaturalist.org/taxa/408848-Nototodarus-sloanii/browse_photos
https://www.coolantarctica.com/schools/antarctic_pemmican_recipe.php
https://www.nationalgeographic.com/animals/mammals/facts/orca
https://www.antarctica.gov.au/about-antarctica/animals/seals/
https://fineartamerica.com/featured/1-antarctica-watercolor-map
https://www.freepressjournal.in/cmcm/mystery-behind-bloody-waterfall-revealed

19-20

https://www.zsl.org/blogs/asia-conservation-program/saving-the-world%E2%80%99s-most-illegally-traded-wild-mammal
https://simple.m.wikipedia.org/wiki/Run_Run_Shaw
https://ksc.kerala.gov.in/speaker/dr-g-n-ramachandran/
https://images.app.goo.gl/uS5PBHpvqpm4nwhm8
https://images.app.goo.gl/S4jD3T1Bt6i3ckgz7
https://images.app.goo.gl/rhM6hP5qMdEfgjE58
https://images.app.goo.gl/sQTdY85uvE4MHe7G7
https://images.app.goo.gl/7aihgXLebyY5SoGC8
https://commons.wikimedia.org/wiki/File:Lion-tailed_macaque_by_N_A_Nazeer.jpg
https://www.asianscientist.com/as100/
https://images.app.goo.gl/rXHZkt34dJpLLW3a7
https://nrcp.dost.gov.ph/previous-issues/547-national-scientist-former-dost-nrcp-president-edgardo-gomez-dies-at-81
https://www.nationalgeographic.com/animals/reptiles/facts/draco-lizard
https://en.m.wikipedia.org/wiki/Kamala_Sohonie
https://www.nationalgeographic.com/animals/reptiles/facts/gharial
https://www.skku.edu/new_home/205_eng/newsletter/V202/html/sub11.html
https://images.app.goo.gl/HHr4SG5HzYarv1o39
https://news.mongabay.com/2015/11/asap-reversing-decline-of-critically-endangered-species-in-southeast-asia/
https://indiabiodiversity.org/species/show/226676
https://en.wikipedia.org/wiki/Hitoshi_Kihara
https://images.app.goo.gl/tMtPex268iVmBLKG7
https://images.app.goo.gl/iEgSThUWSVbimEPx8
https://en.m.wikipedia.org/wiki/Iridescent_shark
https://www2.illinois.gov/dnr/education/Pages/WAFTCopesGrayTreefrog.aspxhttps://www.pexels.com/ {CREATIVE COMMON]

29-30

https://images.immediate.co.uk/production/volatile/sites
https://cdn.britannica.com/06/180006-138-F7CE1D29/Charles-Darwin-Overview-life-focus-evolution-work.jpg?w=800&h=450&c=crop
https://encrypted-tbn0.gstatic.com/images?
https://alchetron.com/cdn
https://upload.wikimedia.org/wikipedia/commons/a/a5/JeanBaptiste_de_Lamarck.jpg
https://cdn.theculturetrip.com/wp-content/uploads
https://i.dailymail.co.uk/1s/2020/06/15/13/29624464-8422005-
https://images.fineartamerica.com/images-medium-large/common-adder-colin-varndell.jpg
https://museum.wales/media/29675/Wallace-frontpiece-My-Life.jpg
https://images.fineartamerica.com/images/artworkimages/mediumlarge/2
https://upload.wikimedia.org/wikipedia/commons/c/c0/Carolus_Linnaeus.jpg
https://www.alexrovira.com/wp-content/uploads/soluciones-jane-goodall-cover.jpg
https://images.fineartamerica.com/images/artworkimages
https://i.pinimg.com/originals
https://www.farminguk.com/images/News/42212_1.jpg
https://cdn.britannica.com/30/99730-050-E68F62FF/Rosalind-Franklin.jpg
https://goldlabfoundation.org/wp-content
https://img.freepik.com/free-photo
https://leesbirdblog.files.wordpress.com/2021/06
https://www.watersportsvilamoura.com/wpcontent/uploads
https://www.takingittothestreetssf.org/wp-content/uploads
https://www.natureplprints.com/p/729/hooded-seal-male-display-cystophora-cristata-st-18060962.jpg
https://www.shutterstock.com/search/fauna+europe
https://www.pexels.com/ {CREATIVE COMMON]

35-36

pacific-pocket-mouse.jpg（currentresults.com
https://clarknow.clarku.edu/2016/07/15/coyote-or-coywolf-whats-in-a-name/
https://animalia.bio/)
amp.wbur.org
https://i.ytimg.com/vi/mNHD4itmn6o/hqdefault.jpg
https://i.pinimg.com/736x/fd/f9/ef/fdf9efd307002b5102942c3e732ec465.jpg
https://pixabay.com/images/search/bald%20eagle/
www.sunrisebirding.com
https://outschool.com/classes/the-adorable-and-helpful-sea-otter-usOpoz40
https://www.birdforum.net/opus/Akiapolaau
https://commons.wikimedia.org/wiki/File:Livingstone%27s_Fruit_Bat.jpg
https://www.rainforest-alliance.org/species/armadillo/
https://www.ndtv.com/india-news/pfizer-centre-open-to-talks-to-make-covid-vaccine-available-in-india-2323504
https://www.thefamouspeople.com/american-scientists.php
http://findliveworship.org/

43-44

https://www.thefamouspeople.com/australian-scientists.php
https://health.adelaide.edu.au/engage/alumni
https://www.hmoob.in/wiki/Gouldian_finch
https://www.nbcnews.com/news/amp/wbna27472735
https://www.nobelprize.org/prizes/medicine/1970/katz/facts/
https://en.wikipedia.org/wiki/Fred_Hollows
https://theconversation.com/amp/photos-from-the-field-zooming-in-on-australias-hidden-world-of-exquisite-mites-snails-and-beetles-147576
https://www.marylandzoo.org/conservation/current-projects/native-species/
https://artuk.org/discover/artworks/henry-harris-professor-of-pathology-19631979-regius-professor-of-medicine-19791992-head-of-sir-william-dunn-school-of-pathology-19631993-221412
https://theconversation.com/amp/weve-unveiled-the-waratahs-genetic-secrets-helping-preserve-this-australian-icon-for-the-future-174772
https://www.behance.net/gallery/51706157/SYDNEY
https://www.kiwi.com/stories/great-barrier-reef/
https://www.adelaidereview.com.au/latest/travel/2019/09/25/
https://nomadsworld.com/australian-animals/
https://www.pexels.com/ {CREATIVE COMMON]

51-52

https://images.app.goo.gl/2oTUTrYnBaEr9qpH9
https://images.app.goo.gl/yfb8eVz7usfwCFzV8
https://images.app.goo.gl/AGdc1fCG7syNU3j27
https://images.app.goo.gl/nM9TCz5uJg4j7LCx6
https://images.app.goo.gl/zmpr9k2uWJrU584p6
https://images.app.goo.gl/tvBh3i3vi3iPsqcGA
https://images.app.goo.gl/zmpr9k2uWJrU584p6
https://images.app.goo.gl/MFeHjtXhCueRyY2e6
https://images.app.goo.gl/5fQuc9ZbRWmX7kbg7
https://images.app.goo.gl/EXeqwjw6xJRctdmk6
https://images.app.goo.gl/VMSs11fKbkKokubf9
https://images.app.goo.gl/cvByCER8Pm1u4P426
https://images.app.goo.gl/aNW58WxR5tQShezk7
https://images.app.goo.gl/LrbtAQ1QAGkGPtRy8
https://images.app.goo.gl/BtHENDwRBmeVjVVC8
https://images.app.goo.gl/JTkb1icp5nUf97v86
https://images.app.goo.gl/MiJbpuCyrFBKQY488

59-60

https://www.pexels.com/ {CREATIVE COMMON
https://marmotamaps.com/]

2012

LOOKING BACK

MOVING FORWARD

2022