Editorial

Vijay Chandru, Associate Editor

Friedrich August Kekulé, the featured scientist of this issue, was trained in mathematics, drawing and architecture in the mid-nineteenth century and turned to chemistry where his talents in structure visualization paid off. He went on to make remarkable early contributions in structural chemistry particularly on the quadrivalency of carbon and the theory of benzene structure. The Article-in-a-Box by Gopalpur Nagendrappa gives an inspiring biographical account of Kekulé and his work. Later in a full length article, Nagendrappa tells us about benzene and its isomers. About a century after Kekulé, a young Englishman, William T Tutte, made the reverse journey. After early training in structural chemistry, Tutte went on to become a great combinatorialist and geometer. The lesson is that bold, cross-disciplinary leaps can unleash creative insights that are refreshingly new and often deep.

It seems easy enough to understand the need for a calendar. The cycle of night and day, the waxing and waning of the moon and the finally the cycle of the seasons seem to require the notions of a day, a month and a year. E S R Gopal tells us that this is just the starting point and traces the fascinating history of the calendar and the increasing sophistication in our ideas about time, calendars and millennia.

Modern voice-band modems, the V.34 versions that transmit 33.6 kilobits per second in the 3.6 kHz voice band, are operating close to theoretical limits. This achievement has required sophistication in engineering that builds on mathematical modeling using communication, signal processing and information theory. V Uma-pathi Reddy, in the first part of his article on voice-band modems, gives us an overview of the basic principles.

In another piece on engineering mathematics, P P Majumdar

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leads us through the Saint Venant equations for flood wave propagation, affording us a glimpse of the broad area of study of flood hydrology.

Peter Smetacek, in his third part of the series on butterflies, looks at the types of variations found within species and tries to make sense of the causes. G V S Saiprasad, in another piece from the life sciences in this issue, tells us about artificial seeds developed from encapsulating somatic embryos and their promise.

In May 2000, the Bill and Melinda Gates Foundation handed out a US$40 million grant to the London School of Hygiene and Tropical Medicine for a five-year program to fight malaria. The money will be used to test new vaccines, insecticides and drugs against the mosquito-borne disease that kills two million people each year. Just how complicated this war on malaria and other mosquito borne diseases will be, is brought out vividly by P K Sumodan in his epidemiological piece on the diseases wrought by the tiny terminators.

It is interesting to ask if for any given group G, can we find an object X whose symmetry group S(X) is isomorphic to G? The answer is yes and if, for example, we take G to be Z4, the object X would be a swastika (Nazi or Hindu – either would work). In Part 1 of his article on symmetry in the world of man and nature Shailesh A Shirali gives us an exciting and very friendly tour of symmetries and their groups.

Why do enclosed candle flames bend inwards on a rotating bar? How do we use chromatography to study adsorption, partition and polarity testing? What are chemical chaperones and what do they do? To get the answers, read the Classroom and Research News sections.

As a final note, the information for ordering the Chemistry CD, prepared especially for *Resonance* readers, is included in this issue as well. Interested readers are requested to reserve a personal copy of this CD containing a useful collection of freeware that runs on MS Windows and Linux platforms.