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Saving folk rice landraces from genetic contamination

Traditional farmer breeders of India used to maintain the purity of over 46,000 rice (*Oryza sativa* var. *indica*) landraces, adapted to diverse ecological conditions, by careful removal of off-type seeds. Although rice is predominantly self-pollinated, pollen from wild relatives and modern rice cultivars is a source of genetic 'contamination' of the evanescent landraces, which are losing their unique characteristics. To prevent pollen transfer, experts suggest keeping a large (>100 m) gap, or else building crop barriers with sugarcane or pigeonpea, between neighbouring cultivars. Both these methods are neither practicable for subsistence farmers of South Asia, nor fully effective in preventing cross-pollination. Deb's (**page 155**) experiment with 360 landraces over 6 years suggests that a cropping design based on >12 h difference between the date of the onset of flowering of a landrace and that of the end of flowering of its neighbour can prevent pollen transfer between them.

Probing matter at extreme pressures and temperatures

The Laser Heated Diamond Anvil Cell (LHDAC) is the state-of-the-art technique for generating extreme pressures and temperatures. It has opened up a new arena for probing matter at extreme conditions to synthesize novel materials at conditions hitherto not achieved in the laboratory. The important constituent of the set up is the diamond anvil cell (DAC). While the high strength of the diamond enables generating highest static pressure (≥ 500 GPa), the transparent diamonds allow high power IR lasers to be focused onto the pressurized samples to heat it to very high temperatures (≥ 5000 K). The LHDAC

technique is amenable to probes starting from visible to gamma rays. Such a facility set up by Subramanian *et al.* (**page 175**) consists of a CO_2 laser, a Mao-Bell type DAC, motorized translation stages, a CCD based spectrometer and focusing optical assembly.

Earthquake simulation

Earthquake simulators are shake tables capable of three-axis linear as well as rotational movement. This capability is required to reproduce earthquake histories as recorded around the world near their epicentres. It makes it possible to study structural response under conditions that closely resemble actual earthquakes. The test technology associated with earthquake simulation is controlled by a handful of countries. This makes the test equipment forbiddingly expensive. Thus, until a few years ago, there was only one such facility in the country, imported at a cost said to exceed Rs 20 crores. Ammanagi *et al.* (**page 190**) describe the development of the first indigenous 3-axis shake table, which has been operational at the Indian Institute of Science for almost two years. Results are presented on the simulation of actual earthquakes such as El Centro (California), Kalamata (Greece) and Chi Chi (Taiwan). Though this table has a payload of just 500 kg and is intended largely for education and research, Ammanagi *et al.* claim that it can be readily scaled up to much higher capacity by arguing that the control hardware and software as well as kinematics do not depend on payload capacity.

Arsenic sequestration by metallic iron

Metallic iron has proven to be quite efficient in sequestering dissolved arsenic from water. The mechanism of arsenic sequestration by metallic iron under aerobic conditions appears to be adsorption of arsenic on rust, i.e. iron oxide minerals formed on the metallic iron surface as a result of aerobic corrosion. Sharma and Bose (**page 204**) test a hypothesis concerning the mechanism of arsenic sequestration by metallic iron under strongly reducing conditions. It is suggested that anaerobic corrosion for metallic iron will produce strong reducing conditions in the vicinity of the iron surface, which is sufficient for deposition of arsenic-sulfide, iron-arsenic-sulfide and iron-arsenide phases on the metallic iron surface, leading to arsenic sequestration by metallic iron. X-ray diffraction (XRD) patterns of metallic iron surfaces after contact with arsenic and sulfate showed evidence of arsenopyrite (FeAsS) and oripment (As_2S_3) phases.