

CONTENTS

| | Page |
|-----------------------------|---|
| Part I | |
| The Water Pollution Problem | |
| Chapter 1 | Significance of Pollution 3 |
| Chapter 2 | Pollutional Concerns, causes, and Concepts 7 |
| 2.1 | Disease Production 7 |
| 2.2 | Organic Pollutants 7 |
| 2.3 | Mineral Pollutants 9 |
| 2.4 | Pollution by Recalcitrant Molecules 14 |
| 2.5 | Heat Pollution 15 |
| Chapter 3 | Water in Perspective to Population and Pollution 17 |
| 3.1 | Hydrologic Cycle, Water Availability, and use 17 |
| 3.2 | Population Growth and Its By-products 22 |
| Part II | |
| Biochemical Considerations | |
| Chapter 4 | Biochemical Aspects of Water Pollution 33 |
| Chapter 5 | Ecological Concepts 36 |
| 5.1 | Symbiosis 38 |
| Chapter 6 | Water, Its Properties, Biochemistry, and Biological Implications 41 |
| 6.1 | Water chemistry 41 |
| 6.2 | Bound Water 49 |
| 6.3 | Biological Implications of Bound Water 51 |
| 6.4 | Solutions, suspensions, and Colloids 55 |
| 6.5 | Surfaces and Adsorption 57 |
| Chapter 7 | Degradation of Organic Pollutants 61 |
| 7.1 | Hydrolysis of Polysaccharides 71 |
| 7.2 | Hydrolysis of Proteins 74 |
| 7.3 | Hydrolysis of fats 75 |
| 7.4 | Carbohydrate Dissimilation 76 |
| 7.5 | Amino Acid Dissimilation 80 |
| 7.6 | Oxidation of Fatty Acids and Alcohols 84 |
| Chapter 8 | Hydrocarbon Oxidation 87 |
| 8.1 | General Aspects 87 |
| 8.2 | N-Alkanes 90 |
| 8.3 | Alkenes 92 |
| 8.4 | Cycloalkanes 92 |
| 8.5 | Aromatics 94 |
| 8.6 | Methane, Ethane, and Methanol Oxidation 95 |
| Chapter 9 | Recalcitrant Molecules 97 |
| 9.1 | Isoalkanes 97 |
| 9.2 | Synthetic Anionic Detergents 98 |
| 9.3 | Hydrocarbon Derivatives 100 |
| Chapter 10 | Cycling of Nutrients 111 |
| 10.1 | Cycling of Oxygen, Hydrogen, and Phosphorus 112 |
| 10.2 | Cycling of carbon 112 |
| 10.3 | Cycling of Nitrogen 113 |

| | | |
|---------------------------|---|-----|
| 10.4 | Cycling of Sulfur | 115 |
| Part III | | |
| Major Ecological Problems | | |
| Chapter 11 | Biochemistry of Acid Mine Drainage | 123 |
| 11.1 | Production of Acid | 124 |
| 11.2 | Consideration of Mechanisms of Pyrite Oxidation | 128 |
| 11.3 | Biological Means of Treatment and Abatement | 133 |
| Chapter 12 | Pollution and Accelerated Eutrophication of Lakes | 138 |
| 12.1 | Lake Sediment Formation | 142 |
| References | | 149 |
| Index | | 155 |