

## In this issue

### Acoustics of conch shell

Conch shell has been used as a sounding device in various cultures in diverse occasions worldwide for millennia. But its acoustics has received little attention excepting a report on its spectrum and theory.

Rath and Naik (page 521) report on the mechanism of sound production in lip-driven shell and present the spectral study on at least five samples of shell through a series of graph generated on computer using the Spectra Plus software. The spectra provide peak frequency and subsequent harmonics for each sample.



The authors attempt to comprehend the generation of notes in the conch shell in analogy with that on a truncated conical horn which the straightened conch cavity fairly approximates to. The theory points to fundamental frequency which does not correspond to the recorded peak frequencies. It is pointed out that the peak frequencies are the 'lock-in' frequencies produced in the phenomenon. They further point out that the 'lock-in' frequencies in pipes and conch shells appeared as odd multiples of the tube fundamentals. Harmonics of all integral multiple of peak frequencies appear in the spectra. The existing theory of 'locking-in' is briefly reviewed and it is shown that the observed data fairly agree with the theory.

### Natural product antifoulants

A. P. J. Abdul Kalam aspired India to become a world leader by 2020. As envisioned by him, our achievements in various avenues like space and information

technology are advancing in exponential proportions. Similarly, one of the areas where we are showing tremendous progress is maritime activities, which include the construction of container transshipment terminal, marinas and jetties, exploration of oil and natural gas, shipping and related development of various ports along the west and east coasts of India and enhanced naval facilities. Our naval force is one of the best in the world and the navy-related marine activities are increasing day by day, leading to the introduction of a number of warships. Also, the merchant navy is doing a great job in transporting men and materials round the globe. The strategic location in international shipping route further enhances our country's importance in the global maritime scenario.

In view of the above, the phenomenon of marine biofouling is of utmost concern to a maritime nation like ours and consequently, the antifouling industry assumes greater significance. As of now, we are totally dependent on the international market for antifouling coating requirements. It is high time that we developed our own antifouling coatings. Currently, the focus is on developing coatings based on Natural Product Antifoulants (NPAs) as an environmentally responsible way of fouling control. With vast virgin resources for NPAs at our disposal, India has great potential for developing greener antifouling coatings. The collaborative efforts of marine biologists, organic chemists, paint and polymer technologists are required to achieve this. Also, encouragements from R&D funding agencies are essential for continuing efforts in this direction. See page 508.

### In search of *Sanjeevani*

Almost every Indian grows up listening to the great epic of *Ramayana* and has heard the name *Sanjeevani* – a life-giving herb. The question whether the plant itself is imaginary or real has been raised quite often.

*Sanjeevani* is a herb with magical powers to bring back to life a dead person. In the *Ramayana* when Laxmana

was wounded and was nearly killed by Ravana's son Meghnaad, Jambuvanth was aware that Sushena, a physician in the 'Lankan' Royalty, was the only doctor who might be of help in bringing back Laxmana to consciousness. Hanuman gets (kidnaps) Sushena, who on examining Laxmana asks Hanuman to fetch *Sanjeevani* from the Dronagiri Hills in the Himalayas (currently in Uttarakhand state of India). The legend has it that upon reaching Mount Meru, Hanuman was unable to identify the herb and decided to lift the entire mountain and bring it to the battle-field. Sushena had examined Laxmana in evening and had demanded that *Sanjeevani* to be brought by day break. Though several botanists and Ayurvedic doctors have suggestions on what could be *Sanjeevani*, there has been no systematic approach nor is there unanimity among them.

K. N. Ganeshaiah and his group address this problem (page 484), through the time-tested method of science and provide a logical, deductive solution. They approach the question 'what is *Sanjeevani*?' just a detective would do, and ask some pointed questions: for example, does *Sanjeevani* really exist? They identify the probable candidates (suspects) using a set of criteria – that the plant must be from hills, it should have medicinal properties and that it should be referred to as *Sanjeevani* or nearly so in Indian languages. Using the descriptions and properties given in the *Ramayana* and other epics they shortlist plants that are referred to as *Sanjeevani* or equivalent name in any Indian language/dialect from their own database. From a preliminary list of 17 plants, they narrow down their search to eight species and finally end up with two probable species, *Selaginella bryopteris* and *Desmodium fimbriatum*. Looking at the distribution of these two species, it is interesting to note that *S. bryopteris* is found in the Arawalli mountains, Madhya Pradesh (and maybe the Dronagiri as well). *D. fimbriatum* is found in the Western Ghats. Coming back to the logistics of Hanuman, it appears, the latter species was more closely available for Hanuman. If so could this be the true *Sanjeevani*? The question remains alive!