

'Dynamics of gas-surface scattering' K. L. Sebastian discusses both elastic and inelastic scattering. In the inelastic case, besides the rotational, vibrational and electronic excitation of the gas molecule, phonon and electron excitation of the surface can occur. The theoretically predicted signatures for such excitations have been compared with the features observed in the experimental scattering data.

Surface phenomena can also be selectively studied by taking advantage of the fact that second-harmonic generation is possible only at the surface and is forbidden in the bulk of a liquid (K. Bhattacharyya). What is typically measured is the intensity, the phase and the polarization of the second harmonic generated by the adsorbed species at the surface. While polarization depends on the relative orientation of the adsorbed species at the interface, the phase gives the absolute orientation, and the intensity is related to the interfacial populations. Using this technique it has been possible (i) to investigate chemistry at interfaces, using steady-state and time-resolved techniques; (ii) to study biological membranes, which are essentially oriented dipole layers and hence capable of efficient harmonic generation; and (iii) to study the changes that occur in the molecule on adsorption on a surface.

Reaction dynamics in the liquid state has been considered by two authors. One considers the dynamics of barrier-

less reactions (B. Bagchi) such as fast photoisomerization or photo-induced electron transfer. The author presents a molecular theory—in whose development he has played a major role—that takes into account the effects of collective solvent dynamics and predicts that, in barrierless (or very-low-barrier) electron-transfer reactions in dipolar solvents, the rate of electron transfer is critically dependent on solvent motion, especially translational motion. For photoisomerization reactions, the reaction motion is a rotational diffusion on a potential surface. The second author considers electron transfer in polar liquids (B. L. Tembe) where a barrier is present and the transfer is thermally activated. He has presented his theoretical model, which accounts successfully for the aqueous ferrous-ferric electron-exchange reaction. The treatment employs classical statistical mechanics, and the contribution from solvent dynamics is expressed in terms of vibrational or rotational relaxation times calculated by molecular-dynamics simulations.

The time-dependent quantum fluid dynamics formalism has been shown to be applicable to the study of chemical dynamics (S. K. Ghosh). The author, one of those who developed the methodology, has given a good outline of the underlying theory and assumptions. However, the accuracy of the predictions and the efficacy of the method in treating larger systems is not established yet and much remains to be done.

The chapter 'Chaos in chemical dynamics' (R. Ramaswamy) discusses the fundamental notions of chemical chaos and the problem of quantum chaos. The role of chaos in promoting intramolecular energy transfer in irregular scattering in systems where one of the degrees of freedom asymptotically becomes unbound and in non-conservative systems where the total energy is not held constant have been discussed. It is well known that in systems with complex chemical kinetics periodic and aperiodic behaviour are observed and that nonlinearity is ubiquitous in nature.

The authors are relatively young practitioners in the field and it is heartening to see the Indian contributions, especially on the theoretical front. The book draws our attention to the emergence of beautiful experiments that lead us to a more detailed understanding of the various steps involved in a chemical reaction. Even though the coverage and usefulness of certain chapters are inadequate, the book can be strongly recommended for scientists who wish to undertake research in the area of reaction dynamics and to the post-graduate teachers who wish to introduce their students to the fascinating developments in this area. It is a must for all chemistry libraries.

BALU VENKATARAMAN

*Chemical Physics Group  
Tata Institute of Fundamental Research  
Bombay 400 005*

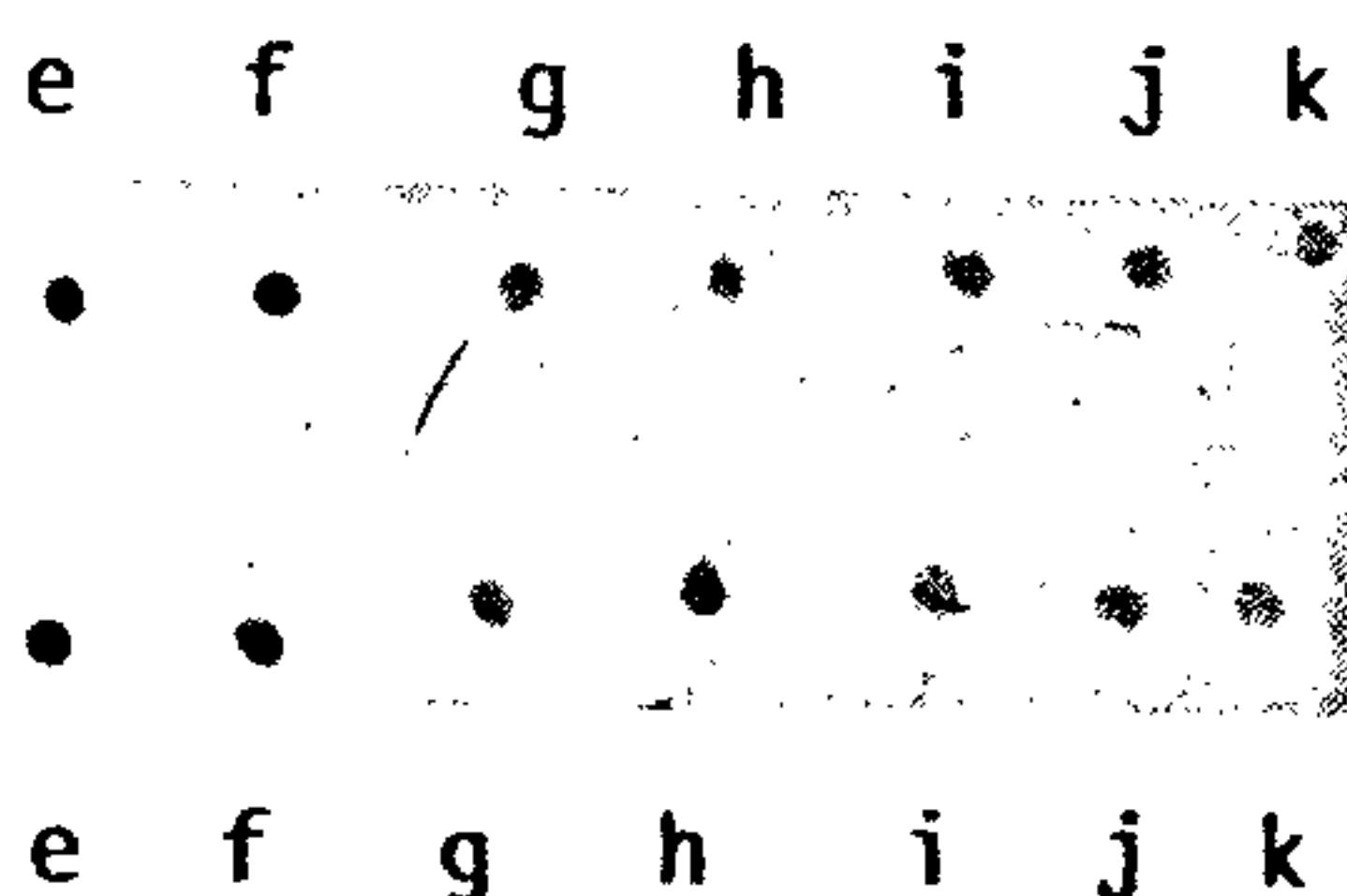
## Erratum

### 5-Methylcytosine residues in DNA decrease during ageing

Deepti D. Deobagkar and Sohan P. Modak

(*Curr. Sci.*, 1991, 61, 483)

The lower panel of Figure 1 on page 484 was printed upside down. The correct figure is given below.



## Correction

### Quaternary tectonic history of northwest Himalaya

K. S. Valdiya

(*Curr. Sci.*, 1991, 61, 664)

Figure 2 on page 665 is slightly modified after Kotlia, B. S. (ref. 21, page, 40, fig. 2) and Figure 3 on page 666 is based on Cromin, V. S. (ref. 3, figs. 1 and 5).