

CONTENTS

	<i>Page</i>
CONTRIBUTORS TO VOLUME I, PART I.....	v
FOREWORD.....	vii
1. Introduction. BY JAMES B. SUMNER AND KARL MYRBÄCK.....	1
I. The Role of Enzymes.....	1
II. Definitions.....	2
III. Terminology and Classification.....	3
IV. Enzymes as Systems.....	6
V. The Early History of Enzymes.....	6
VI. Some Discoveries and Theories of Fundamental Importance for the Modern Development of Enzyme Chemistry.....	8
VII. The Chemical Nature of Enzymes.....	19
VIII. General Properties of Enzymes.....	21
IX. The Determination of Enzyme Activity.....	24
2. Physical Chemistry and Chemical Kinetics of Enzymes. BY E. A. MOELWYN-HUGHES.....	28
I. Determination of Molecular Weights of Enzymes.....	29
II. Electrophoresis.....	42
III. Catalysis.....	55
IV. Structure and Stability.....	69
3. Enzyme Specificity. BY BURCKHARDT HELFERICH.....	79
I. Introduction.....	79
II. Typical Examples of Specificity.....	82
III. Specificity of Enzymes as a Basis for their Classification.....	104
IV. Localization of Specificity in the Enzyme Molecule.....	106
V. Inferences about Enzyme Structure Drawn from Enzyme Specificity....	109
VI. Summary and Further Development.....	111
4. Enzymes in Relation to Genes, Viruses, Hormones, Vitamins, and Chemotherapeutic Drug Action. BY M. G. SEVAG, J. S. GOTS, AND E. STEERS....	115
I. Genes and Enzymes.....	116
II. Viruses and Enzymes.....	130
III. The Relation of Hormones to Enzymes.....	139
IV. The Relation of Vitamins to Coenzymes.....	153
V. Action of Chemotherapeutic Agents on Enzymes.....	157
5. Cytochemical Foundations of Enzyme Chemistry. BY A. L. DOUNCE.....	187
I. Introduction.....	188
II. Enzyme Chemistry of Cytoplasm as Deduced from Physicochemical Studies.....	189
III. Studies of Cell Nuclei and Chromosomes Isolated by Physicochemical Procedures.....	207
IV. Studies of the Chemistry of Cell Components as Deduced from Special Physicochemical Techniques.....	234
V. Histochemical Procedures.....	240
VI. Chemistry of Cell Surfaces.....	255
VII. Enzymes and Genes.....	258
VIII. Summary and Conclusions.....	261

	<i>Page</i>
6. Modern Aspects of Enzymatic Adaptation. BY S. SPIEGELMAN.....	267
I. Introduction.....	267
II. Some Examples of Enzymatic Adaptation.....	268
III. The Operational Description of Enzymatic Adaptation in Microorganisms and its Biological Significance.....	271
IV. Enzymatic Constitution and Enzymatic Adaptation.....	276
V. The Kinetics of Enzymatic Adaptation.....	279
VI. The Relation of Enzymatic Adaptation to Cellular Metabolism.....	281
VII. Interactions between Enzyme-Forming Systems.....	285
VIII. Consequences of Competitive Interactions between Enzyme-Forming Systems.....	289
IX. The Stabilization of Enzymatic Patterns in the Absence of Substrate.....	294
X. The Role of Substrate.....	296
XI. Specificity Relations in Enzymatic Adaptation.....	299
XII. Genetic Implications and "Long Term Adaptation".....	300
XIII. Conclusion.....	305
7. Enzyme Inhibition. BY L. MASSART.....	307
I. Introduction. Specific and Nonspecific Inhibition, Competitive and Non- competitive Inhibition.....	307
II. Kinetics of Specific Inhibition.....	310
III. Compilation of Examples.....	317
IV. Influence of Radiations on Enzymes.....	340
8. Enzymes and Immunology. BY J. R. MARRACK.....	343
I. Introduction.....	344
II. Reactions between Antibodies and Antigens.....	345
III. Specific Combination of Antigen and Antibody.....	350
IV. Effects of Disorganization of Molecules of Antigens and Antibodies.....	363
V. Enzymes as Antigens.....	377
VI. Toxic Enzymes.....	383
VII. Complement.....	387
9. Enzymes Hydrolyzing Fats and Esters. BY ROBERT AMMON AND MAIRE JAARMA.....	390
I. Classification of the Esterases and Remarks on the Organization of the Field.....	390
II. Brief Survey of Methods of Determination and of Esterase Preparations..	391
III. The Individual Esterases.....	396
10. Acetylcholine Esterase and Cholinesterase. BY KLAS-BERTIL AUGUSTINS- SON.....	443
I. Introduction.....	444
II. Existence of Specific Esterases for Acetylcholine and Other Choline Es- ters.....	445
III. Measurement of Activity.....	448
IV. Occurrence of Acetylcholine Esterase and Cholinesterase.....	451
V. Enzyme Preparations.....	455
VI. Activators and Nature of the Active Groups.....	456
VII. Kinetics.....	458
VIII. Inhibitors.....	462
IX. Physiological Significance of Acetylcholine-Hydrolyzing Enzymes.....	469
11. Phosphatases. BY JEAN ROCHE.....	473
I. Historical Introduction.....	474
II. General Biochemistry of the Phosphatases.....	475

	<i>Page</i>
III. Biochemistry of the Various Types of Phosphatases	484
IV. Physiological Chemistry of the Phosphatases	498
V. Pathological Chemistry of the Phosphatases	506
VI. General Conclusions	510
12. Metaphosphate and its Enzymatic Breakdown. BY BJÖRN INGELMAN.	511
I. Introduction	511
II. Enzymatic Breakdown of Metaphosphate	511
III. Occurrence of Metaphosphate in Microorganisms	514
13. Sulfatases. BY CLAUDE FROMAGEOT.	517
I. Introduction	517
II. Phenolsulfatase	518
III. Glucosulfatase	521
IV. Chondrosulfatase	523
V. Myrosulfatase	525
14. Invertase. BY CARL NEUBERG AND INES MANDL.	527
I. Historical	527
II. Occurrence	528
III. Separation	531
IV. Properties	535
V. Stability	536
VI. Configuration	541
VII. Specificity	542
VIII. Mechanism of Invertase Action	546
IX. Kinetics	548
X. Activity	549
XI. Technical Preparations and Applications	550
15. α-D-Glucosidases. BY ALFRED GOTTSCHALK.	551
I. Mode of Contact between Enzyme and α -D-Glycoside	551
II. Maltases	553
III. Glucosaccharase	577
IV. Trehalase	580
16. β-Glucosidase. BY STIG VEIBEL.	583
I. Occurrence	584
II. Preparation and Purification	584
III. Standardization	590
IV. Specificity	593
V. Inactivation	617
VI. Enzymatic Synthesis	618
17. Hydrolysis of Galactosides, Mannosides, and Thioglycosides. BY STIG VEIBEL.	621
I. α -Galactosidase	621
II. β -Galactosidase	623
III. α -Mannosidase	630
IV. β -Mannosidase	633
V. Thioglucosidase	633
18. β-Glucuronidase. BY WILLIAM H. FISHMAN.	635
I. Introduction	635
II. Properties of Glucuronidases	637
III. Physiological Role of β -Glucuronidase	646
IV. Implications in Human Cancer	651
V. Summary	652

	<i>Page</i>
19. Amylases and the Hydrolysis of Starch and Glycogen. BY KARL MYRBÄCK AND GUNNAR NEUMÜLLER.....	653
I. The Substrates.....	654
II. Enzymatic Degradation of Starch and Glycogen.....	664
III. Chemical Nature of Amylases.....	676
IV. Amylase Inhibitors in Cereals.....	702
V. Mechanism of Amylase Action.....	703
VI. Action of Amylases on Raw Starch.....	720
VII. Amylase of <i>Bacillus macerans</i>	721

AUTHOR AND SUBJECT INDEXES for both parts of Volume I will appear at the end of Volume I, Part 2.