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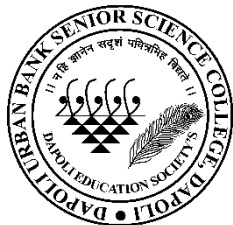
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Index

Sr. No.	Name of Article	Page No.
1.	Electrical Bacteria May Help Clean Oil Spills And Curb Methane Emissions	3
2.	Secrets of an Ancient Chinese Recipe for Bronze Finally Deciphered	4-5
3.	Common Myna (Myna)	6
4.	Ethical Hacking	7-8
5.	Can we live in a World without Commerce?	9-10
6.	Insectivorous plant	11-12
7.	Nobel Prize winner Physics 1930	13-15
8.		

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Address:-

Principal,

Dapoli Urban Bank Senior Science College, Dapoli

Dist. Ratnagiri -415712

Phone- 02358 283256

3. Name & Address of Principal:

Principal Dr. S. P. Jagadale

Dapoli Urban Bank Senior Science College, Dapoli

Dist. Ratnagiri -415712

Phone- 02358 283256

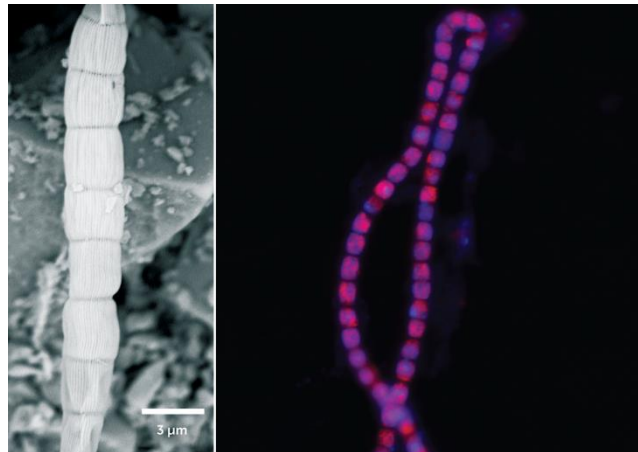
I, Shri Dr. S. P. Jagadale hereby declared that the particulars given above are true to the best of my knowledge and belief.

Sign /-

(Dr. S.P. Jagadale, Principal)

(The editor and publisher may not agree with the views expressed in articles.)

Electrical Bacteria May Help Clean Oil Spills And Curb Methane Emissions



Malkin and her team venture out onto the bay every couple of months to sample the foul muck and track the abundance of squiggling mud dwellers called cable bacteria. The microbes are living wires: Their threadlike bodies — thinner than a human hair — can channel electricity.

Cable bacteria use that power to chemically rewire their surroundings. While some microbes in the area produce sulfides, the cable bacteria remove those chemicals and help prevent them from moving up into the water column. By managing sulfides, cable bacteria may protect fish, crustaceans and other aquatic organisms from a “toxic nightmare,” says Filip Meysman, a biogeochemist at the University of Antwerp in Belgium. “They’re kind of like guardian angels in these coastal ecosystems.

Now, scientists are studying how these living electrical filaments might do good in other ways. Laboratory

experiments show that cable bacteria can support other microbes that consume crude oil, so researchers are investigating how to encourage the bacteria’s growth to help clean up oil spills. What’s more, researchers have shown that cable bacteria could help slash emissions of a potent greenhouse gas — methane — into the atmosphere.

There’s plenty of evidence that cable bacteria exert a strong influence over their microbial neighbors, Meysman says. The next step, he says, is to figure out how to channel that influence for the greater good.

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Article by

Mrs. Amruta Mohite (HOD)

Department of Environmental Science

Secrets of an Ancient Chinese Recipe for Bronze Finally Deciphered



A Chinese bronze container from the fifth century BC

The missing ingredients of an ancient Chinese recipe for bronze may have been uncovered, revealing another level of sophistication in the practice of chemistry at the time.

Kaogong Ji, a 2300-year-old text, is the oldest technical encyclopaedia in the world. The book contains instructions on how to make several objects, such as metal drums, chariots and weapons. It also contains six recipes for bronze that have long puzzled researchers.

While bronze-making wasn't unique to China at that time, Ruiliang Liu at the British Museum in London says the style and scale of the bronzes produced there was unrivalled.

“We asked ourselves, how can Asian and Chinese people manage to produce so many bronzes [at that time],” says Liu.

Bronze is typically made by combining copper and tin. The recipe mystery centres on two ingredients called jin and xi that researchers have been unable to identify. In modern Mandarin, jin means gold, but in antiquity it is believed to have referred to copper or a copper alloy.

Meanwhile, xi has long been considered to refer to tin.

But chemical analyses of bronze vessels from that time period suggest that jin and xi can't simply be copper and tin.

Liu and his colleagues analyzed previously compiled data on the chemical composition of knife-shaped Chinese coins produced in the same era as when the recipes were recorded. By teasing out the relationships between the metals present in the coins, the researchers suggest the objects were created using pre-made alloys.

They discovered that the higher the lead concentration in the coins, the lower the concentration of both copper and tin. The coins with the highest concentration of copper also had the highest concentration of tin. These findings suggest that lead was being mixed into an alloy of copper and tin – a bronze alloy.

By modelling different combinations, the team determined that an 80:15:5 copper-tin-lead alloy mixed with a 50:50 copper-lead alloy

in various ratios was the best match with the chemical coin data.

These pre-made alloys are likely to be jin and xi respectively as recorded in the Kaogong Ji, says Liu. But he adds that the recipes in the book may not reflect how bronze was usually made.

“If anything, the recipes are too specific,” he says. “The people who actually got their hands dirty probably couldn’t read or write so they wouldn’t have been able to record the recipe. I think there is a gap in knowledge between the person who wrote the recipe and the person who did the real work.”

Jianjun Mei at the University of Cambridge isn’t totally convinced by the findings. He says these recipes shouldn’t be considered accurate records of practices used at the time. “These officials [who wrote the text] might only pay attention to the most important materials, such as copper and tin, rather than all other materials,” he says. The recipes still largely work if you take jin and xi to be copper and tin, he says.

Bronze was used in ancient China to make large vessels for religious purposes, says Jessica Rawson at the University of Oxford. “In China, they had a huge workforce and so could afford to use a very complicated system with a lot more metal than in the West,” she says.

Reference

Journal reference: *Antiquity*,
DOI: 10.15184/aqy.2022.81.

Article By

Mr. Kailas V. Gandhi

Department of Chemistry

Common Myna (Myna)

1. Marathi name : Salunkhi
2. English name : Myna
3. Size : 23 Cm
4. Weight : 109.8 to 138 g



Information

Mynas are one of the most common garden birds of India, which are easy to identify because of its distinctive yellow-patch around the eyes which extends to its beak. Common Myna is widely popular in Indian culture, appearing in Vedic and Buddhist texts; often paired with rose-ringed Parakeets (*Tota*), probably because both birds are vocal and are capable of mimicking human sound.

- **Distribution** : Widespread across South and South-east Asia.
- **Habitat** : Open woodland, cultivation and around human habitation.
- **Diet** : These omnivorous birds' feeds on insects, reptiles, small mammals, seeds, grain and fruits and discarded waste from human habitation.

Common Mynas mate for life and build their nests in tree hollows as well as the walls and ceilings of buildings, making these birds a nuisance to humans. Although introduced in Australia and New Zealand as a natural pesticide against locusts and beetles, Mynas have become invasive and a threat to their crops and local birds.

Feeding:

Common Mynas are accomplished scavengers, feeding on almost anything, including insects, fruits and vegetables, scraps, pets' food and even fledgling sparrows.

Breeding:

Common Mynas mate for life. During the breeding season there is usually considerable competition for nesting sites. Favorite locations are in the walls and ceilings of buildings, making these birds a nuisance to humans. Nests are also placed in tree hollows, which are used by native birds. Nests are quite messy and consist of a variety of materials. Leaves, grasses, feathers and assorted items of rubbish are common materials. Violent battles often erupt between occupants of nesting sites and the couple that wish to evict them. Each partner grapples with its opposite number and contestants drop to the ground secured in each other's claws. Bills are jabbed ruthlessly at the opponent. Finally, the defeated couple leaves to search for another site.

Article By
Miss. Nanda B. Jagtap
Department of Zoology

ETHICAL HACKING

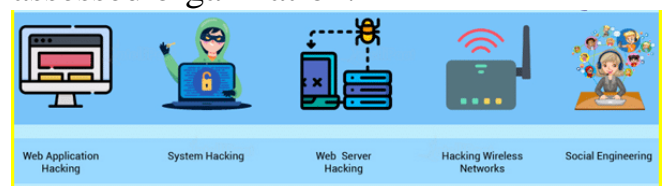
When we talk about Ethical Hacking, it is explicitly implied that we are talking about hacking that is based on ethical or moral values, without any ill intent. Ethical Hacking is defined as any form of hacking that is authorized by the owner of the target system. It can also refer to the process of taking active security measures to defend systems from hackers with malicious intentions on data privacy. From a technical standpoint, Ethical Hacking is the process of bypassing or cracking security measures implemented by a system to find out vulnerabilities, data breaches, and potential threats. It is only deemed ethical if the regional or organizational cyber laws/rules are followed. This job is formally known as penetration testing. As the name suggests, this practice involves trying to infiltrate the system and documenting the steps involved in it. To sum it up, an Ethical Hacker hacks the target system before any harmful hacker can. This allows the security team of the organization to apply a security patch in the system and effectively eliminate an opening for the attacker to enter the system or execute a hack.

Ethical hacking involves an authorized attempt to gain unauthorized access to a computer system, application, or data. Carrying out an ethical hack involves duplicating strategies and actions of malicious attackers. This practice helps to identify security vulnerabilities which can then be resolved before a malicious attacker has the opportunity to exploit them. Also known as “white hats,” ethical hackers are security experts that perform these security assessments. The proactive work they do helps to improve an

organization’s security posture. With prior approval from the organization or owner of the IT asset, the mission of ethical hacking is opposite from malicious hacking.

Hacking experts follow four key protocol concepts:

1. **Stay legal.** Obtain proper approval before accessing and performing a security assessment.
2. **Define the scope.** Determine the scope of the assessment so that the ethical hacker’s work remains legal and within the organization’s approved boundaries.
3. **Report vulnerabilities.** Notify the organization of all vulnerabilities discovered during the assessment. Provide remediation advice for resolving these vulnerabilities.
4. **Respect data sensitivity.** Depending on the data sensitivity, ethical hackers may have to agree to a non-disclosure agreement, in addition to other terms and conditions required by the assessed organization.



Types of Ethical Hacking

1. **Web Application hacking:** Web hacking is the process of exploiting software over HTTP by exploiting the software’s visual chrome browser, meddling with the URI, or colluding with HTTP aspects not stored in the URI.
2. **System Hacking:** Hacktivists gain access to personal computers over a network through system hacking. Password busting, privilege escalation, malicious software construction, and packet sniffing are the defensive measures

that IT security experts can use to combat these threats.

3. Web Server Hacking: An application software database server generates web information in real-time. So attackers use Gluing, ping deluge, port scan, sniffing attacks, and social engineering techniques to grab credentials, passcodes, and company information from the web application.

4. Hacking Wireless networks: Because wireless networks use radio waves to transmit, a hacker can easily squirt the system from either a location nearby. To discover the Identifier and bodge a wireless network, often these assailants use network snorting.

5. Social Engineering: The art of manipulating the masses so that they divulge sensitive information is known as social engineering. Eugenics is used by criminals since it is generally easier to attack your organic hard time trusting than it is to figure out how to spoof your device. There are a number of bug bounty platforms these days, and large companies like Facebook run their own Whitehat programs. But there's never been a study of the ethical hacking community as large as the one just completed by HackerOne. It surveyed its base of nearly 2,000 hackers around the world to come up with these results.

10 interesting facts about ethical hackers, based on the largest ever survey

1. India leads the world in ethical hackers; 23% live there (the U.S. is number two with 20%)

2. Top ethical hackers in India make 16 times the median salary for a software engineer in that country (wow)

3. 58% call themselves "self-taught," but many report they've taken at least some computer science classes

4. Top motivations are "the opportunity to learn tips and techniques," "to be challenged, and "to have fun"; "making money" was 4th

5. 37% hack as a hobby

6. 12% make more than \$20,000 annually

7. 3% make more than \$100,000 annually

8. 1% make more than \$350,000 annually

9. Young person's game: 90% of hackers are younger than 35

10. You can see 20 examples of vulnerability rewards for hackers right here

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Article By

Miss. Netranjali Sandip Mahadik

Department of Computer Science

Can we live in a World without Commerce?

The exchange of products and services involving two or more parties is referred to as commerce. Essentially, it entails purchasing and selling valuable items. The three parties involved in commerce can be either consumers, businesses, or both. Value is exchanged in commerce, and often each of the parties makes money from the transaction. It also encompasses the services provided by businesses and other organizations that support the exchange of products and services. Since the earliest bartering communities, trade has played a significant part in human societies. Even as the world has gotten more connected, its significance has only increased. Global commerce is without a doubt one of the major forces behind globalization. International finance was a major factor in escalating the problem in the present global recession, as well. Let's see the significance of commerce.

Assists in achieving human needs: Trade between nations and across boundaries has been made easier by commerce. In turn, this flow of goods results in the satisfaction of human needs. Additionally, this promotes social welfare. E-commerce product distribution has made it possible for more small firms to thrive.

Raise the level of living: The rise in money flow has also led to a rise in consumption. People are financially

supported and encouraged to make necessary purchases, which raises their level of living. Additionally, the capacity to order a product from anywhere and have it delivered to a variety of locations has made it possible to streamline services, hence boosting consumerism and raising the standard of living.

Giving consumers and producers more power: A nation's economy would inevitably suffer if manufacturing keeps producing but stops selling. Trade is still conducted today because of commerce. The transportation of goods is facilitated by the chain of merchants and wholesalers who buy the items from producers and promote them effectively. The market will become stagnant without these channels. E-commerce is now furthermore the most practical link between customers and manufacturers because of digital platforms.

Creating job opportunities: Commerce is the leading indicator of expansion in industries including manufacturing, warehousing, transportation, banking, and advertising. We require human resources to make sure that these operations are efficient. Both trained and unskilled labor, as well as many white-collar professionals, can find employment in commerce.

Facilitating the generating of income for an entire nation: As trade grows, so do production and consumption. This gives the country's residents employment options. This in turn affects a country's national income. The typical citizen's gross income has a role in the nation's development.

Supporting auxiliary sector growth: Commerce fosters stronger expansion in auxiliary industries including banking, insurance, public relations, promotion, and marketing, among many others.

Promoting industrial development: The growth of industries is one of the key effects of the commercial sector. The specialization is made more efficient by commerce, which also supplies raw ingredients to the industries. Every section of the industry is carefully divided to promote growth and development.

Promoting global trade: The development of e-commerce has enabled companies to look beyond the borders of their own nation. This has made international trade more efficient. Additionally, trade has made it possible to interchange goods and excess domestic production. Increased international trade is a result of improved transportation and communication infrastructure, which is another outcome of the business.

Advantages for developing countries: Commerce has generated opportunities for developing countries all over the world to export excess raw materials to other countries. This process has increased trade as well as the flow of funds into developing countries.

Supporting necessities: Whatever trade and transfer of food, medicinal products, relief packets, and so on is strongly reliant on the distribution network and the commerce industry's smooth operation. During natural disasters such as earthquakes, floods, and some other natural disasters, commerce demonstrates its worth.

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Article by:

Miss. Siddhi Salgaonakar.

Department of Commerce

Insectivorous plant

Insectivorous plants have the most bizarre adaptations to low-nutrient environments. These plants obtain some nutrients by trapping and digesting various invertebrates, and occasionally even small frogs and mammals. Because insects are one of the most common prey items for most carnivorous plants, they are sometimes called insectivorous plants. Most plants absorb nitrogen from the soil through their roots. But carnivorous plants absorb nitrogen from their animal prey through their leaves specially modified as traps. They have features to attract, trap, kill, and digest prey, and absorb nutrients.

A) Sundews



Fig. Drosera spp.

Sundews are plants that trap prey in sticky hairs on their leaves. They make up one of the largest groups of carnivorous plants. Long tentacles protrude from their leaves, each with a sticky gland at the tip. These droplets look like dew glistening in the sun, thus their name. The glands produce nectar to attract prey, powerful adhesive to trap it, and enzymes to digest it. Once an insect becomes stuck, nearby tentacles coil around the insect and smother it. Sundews can reach a height of up to 10 inches (25 cm). However, some

species are tall and with a vine-like appearance, while others hug the ground, making their size variable. Sundews are found in most of the United States, except some portions of the Southwest. They prefer bog habitats and soils lacking nitrogen.

These plants feed on insects. Mosquitoes are abundant in the sundews' preferred habitat and can make up a significant portion of their diet in these locations. Sundews can kill a trapped insect in about 15 minutes, but may digest it over a few weeks. The plant's deadly secretions are harmless to the assassin bug, which hides on the plant to take advantage of helpless victims.

Many species of sundew can self-pollinate, while others reproduce through seeds. Some species of sundew are listed as threatened or endangered in specific states. The primary threat to sundews is loss of wetland habitat.

2) Venus Fly trap



Dionaea muscipula

The Venus flytrap is a flowering plant best known for its carnivorous eating habits. The "trap" is made of two hinged lobes at the end of each leaf. On the inner surfaces of the lobes are hair-like

projections called trichomes that cause the lobes to snap shut when prey comes in contact with them. This type of movement is called thigmotactic—a nondirectional plant response to being touched. To prevent the plant from wasting energy if prey isn't actually there, the trap will only shut when the trichomes are touched multiple times. The hinged traps are edged with small bristles that interlock when the trap shuts to ensure the prey can't squirm out. There are other carnivorous plants in the wild, but the Venus flytrap is one of the very few that exhibits motion to actively trap its prey.

The Venus flytrap is endemic to North and South Carolina, but it has been introduced to a few other states, including Florida and New Jersey. It is popular as a potted plant in many parts of the world, but unfortunately most of the Venus flytraps sold have been cultivated or collected from declining wild populations. The plant grows in moist, acidic soil that may be poor in nutrients. Venus flytraps need an open understorey (the part of the forest below the canopy) to live. Part of what keeps the understorey open is natural fires that sweep through and burn away parts of trees and shrubs. These fires can become dangerous to humans, so often we stop them before they have a chance to provide benefits to the forest. This results in less suitable habitat for the sun-loving Venus flytrap.

The Venus flytrap gets some of its nutrients from the soil, but to supplement

its diet, the plant eats insects and arachnids. Ants, beetles, grasshoppers, flying insects, and spiders are all victims of the flytrap. It can take a Venus flytrap three to five days to digest an organism, and it may go months between meals.

Venus flytraps are perennial plants, which means they bloom year after year. The flowers are white with green veins running from the base of the petal toward the edges. Pollinated flowers eventually give rise to seeds. The Venus flytrap is internationally listed as vulnerable. It is also under consideration for federal listing on the U.S.

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Article by:

Miss. Shruti Awale

Department of Botany

Chandrasekhar Venkata Raman Nobel Prize winner Physics 1930

C. V. Raman.
Indian scientist

First Asian to receive a Nobel Prize in any branch of science.1930

Bharat Ratna 1954

Sir Chandrasekhar Venkata Raman was an Indian physicist known for his work in the field of light scattering. He is the first Asian to receive a Nobel Prize in any branch of science. His son Venkatraman Radhakrishnan was a space Indian scientist.

CHILDHOOD AND EDUCATION:

Dr. C.V. Raman was born on 7 November, 1888 in a South Indian Brahmin family in Tiruchirappalli, Tamil Nadu. His father's name was Chandrasekhara Ramanathan Iyer who was a lecturer in Mathematics and Physics in a college in Vishakhapatnam. His mother's name was Parvathi Ammal. C. V. Raman was an intelligent and brilliant student since his early childhood. At the age of 11, he passed his matriculation and 12th class at the age of 13 with a scholarship. In 1902, he joined the Presidency College and received his graduate degree in 1904. At that time, he was the only student who received the first division. He has done his

Master's in Physics from the same college and broke all the previous records. In 1907, he married Lokasundari Ammal and had two sons namely Chandrasekhar and Radhakrishnan. Because of his father's interest, he appeared for the Financial Civil Services (FCS) examination and topped it. In 1907, he went to Calcutta (now Kolkata) and joined as Assistant Accountant General. But in the spare time, he went to the laboratory for doing research at the Indian Association for Cultivation of Sciences. Let us tell you that, his job was very hectic then also he continued his research work at night due to his core interest in science.

WORKS AND DISCOVERY:

He established the Indian Journal of Physics in 1926 where he was the Editor. He also sponsored the establishment of the Indian Academy of Sciences and served as the President since its inception. He was the President of the Current Science

Association in Bangalore, which publishes Current Science (India).

In 1928, he wrote an article on the theory of musical instruments to the 8th Volume of the Handbuch der Physics. He published his work on the "Molecular Diffraction of Light" in 1922 which led to his ultimate discovery of the radiation effect on the 28th February 1928 and gained him to receive Nobel Prize in Physics in 1930. He became the first Indian to receive a Nobel Prize. Other researches carried out by Dr. C.V. Raman were: Diffraction of light by acoustic waves of ultrasonic and hypersonic frequencies and effects produced by X-rays on infrared vibrations in crystals exposed to ordinary light.

In 1948, he also studied the fundamental problems of crystal dynamics. His laboratory has been dealing with the structure and properties of diamond, and the structure and optical behavior of numerous iridescent substances like pearls, agate, opal, etc. He was also interested in the optics of colloids, electrical and magnetic anisotropy, and the physiology of human vision.

As briefly described that he is best known for discovering the 'Raman Effect' or the theory related to the scattering of light. He showed that when light traverses a transparent material, some of the deflected light changes its wavelength.

Awards and Honours

- In 1924, he was elected as a Fellow of the Royal Society early in his career and was knighted in 1929.
- He won the Nobel Prize in Physics in 1930.
- He was awarded the Franklin Medal in 1941.
- He was awarded the Bharat Ratna in 1954, the highest civilian award in India.
- In 1957, he was awarded the Lenin Peace Prize.
- The American Chemical Society and the Indian Association for the Cultivation of Science in 1998 recognised Raman's discovery as an International Historic Chemical Landmark.
- On 28 February every year, India celebrates **National Science Day** to commemorate the discovery of the Raman Effect in 1928 in his honour.

Discovery of Raman Effect:

The Raman Effect is the process of scattering of light particles by molecules of a medium. The scattering occurs due to a change in the wavelength of light as it enters the medium. When a beam of light travels through a dust-free, transparent chemical, a small fraction of the light emerges in directions other than where it should.

Light consists of particles called photons, whose energy is directly

proportional to the frequency with which they travel. When they strike molecules in a medium at high speeds, they bounce back and scatter in different directions depending on the angle with which they hit the molecules.

DEATH:

In 1970, he received a major heart attack while working in the laboratory. He took his last breath in the Raman Research Institute on 21st November, 1970.

Dr. C.V. Raman was one of the great legends from India whose hard work and determination made India proud and became the first Indian to receive a Nobel Prize in Physics. He proved that, if a person really wants to pursue his/her desires nobody can stop. His interest in science and dedication towards research works made him discovered the Raman Effect. He will always be remembered as a great Scientist, Physicist, and Nobel laureate.

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Article by:

Mr. Aniket Nandiskar

Department Of Physics

