

Foreword

The importance of the hydrophobic effect began to be first realised in colloid chemical studies on the formation of soap molecule aggregates. Its role as a determinant in biopolymer structures was appreciated and commented upon with some rigour some thirty years ago. The early sixties saw a lot of activity in the area particularly focussed on globular protein structures and interactions and also a revival of interest on micelles. Charles Tanford has been one of the trend-setters in quantitatively analysing the hydrophobic effect and its consequences since those days. The first monograph on the hydrophobic effect was written by him in 1973 and has gone through a second edition in 1980. It is thus particularly appropriate that Professor Tanford starts our "Symposium in Print" with a perspective overview. This overview contains information that is interesting, stimulating and provocative. For example, Tanford points out that had Benjamin Franklin done some mental "kite flying", he would have been the first to measure molecular sizes.

The second article is from Arieh Ben-Naim, who has done much to aid our understanding of the thermodynamic and statistical mechanical basis of the hydrophobic effect through his earlier papers and his 1980 monograph on hydrophobic interactions. This is the first time the importance of solvent-induced effects is being discussed in the context of hydrophobic interactions.

The distance-dependence of the hydrophobic force between surfaces is only recently becoming delineated. We are fortunate that one of the pioneers in these measurements, Dr Pashley, has contributed a paper specifically on this topic. Jacques Desnoyers has been concerned over the years with thermodynamic aspects of solvation, hydrophobic hydration and hydrophobic association. Roux and Desnoyers have analysed micellar type equilibrium models for alcohol:water mixtures.

The influence of hydrophobic forces on chemical reactivity is a subject of great interest. Xi-Kui Jiang and associates had earlier provided compelling evidence for the self-coiling of long chain ester molecules by studying their solvolysis rates. In one of their papers, they show that lipophilic forces are important while in another paper the competition between aggregation and amylose-wrapping of long chain esters is studied. The concept of the critical aggregation concentration that they have introduced might have other applications as well.

V Ramamurthy has written an interesting article on the hydrophobic cavities that the cyclodextrins offer to guest molecules and the use of these pockets as unique media to do photochemical reactions of organic chemical interest. We also have two papers on micellar aggregates. The differences in the microenvironment offered to a solubilizate in micelles of different structures and packing arrangements have been presented in one paper. This is a fine-structural comparison between micelles and is novel since until now all micelles have been thought of and treated as aggregates that provide a hydrophobic interior for housing guest molecules. The paper by Puranam and Balaram carries us into the realm of

biomolecules and treats an important problem of metabolite solubilization and clearance. The paper offers an insight into the mode of solubilization of the pigment bilirubin in bile salt assemblies and the intimate proximal interactions that occur between the solubilizate and the host molecules. The last paper by R Nagaraj is concerned with the role of the hydrophobic leader sequence that occurs in proteins destined for transport across membranes. What are the signals that are built into these molecules that tell them to cross the membrane – and how do these signal segments interact with the membrane?

As mentioned earlier, this issue is a “Symposium in Print”. The authors did not meet formally but offered to contribute to a common theme. We thank all the invited authors for their enthusiasm for the idea, their promptness, and for putting up with some protracted correspondence that must have tried their patience.

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Guest Editor

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