ANALYSIS OF NORMAL
and
ABNORMAL CELL GROWTH

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Model-System Formulations and Analog Computer Studies

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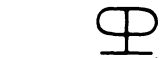

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This book is dedicated to my wife and to my sons, Hilary and Julian, who often forbore the burden of its preparation

Preface

This book represents an attempt to explore a complex biological problem. The subject is analyzed from a theoretical point of view, and various procedures are utilized to gain insight into mechanisms of the basic processes. Quantitative study of a model-system is carried out on an analog computer, which serves as a mathematical tool, but not as a simulating device. Since the book is meant primarily for all students and researchers in biology who are interested in cellular problems at a very basic level, details of computer technological procedures as well as mathematical formulations have been omitted. The main aspects of this book are organizational dynamics of cellular growth and cellular interactions.

This book can be read by any competent student of biology; no specific mathematical background is necessary for an adequate comprehension. Those who are not familiar with differential equations may ignore the ones presented here and follow the flow equations in the tables in the text. Also, no background is required in analog computer techniques for an understanding of the basic analysis. This work is projective in character, and the subject, in many areas, is treated in a highly speculative manner, especially when the phenomenon of abnormal growth and cancer is discussed. The primary purpose here is to stimulate new thinking and experimental approaches to this complex research problem. It may appear that the author has been too confident in deriving various con-

clusions. This may have resulted from an overdose of self-encouragement during the work, where many difficulties were encountered in designing the model-system, as well as in solving the mathematical problems. Therefore, this work carries a personal stamp and should not be taken too dogmatically. It is hoped, however, that it might induce the reader to consider biological processes from a more quantitative point of view.

F. HEINMETS

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