

# *The* PHARMACOLOGICAL BASIS *of* THERAPEUTICS

*Second Edition*

A TEXTBOOK OF PHARMACOLOGY, TOXICOLOGY,  
AND THERAPEUTICS FOR PHYSICIANS AND MEDICAL STUDENTS

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## PREFACE TO THE SECOND EDITION

The three main objectives which guided the writing of the first edition of this book have also served in the preparation of the second edition. These objectives are the correlation of pharmacology with related medical sciences, the reinterpretation of the actions and the uses of drugs from the viewpoint of important advances in medicine, and the placing of emphasis on the applications of pharmacodynamics to therapeutics. Because of the accelerated pace at which new drugs are being marketed for clinical use, a fourth objective has been given prominent attention, namely, to provide the reader with a "way of thinking about drugs" so that he will be better prepared to withstand the flood of unsubstantiated claims that are often made for new drugs and to evaluate critically the published literature on the properties and the uses of the many new therapeutic agents in comparison with the older well-established compounds of the same class. In this connection, our British colleague Dr. Gordon Millichap has supplied us with an appropriate paraphrase of Shakespeare's advice, given by Polonius to his son Laertes, in *Hamlet*, as follows:

Those drugs thou hast, and their adoption tried,  
Grapple them to thy soul with hoops of steel;  
But do not dull thy palm with entertainment  
Of each new-hatch'd, unfledged remedy.

In a real sense, this second edition constitutes a complete revision of the first edition. The 14 years which separate the two books have witnessed pharmacological and therapeutic advances which are probably unparalleled in the history of medicine. Nearly every page of the text reflects these advances. Nevertheless, the organization of the material in the first edition proved so sound that the numerous changes and new inclusions could readily and smoothly be incorporated. Hence the reader who is acquainted with the first edition will be on familiar ground.

The authors are indebted to so many score individuals for advice, help, and encouragement in the preparation of the book that it is not feasible to name all of them in this Preface. However, the contributions of a few persons require special comment. Our warm thanks are expressed to Professor Walter S. Loewe, who read much of the early drafts and made many sentences mean what the authors had intended them to mean. Dr. Mark Nickerson helped prepare the chapter on adrenergic blocking drugs, a field which his own able research has done so much to develop. Dr. Stewart C. Harvey assisted with some difficult sections on structure-activity relationship. Dr. Harry B. van Dyke was most generous with his sage advice and helpful criticism throughout the entire period of the preparation of the revision. Dr. Harry M. Rose patiently reviewed each succeeding draft of the chapters on antibiotics. To Dr. Edward Fingl, a special debt of gratitude is gladly acknowledged. In a real sense, he has been a junior partner in the preparation of several chapters and in the reading and correcting of original manuscript and galley proof.

We are also grateful to the many secretaries, reference librarians, and proofreaders who have given us such able assistance. The fine cooperation of The Macmillan Company and the expert work of their copy editor, Miss Joan Carolyn Zulch, have greatly facilitated the transformation of the raw manuscript into a printed book. Thanks are also due to the many thousand readers whose enthusiastic reception of the first edition has sustained us in the arduous task of preparing the new book. Finally, the authors wish to pay tribute to their mutual friendship which has vigorously survived the dual authorship of two editions of this text.

LOUIS S. GOODMAN  
ALFRED GILMAN

*November, 1954*

## PREFACE TO THE FIRST EDITION

Three objectives have guided the writing of this book—the correlation of pharmacology with related medical sciences, the reinterpretation of the actions and uses of drugs from the viewpoint of important advances in medicine, and the placing of emphasis on the applications of pharmacodynamics to therapeutics.

Although pharmacology is a basic medical science in its own right, it borrows freely from and contributes generously to the subject matter and technics of many medical disciplines, clinical as well as preclinical. Therefore, the correlation of strictly pharmacological information with medicine as a whole is essential for a proper presentation of pharmacology to students and physicians. Furthermore, the reinterpretation of the actions and uses of well-established therapeutic agents in the light of recent advances in the medical sciences is as important a function of a modern textbook of pharmacology as is the description of new drugs. In many instances these new interpretations necessitate radical departures from accepted but outworn concepts of the actions of drugs. Lastly, the emphasis throughout the book, as indicated in its title, has been clinical. This is mandatory because medical students must be taught pharmacology from the standpoint of the actions and uses of drugs in the prevention and treatment of disease. To the student, pharmacological data per se are valueless unless he is able to apply his information in the practice of medicine. This book has also been written for the practicing physician, to whom it offers an opportunity to keep abreast of recent advances in therapeutics and to acquire the basic principles necessary for the rational use of drugs in his daily practice.

The criteria for the selection of bibliographic references require comment. It is obviously unwise, if not impossible, to document every fact included in the text. Preference has therefore been given to articles of a review nature, to the literature on new drugs, and to original contributions in controversial fields. In most instances, only the more recent investigations have been cited. In order to encourage free use of the bibliography, references are chiefly to the available literature in the English language.

The authors are greatly indebted to their many colleagues at the Yale University School of Medicine for their generous help and criticism. In particular they are deeply grateful to Professor Henry Gray Barbour, whose constant encouragement and advice have been invaluable.

LOUIS S. GOODMAN  
ALFRED GILMAN

*New Haven, Connecticut*  
*November 20, 1940*

# CONTENTS

PREFACE TO THE SECOND EDITION	v
PREFACE TO THE FIRST EDITION	vii
<b>SECTION I. INTRODUCTION</b>	
1. General Principles	1
<b>SECTION II. CENTRAL NERVOUS SYSTEM DEPRESSANTS</b>	
2. History and Theories of General Anesthesia	21
3. Stages of General Anesthesia	28
4. Preanesthetic Medication, Technics of Anesthesia, Anesthetic Accidents, and Properties of Ideal Anesthetics	40
5. General Anesthetics	55
<i>I. Ether and Chloroform, Vinyl Ether, Ethyl Chloride, and Trichloroethylene</i>	
6. General Anesthetics ( <i>Continued</i> )	75
<i>II. Gas Anesthetics: Nitrous Oxide, Ethylene, and Cyclopropane</i>	
7. Basal Anesthetics	93
8. The Aliphatic Alcohols	98
9. Hypnotics and Sedatives	123
<i>I. The Barbiturates</i>	
10. Hypnotics and Sedatives ( <i>Continued</i> )	156
<i>II. Bromide, Chloral Hydrate, Paraldehyde, and Miscellaneous Agents (Cannabis, Mescaline)</i>	
11. Drugs Effective in Convulsive Disorders	178
12. Centrally Acting Skeletal Muscular Relaxants	206
13. Natural and Synthetic Narcotics	216
14. Analgesics and Antipyretics	281
<i>I. Salicylates and Congeners; Cinchophen and Congeners; Colchicine</i>	
15. Analgesics and Antipyretics ( <i>Continued</i> )	311
<i>II. Acetanilid and Acetophenetidin; Aminopyrine and Antipyrine</i>	

**SECTION III. CENTRAL NERVOUS SYSTEM STIMULANTS**

- 16.** Picrotoxin, Pentylenetetrazol, Nikethamide, Strychnine, and Camphor **325**  
**17.** The Xanthines **339**

*Caffeine, Theophylline, and Theobromine*

**SECTION IV. LOCAL ANESTHETICS**

- 18.** Cocaine; Procaine and Other Synthetic Local Anesthetics **354**

**SECTION V. DRUGS ACTING ON AUTONOMIC EFFECTOR CELLS**

- 19.** Anatomical, Physiological, and General Pharmacological Considerations **389**

- 20.** Drugs Stimulating Structures Innervated by Cholinergic Nerves (Parasympathomimetic Drugs) **422**

*I. Choline Esters*

- 21.** Drugs Stimulating Structures Innervated by Cholinergic Nerves (Parasympathomimetic Drugs) (*Continued*) **444**

*II. Cholinesterase Inhibitors and Anti-Curare Agents: Physostigmine, Neostigmine, Diisopropylfluorophosphate, Edrophonium, and Their Congeners*

- 22.** Drugs Stimulating Structures Innervated by Cholinergic Nerves (Parasympathomimetic Drugs) (*Continued*) **470**

*III. Pilocarpine, Arecoline, and Muscarine*

- 23.** Drugs Stimulating Structures Innervated by Adrenergic Nerves (Sympathomimetic Drugs) **476**

*I. Epinephrine and Levarterenol*

- 24.** Drugs Stimulating Structures Innervated by Adrenergic Nerves (Sympathomimetic Drugs) (*Continued*) **505**

*II. Ephedrine, Amphetamine, and Other Sympathomimetic Drugs*

- 25.** Autonomic Blocking Agents **541**

*I. Drugs Inhibiting Structures Innervated by Postganglionic Cholinergic Nerves*

- 26.** Autonomic Blocking Agents (*Continued*) **570**

*II. Drugs Inhibiting Structures Innervated by Adrenergic Nerves: Adrenergic Blocking Agents*

- 27.** Autonomic Blocking Agents (*Continued*) **596**

*III. Drugs Inhibiting Skeletal Muscles and Autonomic Ganglia*

**SECTION VI. HISTAMINE AND ITS ANTAGONISTS**

- 28.** Histamine and Antihistaminic Agents **644**

**SECTION VII. CARDIOVASCULAR DRUGS**

29. Digitalis and Allied Cardiac Glycosides 668  
 30. Antiarrhythmic and Antifibrillatory Agents 711

*Quinidine and Procaine Amide*

31. Vasodilator and Antihypertensive Agents 730

*Nitrites, Thiocyanate, Veratrum Alkaloids, Rauwolfia, Hydralazine, and Khellin*

**SECTION VIII. WATER, SALTS, AND IONS**

32. Agents Affecting Volume and Composition of Body Fluids 764  
 33. Cations: Potassium, Calcium, Magnesium, Barium, and Ammonium 795  
 34. Anions: Phosphate, Iodide, Fluoride, and Other Anions 820

**SECTION IX. DRUGS AFFECTING RENAL FUNCTION AND ELECTROLYTE METABOLISM**

35. Diuretics and Other Agents Employed in the Mobilization of Edema Fluid 840  
 36. Antidiuretics 869  
 37. Inhibitors of Renal Tubular Transport of Organic Compounds 880

**SECTION X. DRUGS AFFECTING UTERINE MOTILITY**

38. Oxytocics 886

*Ergot, Ergot Alkaloids, and Posterior Pituitary*

**SECTION XI. GASES AND VAPORS**

39. The Therapeutic Gases 905

*Oxygen, Carbon Dioxide, and Helium*

40. Noxious Gases and Vapors 926

*Carbon Monoxide, Hydrocyanic Acid, and Miscellaneous Agents*

**SECTION XII. HEAVY METALS AND HEAVY-METAL ANTAGONISTS**

41. Heavy-Metal Antagonists 939  
 42. Arsenicals 948  
 43. Mercury, Antimony, Gold, and Miscellaneous Metals 970  
 44. Lead 1002

**SECTION XIII. LOCALLY ACTING DRUGS**

45. Demulcents, Emollients, Protectives, Adsorbents, Hemostatics, Irritants, Astringents, and Certain Enzymes 1017  
 46. Gastric Antacids and Digestants 1029



47. Cathartics 1049  
 48. Emetics, Antiemetics, and Expectorants 1064

**SECTION XIV. ANTISEPTICS, DISINFECTANTS, AND DRUGS USED  
 IN THE CHEMOTHERAPY OF INFECTIOUS DISEASES**

49. Antiseptics, Germicides, Fungicides, Virucides, and Ectoparasiticides 1075  
 50. Drugs Used in the Chemotherapy of Helminthiasis 1133  
 51. Drugs Used in the Chemotherapy of Malaria 1161

*Quinacrine, Chloroquine, Chloroguanide, Pyrimethamine, Pama-  
 quine, Primaquine, and Quinine*

52. Drugs Used in the Chemotherapy of Amebiasis 1208

*Emetine, Halogenated Oxyquinolines, Organic Arsenicals, Chloro-  
 quine, and Fumagillin*

53. Miscellaneous Drugs Used in the Treatment of Protozoal Infections 1228

*Diamidines and Suramin*

54. Penicillin Therapy of Syphilis 1233

55. Drugs Used in the Chemotherapy of Tuberculosis and Leprosy 1250

56. Sulfonamides 1276

57. Antibiotics 1321

*I. Penicillin*

58. Antibiotics (*Continued*) 1360

*II. Streptomycin and Dihydrostreptomycin*

59. Antibiotics (*Continued*) 1378

*III. The Tetracyclines: Chlortetracycline, Oxytetracycline, and Te-  
 ttracycline*

60. Antibiotics (*Continued*) 1394

*IV. Miscellaneous Antibiotics: Chloramphenicol, Erythromycin, Car-  
 bomycin, Polymyxin B, Neomycin, Bacitracin, and Tyrothricin*

**SECTION XV. DRUGS USED IN THE CHEMOTHERAPY OF  
 NEOPLASTIC DISEASE**

61. Cytotoxic Drugs, Hormones, and Radioactive Isotopes 1415

**SECTION XVI. DRUGS ACTING ON THE BLOOD AND THE  
 BLOOD-FORMING ORGANS**

62. Drugs Effective in Iron-Deficiency Anemias 1451

63. Drugs Effective in Pernicious Anemia and Allied Megaloblastic Ane-  
 mias 1478

*Cyanocobalamin (Vitamin B<sub>12</sub>), Liver Extract, and Folic Acid*

**64. Anticoagulants** **1500**

*Heparin and Bishydroxycoumarin, and Their Congeneric Substitutes*

**SECTION XVII. HORMONES AND HORMONE ANTAGONISTS**

**65. Thyroid and Antithyroid Drugs** **1528**

**66. Parathyroid** **1566**

**67. Anterior Pituitary and Anterior Pituitary-Like Hormones** **1573**

**68. Estrogens and Progestogens** **1589**

**69. Androgens** **1609**

**70. Insulin** **1620**

**71. Adrenocorticotropic Hormone and Adrenocortical Steroids** **1642**

**SECTION XVIII. THE VITAMINS**

**72. Water-Soluble Vitamins** **1692**

*I. The Vitamin B Complex*

**73. Water-Soluble Vitamins (Continued)** **1720**

*II. Ascorbic Acid (Vitamin C)*

**74. Fat-Soluble Vitamins** **1728**

*I. Vitamin A and Vitamin D*

**75. Fat-Soluble Vitamins (Continued)** **1746**

*II. Vitamin K and Vitamin E*

**Appendix I. Principles of Prescription Writing** **1759**

**Appendix II. General Principles of Toxicology** **1777**

**INDEX** **1781**

• •

•