In this issue

Biomolecular recognition

The exquisite specificity of molecular recognition processes in biology has been appreciated for almost a century, following Emil Fischer's 'lock-and-key' hypothesis for enzyme action (*Ber. Dtsch. Chem. Ges.*, 1894, **27**, 2985). The remarkable selectivity of intermolecular interactions, exemplified by diverse ligand–macromolecule binding phenomena, including antigen–antibody and effector–receptor complexation, has led to the paradigm that molecular shape selection and recognition is a general biological theme. Over the last several years, the importance of specificity in biological interactions has been repeatedly reaffirmed by crystallographic, spectroscopic and biochemical studies. Site-directed mutagenesis has contributed greatly to the delineation of crucial residues at ligand-binding sites on proteins. One of the more recent techniques to probe the details of biological binding processes is computer modelling. This approach relies on a knowledge of the three-dimensional structure of the macromolecule and attempts to dock small molecules to binding cavities. Introduction of energy-minimization strategies, with flexible geometries, then adds icing to the cake. On **page 363** of this issue, Balaji *et al.* describe an analysis of the binding of guanosine monophosphate (GMP) isomers to the enzyme ribonuclease T_1. The authors demonstrate that the order of inhibitory power of the nucleotide isomers can be rationalized and that specific roles can be ascribed to residues at the active site. Indeed, fine details of sugar ring puckering can be probed in the computation. Critical comparisons with the results of X-ray and NMR studies suggest that a multipronged approach to protein–ligand interactions may be illuminating.

Optical matter

In the Kundt's tube experiment normally done in the undergraduate physics course, when sound waves are excited dust particles settle at the nodes inside the tube and the wavelength of sound can easily be determined by measuring the distances between the nodes using an ordinary metre scale. In the case of light, a remarkable experiment was performed at Bell Labs and the Institut d'Optique, when fine spherical particles were levitated by a laser light beam. These particles remained floating because of the pressure of light—a phenomenon analogous to a ping-pong ball 'floating' on a jet of water. As an extension to this, when one uses two interfering laser beams, tiny spheres can be lined up in a row. In this case it is found that these spheres move away from the dark region to the bright regions. On **page 340** is a report of remarkable experiments that produced what has been called 'optical matter'. By sending a series of laser beams through the bottom of a glass box filled with water in which there are tiny plastic spheres approximately one micron in diameter, very peculiar effects can be seen. By crossing the laser beams interference patterns of light form, which organize these microscopic particles into two-dimensional crystals. If there are three interfering lasers at proper angles, one gets hexagonal patterns, and with five (wonder of wonders?) one gets quasicrystalline patterns. One sees not only these two-dimensional crystals but by proper optical methods also their diffraction patterns. The report states that two-dimensional crystals, composed of beads of polystyrene and titanium dioxide, and even bacteria, have been formed. Obviously the optical forces that aggregate these crystals must be greater than the thermal forces that cause Brownian movement. This technique of producing 'optical matter' can be used for the study of many phenomena—the melting phenomenon, statistical mechanics associated with crystal formation, the study of transformations, etc. There are many questions that come up. Can three-dimensional crystals be formed? Since the wavelength of light determines the unit cell dimension, can it be decreased by using X-ray lasers? If now the liquid is frozen can such crystals of large molecules be used for X-ray crystallographic studies?

Men of eminence

At the Commonwealth University Association meeting in 1958 one of the vice-chancellors, Eric Ashby, also a reputed botanist, saw Parija's name and the conversation between them went as follows:

Eric Ashby: Your name reminds me of a botanist of Blackman–Parija fame. Are you related to the classical Parija?

Parija: Yes, I am that classical person, now fossilized.

Eric Ashby: Fossils are also so important in botany.

To most botanists, Prankrushna Parija is known for his pioneering papers on senescence of apples. After Parija came back to India, none of his work reached the quality of his first three papers published in the *Proceedings of the Royal Society*. However, he has had a remarkable impact on the growth of botany and botanical research in India, particularly in the universities.

In the birth centenary year of this remarkable botanist and science administrator C. V. Subramanian remembers Parija (**page 380**). Parija was a product of Calcutta University, first taking an honours degree in mathematics. Amongst his contemporaries were men who also made their mark in science—S. N. Bose (of Bose statistics), M. N. Saha (stellar temperatures), J. C. Ghosh (physical chemistry), N. K. Siddhantha (the distinguished botanist), and others. In the faculty at that time were J. C. Bose, P. C. Ray, C. V. Raman and the mathematicians D. N. Mullick and B. D. Mukherjee—one envies the galaxy of students and teachers at that time and one is tempted to ask, 'What has happened to the universities these days?'