In this issue

Targeting Cancer
Advances in drug delivery

We do have drugs that can stop the onslaught of cancer cells. The problem, however, is delivering them to a specific site where malignancy has set in. Cancer therapeutics are toxic and are meant to kill cells. The non-specific delivery of such drugs is detrimental to normal cells. This problem has long been a stumbling block in cancer therapy.

However, recent developments on using chitosan nanoparticles to deliver drugs specifically to cancer cells, raise hope for reaching a solution to the problem soon.

Malignant tissues are more prone to the entry and accumulation of nanoparticles because of their leaky vasculature. Within the acidic environment of cancer cells, chitosan nanoparticles offload drugs with greater ease and thus ensure targeted action. Because malignant cells frequently express receptors for folic acid, the targeting can be made more precise by coupling folic acid with chitosan nanoparticles.

Such systems can be used for the delivery of both drugs and gene fragments to malignant cells, and even to cancer stem cells, for enhanced therapeutic effect. On **page 1530** read a Review Article where scientists from India, Malaysia and Vietnam discuss the recent advances in chitosan–folic acid systems and the advantages they offer for cancer therapy.

LED through the Years
Analysis of patents

LED bulbs consume half the amount of power used by incandescent bulbs and tube lights. They have a longer lifespan and, therefore, reduce the amount of disposable waste generated each year. Due to these quali-ties, LED electronics have taken over the market. This sector is projected to grow further in the coming years. But growth depends on innovations and advancements in the industry. After all, LEDs have been around for the past 50 years but it is only now that people have begun using this technology.
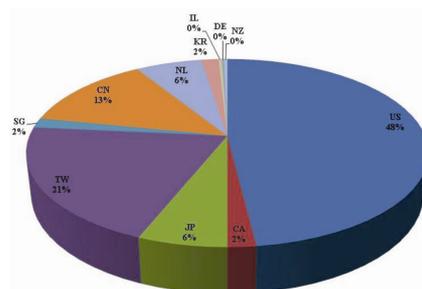
LED bulb patent percentage.

A study of developments in LED technology shows us what works best for consumers and highlights what has proven most efficient for market growth till date. On **page 1519** read a General Article that analyses relevant LED bulb patents from the database of the United States Patent and Trademark office from 1976 to 2014.

The study focuses on patents filed by the four largest producers of LED – America, Taiwan, China and Japan. The patents are categorized by country, company, and technology type to cover the broad aspects of production. The article also brings out the historical interplay of policies and patents.

Winds of Change
Ancient Indian maritime network

Knowledge of monsoon winds helped early mariners sail across vast oceans. Until recently, Hippalus – a Greek mariner who navigated the Red Sea – was credited with discovering the monsoon wind system. However, because these winds them-selves were known as Hypalus, it is possible that a wrong pronunciation led to a confusion between Hypalus and Hippalus, claims Andres Tchernia, a notable historian of maritime archaeology.

This theory draws support from a few historians who claim that monsoon winds were used for navigation since the Hellenistic era. At that time, the southern Arabian Semites and Indians harnessed monsoon winds to cross the Indian Ocean.

Records, however, show that even before Hippalus came to India, people from the Indus valley civilization had started sailing. There is evidence now that suggests that these people were aware of the monsoon winds and the use of celestial bodies for navigation.
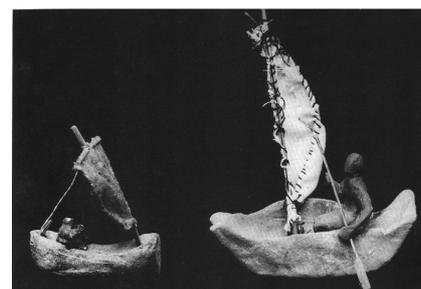
Clay model boats found from Lothal excavations.

Ancient Indian texts from the Rig Veda have precise mentions of Indian traders using monsoon winds and currents for deep-sea navigation. These and other accounts from archaeological excavations at Harappa, Mohenjo Daro and Lothal show that early Indian traders used knowledge of monsoon winds for navigation.

Sila Tripathy from the CSIR-National Institute of Oceanography, maps the existence of the ancient Indian maritime network on **page 1618**.

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