published by a famous University Press, then the expectations about the content are indeed high. Unfortunately, a few issues about the text detract from the merits of the book.

Selection (along with adaptation) is supposed to be a major theme running through this book. However, the concept of selection is dealt with somewhat arbitrarily in the text. The preface (p. viii) states 'Natural selection is competition.' Surely, it is not! Then on the last paragraph on page 1, it is stated 'Such differential reproduction, which we call natural selection... .' However, here one needs to keep in mind the fact that for natural selection to operate, there has to be (at least partial) inheritance of the traits that lead to the said differential reproduction. The same paragraph then goes on to state 'An organism's genome may be viewed as its hypothesis, encoded in its DNA, of how to live and reproduce in its environment. By trial and error, strictly speaking, by testing variant hypotheses generated by copy errors, natural selection improves this hypothesis, coordinating the organism's function more nearly with relevant features of its environment.' The authors' use 'An organism's genome' right at the beginning of the sentence and then omit to state that the 'improvement in hypothesis' being talked about happens across generations. This can automatically lead to the assumption that natural selection 'improves' an organism within its own lifetime, which is a very Lamarckian idea that I am sure the authors do not wish to convey.

This book takes an unabashedly 'gene-centric' view of evolution. While understandable for a book in the 1970s, that seems to be completely anachronistic for a book published in 2019. I can appreciate that a focus on Nature might preclude the authors from focusing too deeply on concepts from epigenetics, evo-devo or gene–environment interactions in the context of evolution. However, given that there are three full chapters on the mechanisms underlying evolution, would it have been too out of place to consider these phenomena? More critically, why so much of focus on the 'selfish gene', when the field of evolutionary biology has moved quite beyond it?

Another feature of the writing that merits some discussion is the high degree of anthropocentrism. Many authors use examples familiar to the reader to create a context, before introducing new concepts as an analogy. L&Z use this trick throughout the book. For example, chapter 6, which deals with how diversity is organized into communities, starts with a three-and-a-half page long discussion about the central role of competition and cooperation in organizing human economies, which then forms the basis of explaining how communities and ecosystems are structured. This actually adds to the relatability of the book and is laudable. However, to my mind, L&Z overdo this with sentences like 'To become de facto lord's of creation, human beings…' (p. 26) and 'An ultimate animal technology is conscious human minds...' (p. 3). Given that this is a book about Evolution – a field that has a historical baggage of the *Scala Naturae* – I would have been happier if the book were a little more careful about this issue. In a year in which the whole of humanity has been brought to its knees by a virus, the first statement seems ironical.

Finally, the book contains a few claims that have no business of being in any book on biology. Page 131 states 'How does a gene store the instructions for its process? James Watson and Francis Crick showed in 1953 that its instructions are encoded in its sequence of "nucleotides"…' Watson and Crick's 1953 paper does not contain anything about how the genetic information is encoded. Page 56 states 'A coral is a colony of sea anemones…' Perhaps not, particularly when, on the same page, they are identified separately as examples of cnidarians. Page 128 states 'Mendel's paper came out in 1866, but it lay ignored until 1900, when studies of chromosomes suggested that they were the carriers of heredity.' The first part is correct as Mendel's work was indeed rediscovered in the year 1900. However, the realization that chromosomes are physical carriers of heredity comes about 2–3 years later with the work of Sutton, Boveri and others (Wilson, E. B., *The Cell in Development and Heredity*, Macmillan, New York, 1925, 3rd edn, pp. 923–927). Thus, this book is in dire need of a thorough round of editing and fact checking.

So who should read this book? Curiously, L&Z do not mention the audience they have in mind for the book. Therefore, here is my personal take on that question. If you are a teacher of evolution, looking for excellent examples to illustrate concepts in Ecology and Evolution for your students, this book (and particularly its bibliographic essay) is an excellent resource. If you are a person who loves pretty pictures, wishes to be awed by the wonders of nature and evolution, and have reasonable tolerance for a few inaccuracies here and there, this book is going to be of interest to you. However, if you are a student of evolution, who is trying to learn the concepts of the subject, I would recommend that you look for some other resources. In its current form, this book badly needs a thoroughly revised and considerably enlarged next edition.

SUTIRTH DEY

Department of Biology,
Indian Institute of Science Education and Research,
Pashan,
Pune 411 008, India
e-mail: s.dey@iiserpune.ac.in

Annual Review of Biophysics, 2020. Ken A. Dill (ed.). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. Vol. 49. viii + 345 pages. Price: US$ 118.00.

Biophysics is a subject where theoretical and practical knowledge of physics is implemented enormously to understand the biological system and study the function of biological macromolecules. These techniques are entirely integrated with biochemistry, microbiology and cell biology techniques to understand the structure, function and mechanism of biological systems. Recently, molecular simulations, computational biology, integrated modelling, spectroscopic techniques, microscopic techniques, membrane biophysics, nanotechnology, system biology and structural biology are employed together to address the biological key questions. These biophysical techniques are used to address the biological assembly, dynamics of biomolecules, protein folding and mechanistic behaviour of biological macromolecules. The *Annual Review of Biophysics* is one of the oldest Biophysics review journals, mostly covering the best exciting biophysical research. However, the volume under review mostly focuses on the novel biophysical techniques or new

development of the biophysical research field, which are often under looked in a biophysical laboratory. Most of the chapters and topics illustrate the well-established and newly developed biophysical techniques suitable for most of the Ph.D. students, undergraduate students and postdoctoral fellows. Numerous excellent research papers and review articles on recent development in biophysics and novel approaches to use these methods are published in different journals. However, most of the literature is dispersed in different journals or books. Therefore, it is an excellent approach to keep most modern biophysical approaches together in book format, and the *Annual Review of Biophysics 2020* serves that purpose.

This volume considers accommodating various critical biological problems addressed by biophysical, imaging, spectroscopic techniques. In recent days, most research groups actively participate in multidisciplinary research approaches, where several researchers from different backgrounds work together. Therefore, this type of review book is required for undergraduate, graduate, postdoctoral research scholars and faculties from biological sciences. All these readers will be aware of the novel biophysical techniques, new approaches to implementing biophysical techniques and proper application of these techniques. Additionally, all the researchers will get this information in one book. However, this is not a suitable book for beginners who are just starting their biophysics research careers. This volume primarily focuses on advanced users who are using several biophysical techniques regularly.

This review volume covers the recent technological developments, applications of these novel techniques jointly, new approaches to implement several well-known biophysical techniques and challenges to employ these techniques. This book will be popularized within the various research groups and scientists interested in current technological and analytical innovations in biophysics. The authors cover several cutting-edge biophysical techniques and their applications in biological membrane organization, enzyme kinetics, gene regulation, protein–lipid interactions, RNA droplets, protein evolution, and high-resolution imaging of biological macromolecules using light microscopy, confocal microscopy, transmission electron microscopy. Additionally, this volume sheds light on the multidisciplinary research areas, including theoretical/mathematical biology, thermodynamics in cell biology, quality control by MHC-I immunology complex, and structural, functional characterization of cytokinetic FtsZ-Ring, which provide the adequate understanding and knowledge about the recent advancement of biophysical techniques. This is also an outstanding effort by the editor to compile several aspects of biological problems and various biophysical techniques in one volume.

The volume could be divided into three parts. The initial part mainly focuses on the mathematical model and computational biology and molecular simulation of different biological macromolecules, lipid membranes, lipid–protein interactions and system biology. The second part mainly targets simulation studies of enzyme kinetics, enzyme reactions, ligand bindings, enzyme chemotaxis, enhanced enzyme diffusion (EED), and molecular simulation of enzyme catalysis and variability upon pH and temperature changes. The last part emphasizes imaging techniques, X-ray crystallography, molecular simulation addresses the structural, functional characterization of FtsZ-ring, mitochondrial structure and RNA droplets. However, according to me, the second part of this volume is most exciting. The author, Ron Elber, elucidates the application of automatic detailed simulation methods to understand the kinetics of a wide range of biological macromolecules. This chapter is well written, and some figures are used to describe the results; The Milestoning theory and applications are explained with schematic figures and mathematical formulas. This study has a high impact on understanding the enzyme kinetics, conformational dynamics and ligand–protein interactions. This volume simultaneously covers enhanced enzyme diffusion (EED), which has a significant role in biotechnology and nanotechnology. The authors discuss fluorescence correlation spectroscopy and Dosy-NMR experiments to measure different thermodynamical parameters, like hydrodynamics, temperature change, pH change and diffusion rates. Furthermore, in chapter eight, the adaptation of enzymes and the enzyme-catalysed reaction rate at different temperatures is an important addition here, illustrating the thermodynamical parameters based on ITC results and simulation study. This chapter also accommodates several mathematical details of enzyme kinetics and changes in several thermodynamical parameters of enzymes. The chapter by Campitelli *et al*. demonstrates the conformational dynamics and allostery of protein in protein evolution background with several high-resolution structures. In this chapter, the authors explain computational approaches, dynamic flexibility index, and dynamic coupling index to understand the effect of a single amino acid mutation in protein activity, dynamics and protein evolution. These four chapters cover an enormous area of enzyme catalysis, dynamics, binding, interaction and kinetics of enzyme, which will help several researchers.

This volume also covers RNA droplets by Rhine *et al*. The authors describe the formation of granules using liquid–liquid phase separation techniques of the DNA–RNA, RNARNA, protein, and protein–RNA biomolecules. They also focus on size, viscosity, surface tension changes in the presence of RNA. This chapter is well-written with multiple figures, which will attract the attention of readers. The gene regulation chapter represents the linear framework and graph-based approach to explaining the Markov process, where the authors introduce the higher-order cooperativities to study the gene regulation. This chapter also explains several mathematical formulas and figures. The last two chapters mostly utilize different microscopy techniques, like super-resolution microscopy, single-molecule imaging, confocal microscopy, fluorescence super-resolution microscopy, high-resolution TEM, and cryo-electron tomography to elucidate and visualize the cell organelles and FstZ-ring dependent bacterial cell wall formation. Both chapters explain the recent development of high-resolution microscopy and imaging, capable of answering previously unattainable questions in the biological system. The chapter 'Principal and application of biological membrane organization' is an excellent addition to this volume. This chapter is demonstrated nicely with several figures, and undergraduates and master's students will be benefitted from this chapter.

The authors and the editor of this volume have a significant contribution, which covers a broad research area of newly developed biophysical techniques. However, a few small modifications will

be more approachable to more biology background students. A short description of all the chapters will be a good addition and more accessible for the student to understand the topic of each chapter. There is no preface, and it will be suitable for the reader. Most of the chapters of this book focus on the researchers who are involved in biophysical research. Therefore, it is a bit difficult for general biology students, undergraduate and master students to understand the content of the volume. Initial few chapters, like 'Mitochondria-associated proteostasis', are explained with only two or three figures. In my view, few extra figures can describe these chapters more attractively. Few chapters used different types of approaches and techniques. A flowchart or schematic diagram of all the various methods and experiments employed to address the biological questions in the individual chapter will be an excellent addition to illustrate the chapter appropriately. In the last chapter, cryoelectron tomography is mainly abbreviated as cryo-ET, highlighted as cryo-ECT in this volume.

In summary, the authors have contributed significantly and many chapters and topics are interconnected, which are coherent in this book. This volume covers a wide range of techniques and novel approaches to biophysical techniques. I strongly recommend this book to most of my Ph.D. students and postdoctoral research fellows. I would also recommend a copy of this volume in the university library.

SOMNATH DUTTA

Molecular Biophysics Unit,
Division of Biological Sciences,
Indian Institute of Science,
Bengaluru 560 012, India
e-mail: somnath@iisc.ac.in

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