

# Editorial

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*V Rajaraman, Associate Editor*

This century will be the century of biologists. We have started this century by sequencing most of the human genome. Gene therapy has begun. As Amitabh Joshi states in the Article-in-a-box, biology today is almost nothing but genetics. The green revolution in our country has been one of the most important applications of genetics to agriculture. It all began with the discovery of the laws of inheritance by Gregor Mendel who is featured in this issue of *Resonance*. Amitabh Joshi states in his article that Gregor Mendel carried out between 1856 and 1868 a series of breeding experiments with peas and concluded from the results that certain 'particulate factors' were the units of inheritance, and that these factors were transmitted to and expressed in offspring in certain regular ways. It is interesting to note that Mendel used quantitative techniques to abstract information from his extensive plant breeding experiments. The methods used and the explanations he gave were far ahead of his time and he was not able to fully convince his contemporary 'experts'. The letter written by him to Carl Nägeli, (one of his contemporaries) appears in the Classics section and shows the difficulty Mendel had in convincing him. It took 30 years before it was realized by the scientific community that Mendel was correct. There are two very interesting articles on our modern views of inheritance. One of the most interesting ideas is that of genome imprinting. From the article by Ranganath and Tanuja and that by Gadagkar we learn that when chromosomes (and the genes they contain) pass through a male or a female body they sometimes get differentially imprinted. This imprint is passed on to the next generation. As Gadagkar states "our paternally derived genes and maternally derived genes may behave differently in our bodies even though they may be otherwise identical". Sociobiologists have for long assumed that paternal and maternal genes do not behave differently in the offspring. As this assumption is not entirely correct sociobiologists have to re-look at their theories. This is lucidly explained in the article by Gadagkar.



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There are two articles related to computing which are of great current interest. Palash Sarkar explains basic ideas of cryptology which are now used in secure electronic communication. With proliferation of computers, the internet and consequent emergence of electronic commerce, encryption and decryption of electronic transactions is becoming routine. In fact the information technology bill which has been passed by Lok Sabha recently uses many technical terms such as public key encryption and digital signature whose theoretical bases are given by Sarkar.

Speed of computers and their storage capacity has been doubling every eighteen months. In spite of this, there are still many computational problems which are too large for the fastest currently available computers. To circumvent the limitations of silicon based computers physicists have been exploring the design of radically different type of computers called 'quantum computers' which harness the often non-intuitive quantum properties of individual atoms and protons to store and process information. Quantum computers are still in an experimental stage and it may take a decade or more (barring any breakthroughs) before they become commercially available. Vijay and Gupta describe in the first part of their article on Quantum Computing the basics of qubits and how quantum gates can be built.

There are four more interesting articles in this issue. Sukumaran continues his series on the evolution of the atmosphere and oceans. In this part he tries to answer the questions how oceans on our earth are formed and why oceans are salty. It is interesting to note that the final word has not yet been said on this issue. Hall and Sarkar describe bootstrap methods in statistics.

Origami is the art, popularized by Japanese, of folding paper (a two dimensional object) to obtain a variety of three dimensional objects. Ranganathan, in a very interesting article explains how the principles of Origami can be used to construct models of Platonic solids. The molecule of the month is Anandamide – after the Sanskrit word for bliss 'ananda' as it gives you euphoria similar to that of *bhong* when you imbibe it. We trust reading this issue of *Resonance* will also leave you with a heady feeling!