Editorial

Renuka Ravindran, Associate Editor

Email: renrav@math.iisc.ernet.in

This issue of *Resonance* is devoted to Sir Isaac Newton. It is the privilege of a few to be regarded by many sections of the scientific community as "one of them". Newton certainly belongs to this privileged few. As the articles in this issue show, the physicists regard him as a physicist, the mathematicians regard him as one of them, and the astrophysicists do likewise. He appears in textbooks at various stages of academic development – from the laws of mechanics, to gravitation, to calculus, to numerical techniques, just to name a few.

V I Arnol'd delivered a lecture in the early 1990's at the Faculty Hall of the Indian Institute of Science on the occasion of 300 years of Newton's *Principia*. In that lecture, he cited examples of what relevance the *Principia* has for us three centuries after it was written. Most theories become obsolete or irrelevant after such a long period, but there are some that endure. Quoting from the article of Arnol'd and Vasil'ev, which first appeared in *Notices of the American Mathematical Society* and was reproduced in *Current Science,* "Analyzing Kepler's laws in two dimensions, Newton discovered an astonishingly modern topological proof of the transcendence of Abelian integrals. Newton's Theorem ("there exists no algebraically integrable convex curve") was not really understood by mathematicians at that time, since it was based on the topology of Riemann surfaces. Thus, it was incomprehensible both for Newton's contemporaries and for twentieth century mathematicians who were bred on set theory and the functions of a real variable and who were afraid of multivalued functions." Another instance of Newton's work being of relevance years after it was done is the theorem on the attraction by spheres. According to Newton, "if toward the individual points of a spherical surface are directed forces

decreasing inversely proportional to the distances from these points, then a particle inside this surface is not attracted to any side". Arnol'd extended this result three hundred years later to "The standard charge on a hyperbolic surface does not attract the points in the hyperbolicity domain."

For one who had the vision and foresight for his research to be of relevance hundreds of years later, it is a pity that Newton was all too human in some respects. He has been accused by many of plagiarism. It has been said that he published the results of Hooke (regarded as the single greatest experimental scientist of the seventeenth century) under his own name and that led to animosity between him and Hooke. There is evidence to suggest that the ideas on gravity and planetary motion were first proposed by Hooke, who was a gregarious, open person, who shared his thoughts with a number of scientists. Newton, on the other hand, was silent, secretive and distant. Newton also had differences with Leibniz, who invented calculus independently. This led to animosity between the scientists of England and Europe. On the basis of his own work, Newton would have attained the status that he now enjoys in the scientific world. What is it that makes a famous scientist crave for more attention by questionable means and at the cost of others?

What do we see of Newton today? There is the famous Sir Isaac Newton Institute for Mathematical Sciences at Cambridge. It encourages scientists from all over the world to visit and give lectures. It is a free and open forum for exchange of ideas. His statue adorns the Trinity College chapel in Cambridge. More than anything else, there are the numerous theories and laws that he has left behind, the derivations of which reflect the genius of this gifted scientist. These will inspire and engage many bright minds for generations to come.