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January 2019

Volume 24 Number 1

journal of science education



Seeking Order in Chaos ❖

Fillable Fractions ❖

Stopping and Reversing Climate Change ❖

Unraveling the Secrets of the Brain ❖

From Periodic Solutions to Instabilities and Chaos

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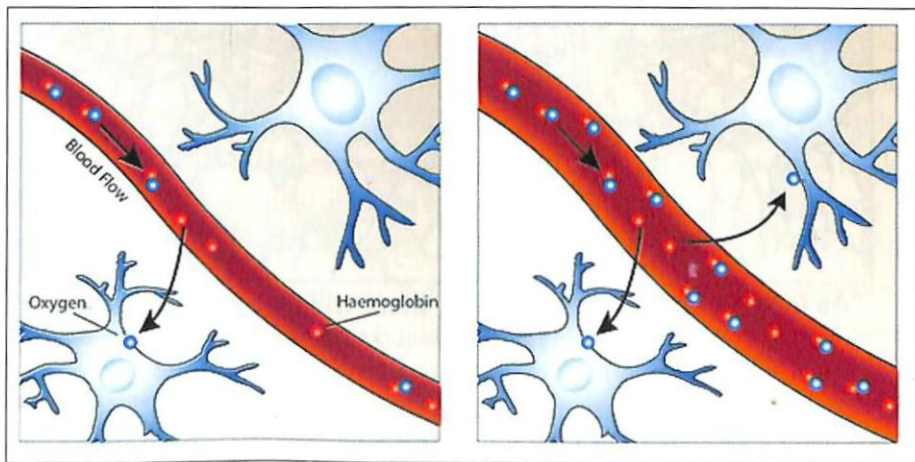
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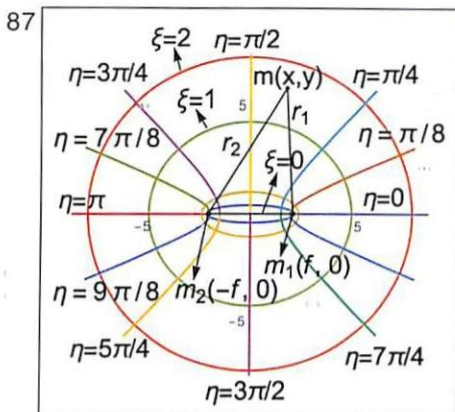
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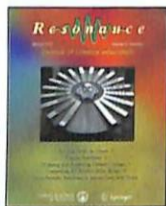
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The cover image features the monument to the Periodic Table honoring Dmitri Mendeleev, situated in front of the Faculty of Chemical and Food Technology of the Slovak University of Technology in Bratislava, Slovakia.

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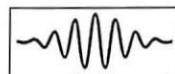


Periodic Table

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Flowering Trees
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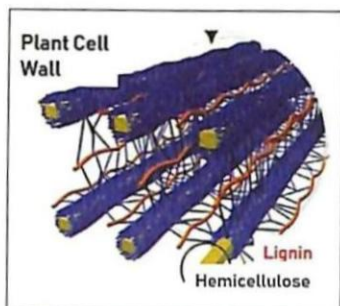
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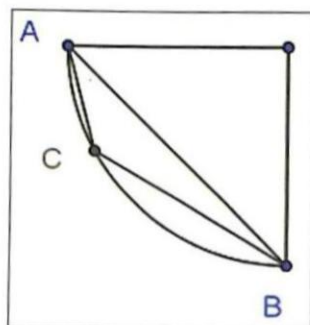


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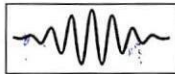

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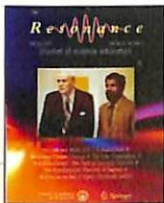



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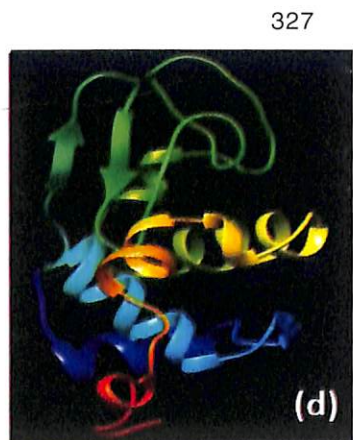
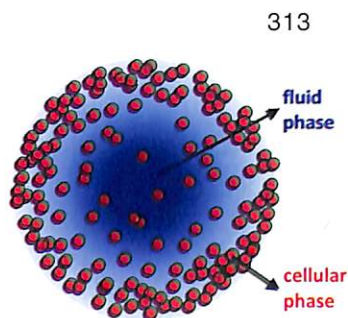
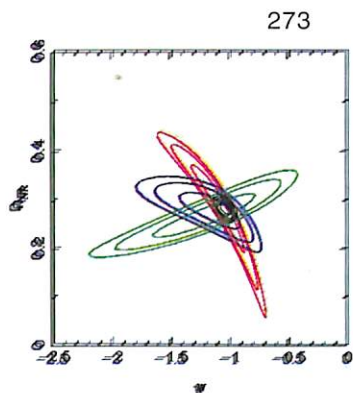


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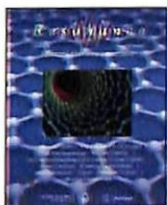
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Mildred Dresselhaus
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Illustration: Subhankar Biswas

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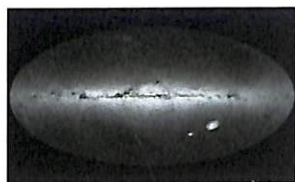
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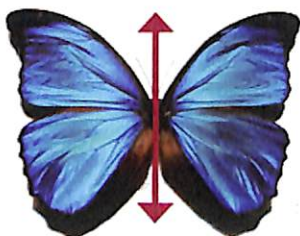
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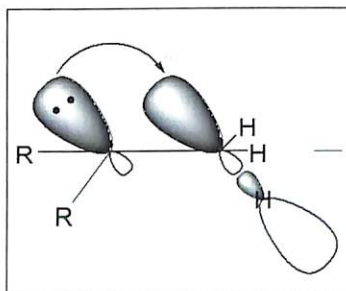
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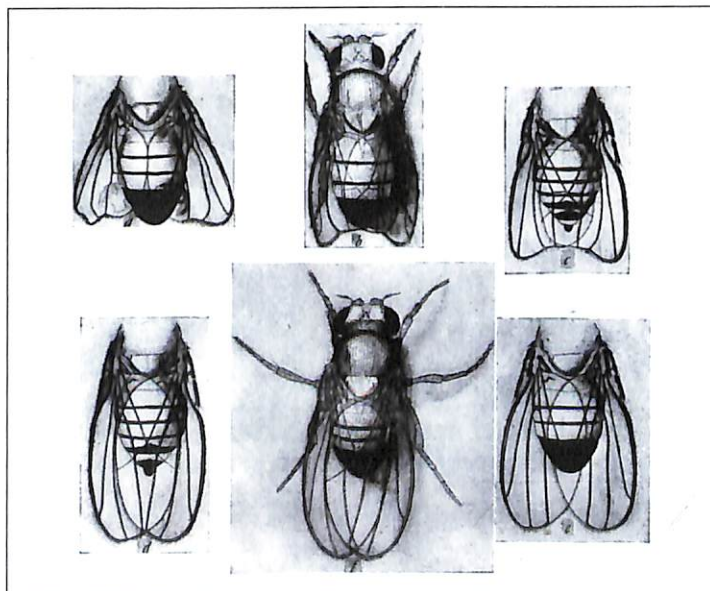
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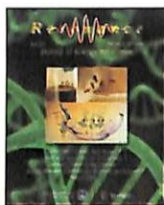


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Common *Drosophila* fruit flies that only need a banana to grow in the laboratory are responsible for some of the major advances in the field of biological science. All started with the genetics experiments in the early twentieth century.

(Cartoon by: Subhasish Halder)

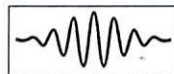
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Hermann Joseph Muller
(1890–1967)

Illustration: Subhankar Biswas

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Flowering Tree
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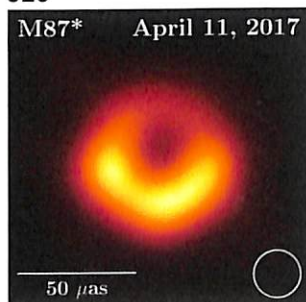
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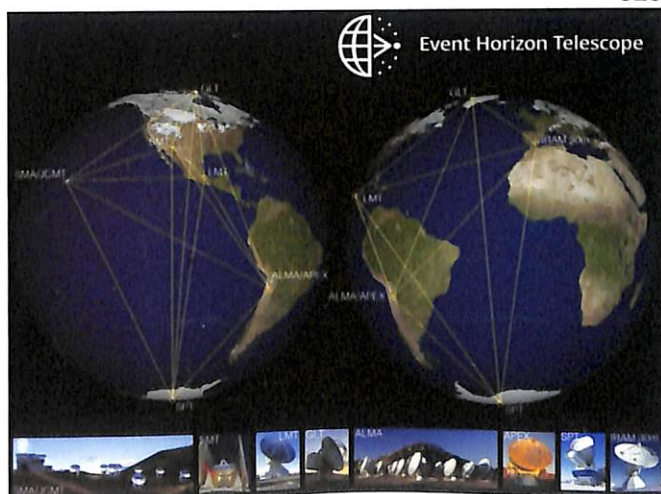
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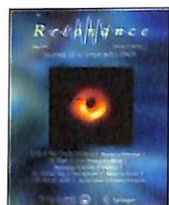
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The front cover depicts the image of the ring around the M87 black hole as captured by the Event Horizon Telescope. The dark central spot is the black hole's shadow. This is the first image of a black hole ever and was originally published in *The Astrophysical Journal Letters* in April 2019.

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Jean Bourgain
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I Am the Light Beneath Your Eyes ❖

Composition of Binary Quadratic Forms ❖

Feynman Diagrams: A Toy Example ❖ Foucault's Pendulum ❖

Listen to a Martingale! ❖

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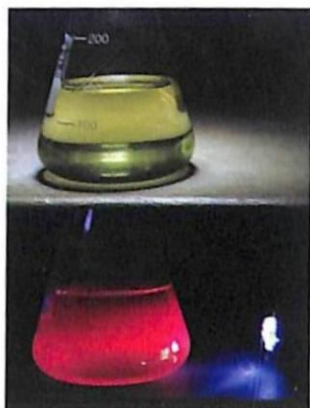
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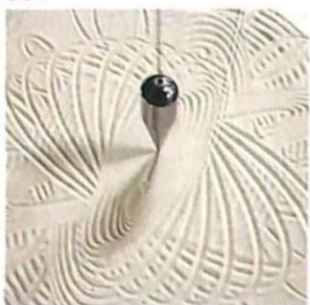
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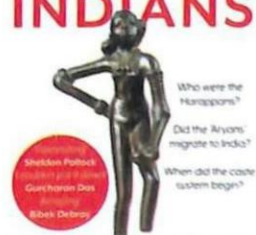
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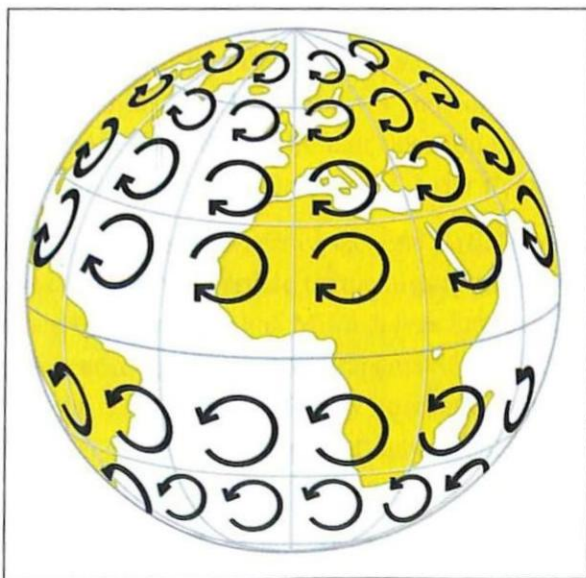
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Map of the principal components of gene frequencies, showing the genetic relationships between various human populations across the world, produced by Luigi Luca Cavalli-Sforza in his book *The History and Geography of Human Genes* (1994).

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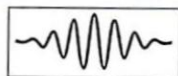
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Luigi Luca Cavalli-Sforza (1922–2018)

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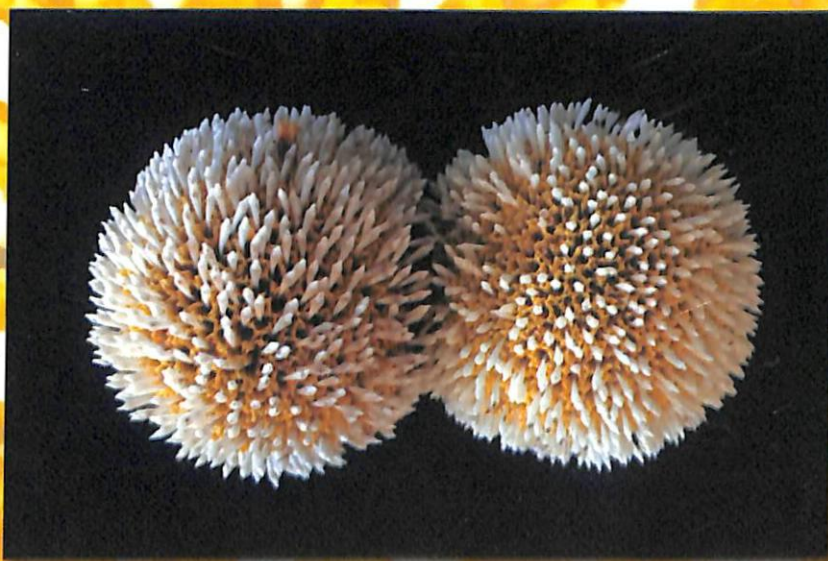
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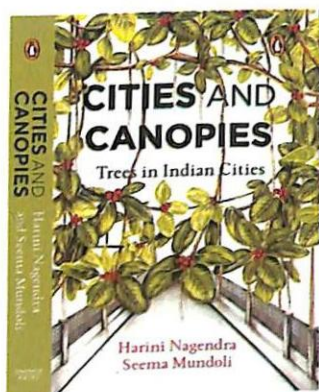
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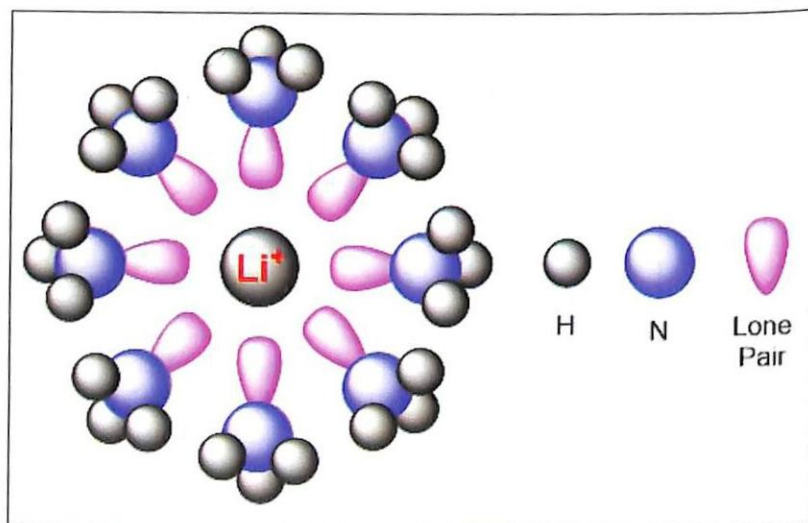
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Flowering Tree
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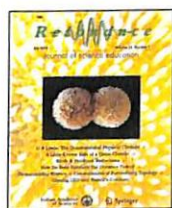


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Two Kadamba flowers used to represent the electron densities of two atoms forming a chemical bond.

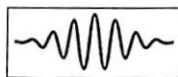
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G N Lewis (1875–1946)

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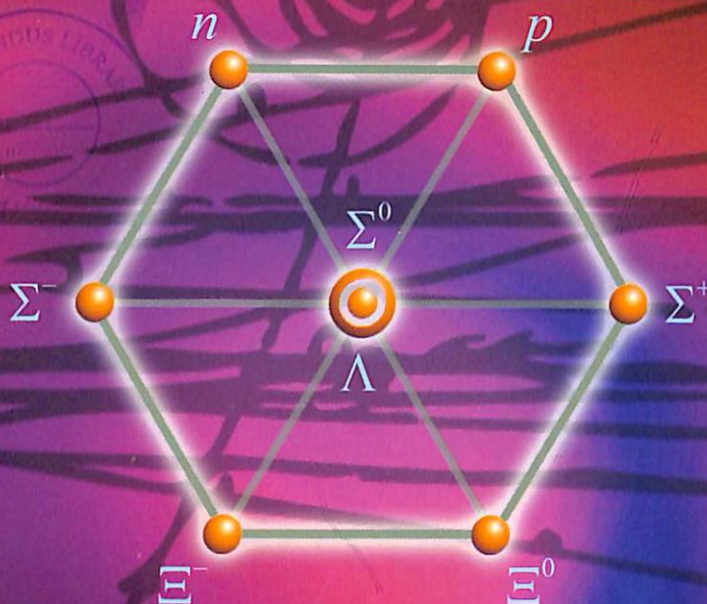
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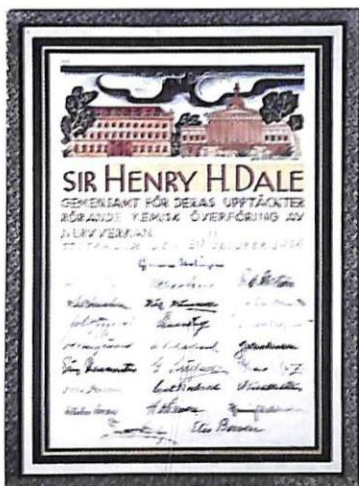
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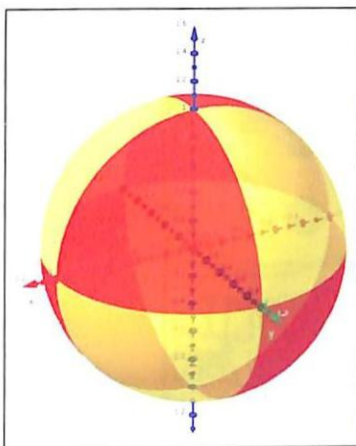


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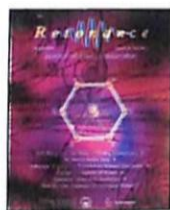
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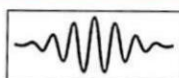
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Murray Gell-Mann (1929–2019)
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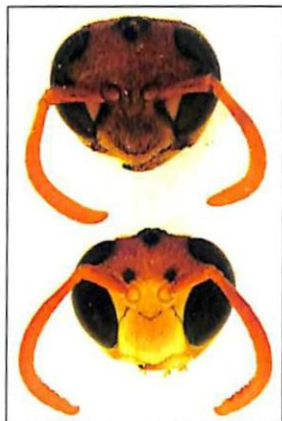
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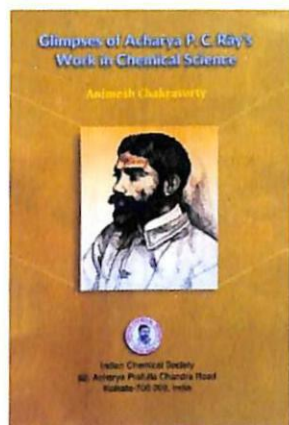
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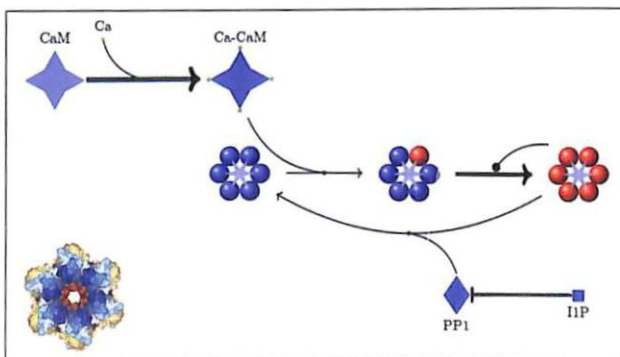


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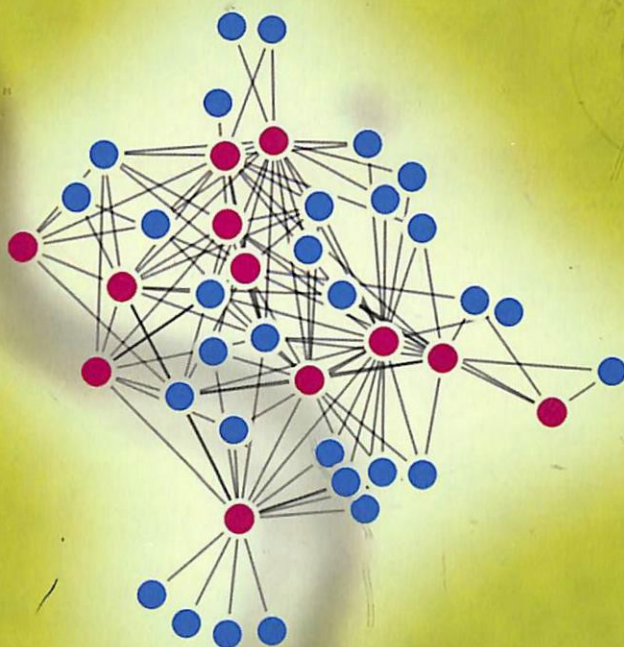
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Retrosynthetic Analysis ❖

How Do Wasps Decide Who Would Be the Queen ❖

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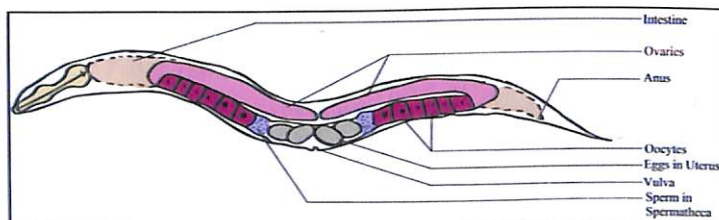
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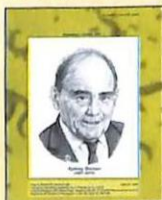
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The image on the front cover represents the partial connections of the *C elegans* worm. The pink circles represent amphid sensory neurons and blue circles represent interneurons. All known connections are represented.

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Sydney Brenner (1927–2019)
Illustration: Subhankar Biswas

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Flowering Tree

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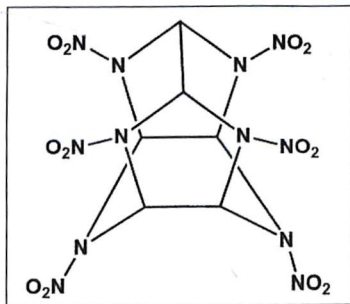


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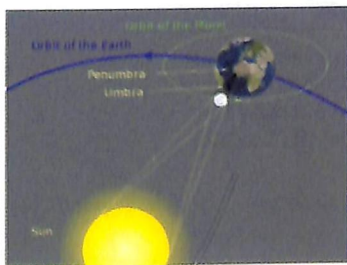


Photo: Souvik Mandal





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Nightlife

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M G K Menon (1928–2016)

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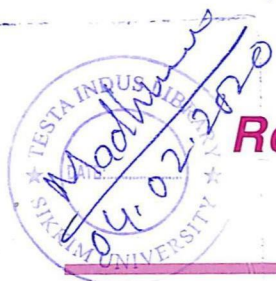
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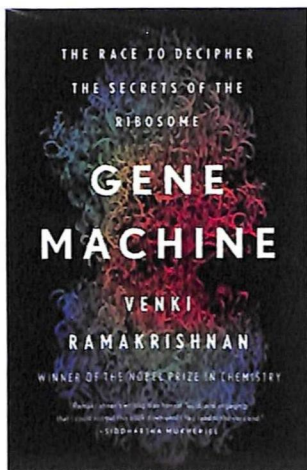
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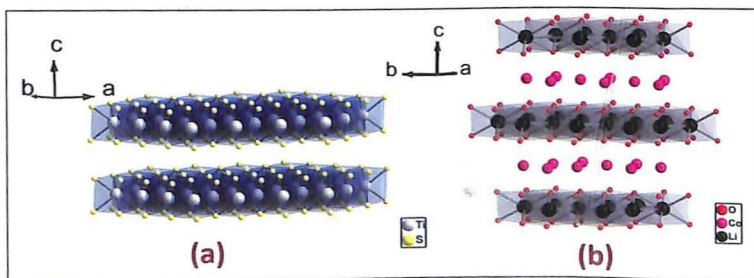
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Birds in the Backyard
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Front Cover



The photograph on the front cover shows common crop seeds or grains. From left to right, the first row shows wheat, rice, sorghum, pearl millet and finger millet; the middle row shows mung beans, matki beans, red lentils, kidney beans and cowpeas; the bottom row shows chickpeas, green peas, flax, garden cress and black sesame. The photograph symbolizes tribute paid to N. I. Vavilov's idea of documentation and preservation of different crop varieties.

Back Cover



Nikolai Ivanovich Vavilov (1887–1943)
Illustration: Subhankar Biswas

