Methods in ENZYMOLOGY

Volume 455

Biothermodynamics, Part A

Edited by

Michael L. Johnson

Jo M. Holt

Gary K. Ackers

VOLUME FOUR HUNDRED AND FIFTY-FIVE

METHODS IN ENZYMOLOGY

Biothermodynamics, Part A

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Preface

Branches of the United States government have twice acknowledged Josiah Williard Gibbs for his contributions to thermodynamics; and thus indirectly acknowledged the importance of thermodynamics. The first acknowledgement was the US Navy with the USNS Josiah Williard Gibbs which was a ship of the line between 1958 and 1971. The second example was the US Postal Service by including him as one four great American scientists on a series of postage stamps that were issued in 2005. "The greatest thermodynamicist of them all" (John Fenn, 2002 Nobel Prize in Chemistry).

Unfortunately, a large fraction of scientists have the impression that thermodynamic approaches are archaic, and, at best, ancillary to the central issues of biochemistry. One reason for this misconception is that thermodynamics is commonly either poorly taught or not at all in departments of chemistry, biochemistry, etc. Steam engines come to mind when I think of my first thermodynamics course. Another reason for this narrow and insular perception is that thermodynamics is frequently equated with a single experimental technique (i.e. calorimetry). Sadly, thermodynamics has seldom been fused with developments in molecular biology, structural analysis or computational chemistry. However, all of these perceptions are far from accurate.

The importance of thermodynamics is its use as a "logic tool." One of many quintessential examples of such a use of thermodynamics is Wyman's theory of linked functions. This volume is one of a continuing series which foster and develop this vision of how thermodynamics can be an important tool for the study of biological systems.

Michael L. Johnson
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