Why study cytochrome complexes? An answer is provided by the range of subtopics in the book, “evolution, structures, energy, and signaling,” which are described in the book title. Studies on the cytochrome family of proteins encompass a uniquely wide area of basic and applied research. Research in this field utilizes a range of theoretical and computational approaches, as well as a broad cross section of experimental techniques.

The book starts with an Introduction by Derek Bendall describing cytochrome notation, which is connected to the history of the field, focusing on research in England in the pre-World War II era. An ab initio “start with the beginning” logic then leads to a discussion of the evolution of cytochromes and hemes. Before presentation of the many individual cytochrome systems, the fundamentals of the theory of electron transfer in proteins are presented, followed by an extensive description of the molecular structures of cytochromes and cytochrome complexes from eukaryotic and prokaryotic sources, including those derived from photosynthetic reaction centers. The presentation of atomic structure information has a major role in these discussions, including the relatively new subject of “supercomplexes.” This structure information has a major niche in the broad field of membrane structure-function. Expanding the perspective beyond structure-function applied to charge transfer and energy storage, the problems of protein and macromolecule assembly, regulation, and signaling, including transmembrane signaling, which have conceptual connections to central areas of biochemistry, biophysics, and cell biology, are considered. Regarding subjects related to cutting-edge areas of biology and plant biology, the up-to-date presentation of the topics of Regulation and Signaling is noted here.

The broad extent of fundamental intellectual and research areas that are represented in this book makes it a useful resource for teaching of academic courses and presentation of seminars on fundamental and
broad aspects of biological energy transduction to advanced undergraduates and graduate students with interests in biology, biochemistry, biological engineering, chemistry, and biophysics.

As a last entry to the Introduction to this book, we note, sadly, the passing of Derek S. Bendall and Bernard L. Trumpower, whose achievements in this field are substantial and of fundamental importance. The Remembrances in this volume that are dedicated to them are of historical importance and note their many contributions to the subjects discussed herein.

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