Editorial

K L Sebastian, Chief Editor

Email: kls@ipc.iisc.ernet.in

This issue of *Resonance* features the well-known Russian mathematician, Vladimir I Arnold. Arnold has made seminal contributions to mathematics and physics. His work on the stability of classical mechanical systems, along with his thesis supervisor Kolmogorov lead to what is now known as the Kolmogorov–Arnold–Moser (KAM) theorem. (Moser, an American mathematician found the same results independently of Kolmogorov and Arnold.) Arnold never viewed mathematics as an abstract science, independent of its applications. For him it was a part of natural science, especially of physics. According to him mathematics should always be taught with its applications. He was a strong critic of the famous French school of 'Bourbaki', which advocated a particularly abstract approach to mathematics and its teaching, devoid of the use of applications, and even of diagrams. His strong views on the subject is clearly illustrated in this month's Classics, which is the transcript of a talk that he gave in Paris in 1997. A commentary on Arnold's talk stressing what mathematicians should learn from the talk, by Paranjape, too is included in this issue.

Arnold has been honored with several prestigious awards for his contributions, too numerous to list. Interestingly, there is even a small planet, Vladarnolda, discovered by Karachkina in 1981 and registered as #10031, named after Arnold. He has written several interesting books, characterized by his lucid, elegant style. Of them, a book particularly interesting to those aspiring for a career in mathematics is *Arnold's Problems*, a rather thick book that contains a large number of (even now) unsolved problems, discussed by Arnold in his famous seminars at the Moscow State University over several decades. In the preface to the book, Arnold, in his characteristic style, writes: "I. G. Petrovskii, who was one of my teachers in Mathematics, taught

me that the most important thing that a student should learn from his supervisor is that some question is still open. Further choice of the problem from the set of unsolved ones is made by the student himself. *To select a problem for him is the same as to choose a bride for one's son*."

In the Article-in-a Box, Nityananda gives insights into the life of this genius. In another article, he covers the subject of caustics, illustrating how bad lenses lead to singularities which are described by beautiful mathematics. The universal features of such singularities was one of Arnold's favorite research topics. Jain gives an elementary introduction to the subject of nonlinear resonances and his article should serve as a starting point for anyone interested in the famous KAM theorem.

Bohr's quantization of the classical orbits for the electron in the hydrogen atom and his beautiful explanation of its spectrum is very well known. However, very few people are aware of earlier attempts in that direction by others. An article by Ogilvie describes the attempts of a Danish inorganic chemist in that direction. Converting chair-like transition states into zig-zag projections is the subject of the Classroom article by Hussaini. A discussion of the use of natural and synthetic polymers in reducing sound pollution in our environment forms the subject of the article by Geethamma *et al*.

The Schmallenberg virus, which has caused stillbirths in animal populations in Europe is discussed in the article by Meyers and Tatu. Finally, we have an interesting article by Abbas on the sheep distribution problem.

Resonance is delighted to learn that Manjul Bhargava, a mathematician of Indian origin is among the four winners of the Fields Medal, and that Subhash Khot, an Indian has been given the Nevanlinna Prize. *Resonance* thanks Sury for providing us with a write-up on the research that led to the award of these prizes.