

In this issue

Cardiac surgery—The triumph of experiment

For the countless millions who have benefitted from the dramatic advances of modern medicine, cardiac surgery is an area which claims some of the most visible triumphs of twentieth century medical science. Surgery, inevitably is firmly based on empirical experimentation. It is this 'ethos of experiment' which makes cardiac surgery a fitting topic for the C. V. Raman Lecture at the Indian Institute of Science. In commemorating India's most distinguished experimental scientist, it is but fitting that M. S. Valiathan (page 451) emphasizes the experimental origins of modern cardiac surgery. In tracing the historical backdrop to the dramatic developments of the last few decades, the author ranges over the centuries; reminding us of Claude Bernard's 19th century statement: 'Scientific medicine, which it is my duty to teach you, does not exist'. While general surgery has a hoary past, the heart has become the province of surgeons only in the last half a century. The author reminds us that today, the tools and techniques of cardiac surgery come from a 'wide variety of disciplines—physiology, mater-

ials science, electronics, chemical engineering and biostatistics.' The development of the bubble oxygenator and heart valve at the Sree Chitra Tirunal Institute, Trivandrum are testimony to the progress made in India in this area in recent times.

Protein tyrosine phosphatases

Signal transduction mechanisms in biology appear bewilderingly complex at the level of biochemistry. From initial recognition of chemical effectors by membrane receptors, a complex cascade of biochemical events precede physiological response. The control elements in this intricate scenario are often proteins, whose activities are modulated by the simple chemical expedient of phosphorylation; a process which adds a phosphate group to an acceptor hydroxyl on the amino acids tyrosine, serine and less often, threonine. The actual act of phosphorylation is performed by protein kinases, an extremely well studied class of enzymes. Interestingly, the activity of the kinases is also regulated by phosphorylation of their tyrosine residues, requiring that an important role be played by a new class of enzymes, the phospho-tyrosine phos-

phatases, for which the protein kinases serve as substrates. Surprisingly, these enzymes have been purified and characterised only in the last few years, but their importance is attested by the burgeoning literature in this area, reviewed in this issue by Swarup and Radha (page 462). Recent studies implicate tyrosine phosphatases in fundamental biological processes like cell division, specific differentiation and development.

Global warming

Greenhouse effects and global warming continue to be major matters of concern to scientists of a wide variety of persuasions. Despite greater public (and political) awareness as witnessed by the 1990 Montreal Protocol, which proposes to regulate the use of chloro-fluorocarbons, the prognosis for the future is far from rosy. In an extensive evaluation of the problem Rao and Chakravarty (page 469), reach a sobering conclusion that the emission fluxes of the other major greenhouse gases, also need to be regulated, if doomsday scenarios are to be avoided by the middle of the next century.