

In this issue

Liberal Arts Meet Sciences *Educational strategies*

The National Education Policy 2020 may provide the flexibility required to introduce courses that cut across disciplines and to bridge the famous ‘two cultures’ of C. P. Snow. Leveraging on the experience of teaching a course on the principles of science in a liberal arts curriculum, Thounaojam Umeshkanta Singh suggests methods to integrate natural sciences, humanities and social sciences in university curricula.

In a General Article in this issue, he stresses the importance of incorporating the principles of science in liberal arts curricula and, in science curricula, the history and philosophy of science. Narrow specialisations do not give the intellectual flexibility and spirit of innovation required to cope with a rapidly changing world, he says. Read on for more from **page 1252**.

Plant–microbe Interaction *MicroRNAs mediate*

Many bacteria and fungi infect plants. Plants resist the attack by recognising the pathogen and initiating defence mechanisms. The pathogens respond by trying to overcome recognition or by inhibiting plant defences. In the evolution of this armament race between plants and microbes, microRNAs play a major role.

It is not merely in conflict – microRNAs play a role in regulating collaboration between microbes and plants also, helping plants access nitrates, phosphates and minerals, warding off attack by pathogens and pests...

Human understanding of the network microRNAs involved in conflict and collaboration between plants and microbes has gone through an exponential growth in the last two decades and seems to have hit a plateau now. It is time to review the topic, to synthesise information scattered in

journal articles. Read the Review Article on **page 1282** in this issue.

Groundwater in Raebareli *Water quality index*

The Raebareli district in Uttar Pradesh is home to nearly 35 lakh people. Most of the population is rural and agriculture-based and cannot access piped water supply. So, people here depend on groundwater for drinking and domestic use.

Researchers from the Shri Ramswaroop Memorial University, Barabanki examined water samples from dug wells and hand pumps during different seasons to measure water contaminants and to calculate the water quality index.

Though areas with excellent water quality and those with water unfit for drinking do not change much from season to season, water quality is generally better during the monsoon in most areas. About half the sources of groundwater are poor quality – some not fit even for cattle to drink. Geogenic fluoride and anthropogenic nitrates in the groundwater pose problems for public health in the area, say the researchers. Read on for more details in the Research Article on **page 1308**.

Bricks and Binder Heritage *In Vat Phou, Laos*

Vat Phou is a Khmer Hindu temple constructed in southern Laos, in the fifth century and expanded as a complex between 11th and 13th century AD. Today, the UNESCO heritage site is in a dilapidated condition.

The brick masonry in the gallery of the southern quadrangle of the Vat Phou temple is badly in need of restoration. It is important that the materials used in restoration closely match the original. Researchers from IIT Madras undertook a study of the bricks and binder used in the ancient temple.

When modern science and technology probe ancient monuments, secrets of the processes used for making bricks and binder from the historical past come tumbling out of cultural heritage. Read more in the Research Article on **page 1300** in this issue.

Gelatinous Foam on Beaches

Early morning, 10 June 2019, white gelatinous foam, about two feet high, appeared along a stretch of about 300 metres on the beaches of Kollam, Kerala. It was the rainy season. Within three hours, the rains washed away most of the foam. What caused this transient phenomenon?

Researchers from the CSIR-NIO went to the location on 11 June to collect samples of what was left of the foam, by now turning yellowish, and conducted a series of experiments. The foam contained a large number of viruses, quite a few bacteria and the alga, *Phaeocystis globosa* Scherffel, says the Research Communication on **page 1371** in this issue.

The alga is usually seen as vegetative solitary cells but suddenly blooms and forms colonies of thousands of cells, held together by gelatinous materials. The colony secretes toxic substances that reduce predation. But the bloom accumulates protozoa and viruses – many that infect the alga. The colony disintegrates leaving the gelatinous material behind. This algal bloom is known to impact fisheries.

Usually, the blooms of this harmful alga occur on the coasts of higher latitudes. It is rare on the coasts of Kerala, well known for upwelling and rich harvests of fish that come closer to shore during the monsoon. What triggered this rare event in 2019? What can we do to ensure that it does not recur?

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