

PREFACE TO THE TRANSLATION

The Russian edition of this book was published in the Fall of 1965; the manuscript had been finished a year earlier. Since then, many changes have taken place in molecular biology. No other field of science is currently undergoing as rapid a development. As a result, this book has been extensively revised for the translation, and much new material has been introduced. And yet, even this version will to some extent be obsolete at the time the translation appears in print. This, of course, cannot be helped. I believe, however, that the basic concepts of molecular biophysics which are the subject of this book will remain significant for a considerable length of time.

M. V. Vol'kenshtein

*Nature is not what you believe—
It is neither a mold nor a spiritless face.
It has a soul, it has freedom,
It has love, it has a tongue.*

F. I. TYUTCHEV

Nature is not a temple, but a workshop, in which man is the laborer.

I. S. TURGENEV

PREFACE TO THE RUSSIAN EDITION

Nature has been described as a "work of beauty and love" by the Russian poet Tyutchev, and as a "workshop" by Turgenev. Are these two descriptions mutually contradictory? Must we wonder at the beauty and charm of living nature, at the soft aroma of a rose, at the flight of a butterfly, at the thoughts of man, or are these amazing phenomena the rightful subjects of a scholarly examination?

Nature is a magnificent workshop in which the development of matter under strict laws has led to the creation of living organisms, of highly complicated systems, characterized by an amazing structural and functional coordination. The culmination of this development on earth is the human mind, which at present can not only understand the laws of life, but can actively interfere with the surrounding nature and modify it to man's benefit. This is the aim of material science. True science, however, cannot exist without an esthetic appreciation of the objects examined. That very soul and freedom of nature, of which the Russian poet sings, from a scientist's point of view are expressions of the laws of biology, physics, and chemistry. This does not, however, render them any less attractive and interesting.

This book has for its purpose the introduction to molecular biophysics. Molecular biophysics is, on one hand, a part of molecular physics and, on the other hand, a part of molecular biology, a new realm of science, developed during the last decades. The joint efforts of biologists, physicists, and chemists have made it possible to unravel the essence of a number of the basic phenomena of life, starting from the structure and properties of molecules which form organisms, and principally of proteins and nucleic

acids. The achievements of molecular biology testify to the success of material science in a realm which, until recently, appeared totally enigmatic and mysterious. Further scientific developments should bring to mankind vast developments both in theoretical knowledge and in practical applications, namely, in agriculture, medicine, and technology.

The purpose of this book is to explain molecular biophysics to all who might wish to learn about it, to biologists, to physicists, to chemists. This book contains descriptive sections, as well as sections devoted to rigorous mathematical treatment of a number of problems, some of which have been studied by the author and his collaborators. These sections may be omitted during a first reading. Each chapter has a selected bibliography.

This book is far from an exhaustive treatise on molecular biophysics. It deals principally with questions related to the structures and functions of proteins and nucleic acids.

M. V. Vol'kenshtein
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