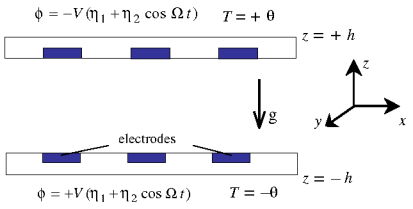
In this issue

Nano-sized smart materials

There has been considerable thinking in recent years on the nature of scientific, engineering, and technological aspects to be carried out in the manufacture of new strong materials like nano and smart materials. These materials involve different length scales right from nano to meso, meso to micro, and micro to macro level with dimensions ranging from zero to three. These materials have evolved to ensure optimum strength and maximum tolerance of flaw. It is the accuracy, reliability, most importantly the predictive power and simulative tool that can be exploited in designing nano and smart materials whose properties can be tailored to suit the desired application. This has renewed interest in the theoretical study of the behaviour of these materials with the motive of understanding the



instability that sets in during the solidification of alloys, which leads to the formation of a layer of dendrites also called mushy layer of dendritic crystals of nano size, which are regarded as certain impurities in the materials arising from instabilities. Therefore there is a need to control, if not completely eliminate these instabilities to manufacture strong material with reduced impurities for important desired applications. The existing mechanism of manufacturing smart materials of nanostructure is mainly based on piezoelectric concept arising in the use of dielectric alloys. Rudraiah and Ng (**page 1076**) advocate the use of usual current arising from using poorly conducting alloys flowing through nanosized porous material in the presence of transverse applied electric field. They provide a brief overview of different types of surface and convective instabilities and propose mechanisms to control them.

Antioxidants for polygenic disorders

Tiwari (**page 1092**) describes the importance of imbalance between antioxidation and oxidation homeostatic phenomena as the root cause of several disorders and reviews the development of several modern medicines for treatment of various diseases based on this principle. He highlights an urgent need for explanation and interpretation of Indian traditional medicine based on the above principles wherever possible in terms of modern medical developments and further describes efforts made in India by CSIR to develop therapeutics based on the above principles.

Infant development in the slender loris

Radhakrishna and Singh (**page 1121**) studied infant development in the grey slender loris *Loris lydekkerianus lydekkerianus* in the forests of Dindigul. A greater number of twin births was observed than singleton births and more isosexuals than heterosexuals. Mothers parked the infants at the age of 3 weeks and weaned them by the age of 5 months. Females appeared to reach sexual maturity by 10 months of age. Social interactions with related conspecifics decreased with age and adult slender lorises did not show differences in social time spent with related and non-related conspecifics.

Shannon's uncertainty principle and gene expression

Codon adaptation index (CAI) has been widely used to find the gene expression level of a gene but for calculating CAI one requires prior knowledge of optimal codon in a set of highly expressed genes. But unfortunately, experimentally known highly expressed genes are very scarce in most of the organisms. In addition to that, in species where translational selection is either absent or ineffective and mutational bias is more pronounced, the CAI values for individual genes are related to its base composition rather than its expression level. In order to overcome these problems, Subramaniyam *et al.* (**page 1142**) have studied application of Shannon's uncertainty principle to measure the degree of constraints in codon bias in the coding sequences of *E. coli*, *S. cerevisiae* and *H. influenza* and the results show a high degree of correlation between Shannon's uncertainty values and CAI. This emphasizes the importance of Shannon's uncertainty principle over CAI in predicting the expression levels of genes.

Earthquake sequence in Saurashtra

An earthquake sequence started in Bhavnagar in eastern Saurashtra on 9 August 2000 with two main earthquakes of magnitude 3.6 on 10 August 2000 and of magnitude 3.8 on 12 September 2000. The maximum magnitude of aftershocks was 3.1 for each of these two main events. Bhattacharya *et al.* (**page 1165**) studied locations of 43 events obtained using the data from local seismograph network. The hypocentres were confined to an area 6 km × 4 km with focal depths between 1 and 4 km and this area is located in and around southeastern part of Bhavnagar town. The damages were disproportionately high considering the magnitudes of the events and this is partly explained by the presence of loose alluvium or poorly consolidated alluvium. The recent seismic activities in Saurashtra region indicate that the region is under the influence of active tectonic processes.