



# Pharmacology for the Dental Hygienist

*Edited by*

**AUSTIN H. KUTSCHER, D.D.S.**

Associate Professor  
Division of Stomatology  
School of Dental and Oral Surgery, Columbia University

**EDWARD V. ZEGARELLI, D.D.S., M.S.**

Edwin S. Robinson Professor of Dentistry  
Director, Division of Stomatology  
School of Dental and Oral Surgery, Columbia University

**GEORGE A. HYMAN, M.D.**

Associate in Medicine, Department of Medicine, College of  
Physicians and Surgeons, Columbia University  
Assistant Physician, Department of Medicine, Presbyterian  
Hospital, Columbia-Presbyterian Medical Center

**PATRICIA McLEAN, R.D.H., M.S.**

Director, School of Dental Hygiene  
Columbia University

**HELENE W. KUTSCHER, B.S.**

Late Manuscript Editor  
Journal of Oral Therapeutics and Pharmacology



**Lea & Febiger • Philadelphia**

ISBN 0-8121-0147-2

Copyright © 1966 by Lea & Febiger. Copyright under the International Copyright Union. All rights reserved. This book is protected by copyright. *No part of it may be reproduced in any manner or by any means, without written permission from the publisher.*

Reprinted March, 1970

Reprinted February, 1972

Reprinted March, 1973

Reprinted June, 1974

Reprinted July, 1975

Reprinted April, 1978

*Library of Congress Catalog Card Number 66-23234*

PRINTED IN THE UNITED STATES OF AMERICA

TO HELENE

A professional colleague of truly remarkable intellect and capacity — but more importantly, by far, a most wonderful and perfect wife and mother.

1924-1966

## Contributors

- JERRY J. ADELSON, D.D.S., ED.D.**  
Assistant Clinical Professor, Division of  
Pedodontics, School of Dental and Oral  
Surgery, Columbia University, New York.
- MORTIMER ADLER, D.D.S.**
- GEORGE B. AMBROSE, M.D.**  
Assistant Professor of Clinical Orthopedic  
Surgery, College of Physicians and Sur-  
geons, Columbia University, New York.
- HELEN M. ANDERSON, M.D.**  
Associate in Medicine, College of Physi-  
cians and Surgeons, Columbia University,  
New York.
- HENRY ARANOW, JR., M.D., MED. SCI. D.**  
Associate Professor of Clinical Medicine,  
College of Physicians and Surgeons, Co-  
lumbia University, New York.
- HAROLD L. ATKINS, M.D.**  
Associate Scientist, Medical Department,  
Brookhaven National Laboratory, Upton,  
New York.
- ROSLYN BARBASH, M.D.**  
Assistant Physician, Allergy Department,  
Vanderbilt Clinic, Presbyterian Hospital,  
Columbia-Presbyterian Medical Center,  
New York.
- HAROLD BAURMASH, D.D.S.**  
Assistant Clinical Professor, Division of  
Oral Surgery, School of Dental and Oral  
Surgery, Columbia University, New York.
- STANLEY J. BEHRMAN, D.D.S.**  
Attending Oral Surgeon, The New York  
Hospital-Cornell Medical Center, New  
York.
- I. B. BENDER, D.D.S.**  
Chairman, Department of Dentistry, Al-  
bert Einstein Medical Center, Philadel-  
phia.
- CHARLES L. BERMAN, D.D.S.**  
Instructor in Dentistry, Section of Perio-  
dontology, School of Dental and Oral  
Surgery, Columbia University, New York.
- HARRIS B. BERNSTEIN, M.SC., D.SC.**  
Assistant Director, Research, Block Drug  
Company, Jersey City, New Jersey.
- FRANK E. BEUBE, L.D.S., D.D.S.**  
Professor and Director, Section of Perio-  
dontology, School of Dental and Oral  
Surgery, Columbia University, New York.
- BASIL O. BIBBY, D.M.D., PH.D.**  
Professor of Dentistry, University of  
Rochester; Director, Eastman Dental  
Dispensary, Rochester, New York.
- HYLAN A. BICKERMAN, M.A., M.D.**  
Associate Clinical Professor of Medicine,  
College of Physicians and Surgeons, Co-  
lumbia University, New York.
- ROY BOELSTLER, D.D.S.**  
Instructor in Operative Dentistry, School  
of Dental and Oral Surgery, Columbia  
University, New York.
- THEODORE E. BOLDEN, D.D.S., M.S., PH.D.**  
Professor and Chairman, Department of  
Oral Pathology and Oral Medicine; Di-  
rector of Research, School of Dentistry,  
Meharry Medical College, Nashville, Ten-  
nessee.
- MARVIN BRODEY, M.D.**  
Instructor in Dermatology, College of  
Physicians and Surgeons, Columbia Uni-  
versity, New York.
- JOHN L. BUCHANAN, M.A., M.D.**  
Fellow, Department of Medicine, Presby-  
terian Hospital, Columbia-Presbyterian  
Medical Center, New York.
- JACK BUDOWSKY, D.D.S.**  
Associate Clinical Professor of Dentistry,  
Division of Stomatology, School of Dental  
and Oral Surgery, Columbia University,  
New York.
- MICHAEL G. BUONOCORE, M.S., D.M.D.**  
Research Coordinator, Eastman Dental  
Dispensary, Rochester, New York.
- EDWARD A. CAIN, JR., D.D.S.**  
Professor of Dentistry, Division of Res-  
torative Dentistry, School of Dental and  
Oral Surgery, Columbia University, New  
York.
- JAMES P. CATTELL, M.D.**  
Assistant Clinical Professor of Psychiatry,  
College of Physicians and Surgeons, Co-  
lumbia University, New York.
- SHU CHIEN, M.B., PH.D.**  
Associate Professor, Department of Physi-  
ology, College of Physicians and Surgeons,  
Columbia University, New York.

NEAL W. CHILTON, D.D.S., M.S.

Clinical Professor of Periodontics, Temple University, School of Dentistry, Philadelphia; Research Associate in Biostatistics, Columbia University Faculty of Medicine, New York.

CHARLES L. CHRISTIAN, M.D.

Assistant Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York.

NICHOLAS P. CHRISTY, M.D.

Assistant Professor, Department of Medicine, College of Physicians and Surgeons, Columbia University, New York.

JOHN P. H. CLARK, D.D.S., M.S.

Associate Professor of Pharmacology and Operative Dentistry, School of Dentistry, Western Reserve University, Cleveland.

D. WALTER COHEN, D.D.S.

Professor and Chairman, Department of Periodontics, School of Dentistry, University of Pennsylvania, Philadelphia.

M. MICHAEL COHEN, D.M.D.

Assistant Professor of Oral Pediatrics, Tufts University School of Dental Medicine, Boston.

HELEN O. CURTH, M.D.

Attending Dermatologist, Presbyterian Hospital, Columbia Presbyterian Medical Center, New York.

JOSEPH A. CUTTITA, M.S., D.D.S.

Associate Professor of Dentistry, School of Dental and Oral Surgery, Columbia University, New York.

GERALD A. DENEAU, PH.D.

Assistant Professor of Pharmacology, University of Michigan Medical School, Ann Arbor.

CAROLYN R. DENNING, M.D.

Associate in Pediatrics, College of Physicians and Surgeons, Columbia University, New York.

NICHOLAS A. DiSALVO, D.D.S., PH.D.

Professor of Dentistry and Director, Division of Orthodontics, School of Dental and Oral Surgery, Columbia University, New York.

EDWARD C. DOBBS, D.D.S.

Professor and Chairman, Department of Pharmacology, Baltimore College of Dental Surgery, University of Maryland, Baltimore.

BOHDAN DOBIAS, M.D.

Instructor in Dermatology, College of Physicians and Surgeons, Columbia University, New York.

BRUCE L. DOUGLAS, D.D.S., M.A., M.P.H.

Associate Professor and Coordinator of Oral Medicine, College of Dentistry, University of Illinois, Chicago.

WILLIAM D. DRUCKER, M.D.

Instructor in Medicine, School of Medicine, New York University, New York.

CLIFTON O. DUMMETT, D.D.S., M.S.D., M.P.H.

Chief, Dental Service, Veterans Administration Hospital, Tuskegee, Alabama.

ROY T. DUROCHER, D.D.S.

Professor of Oral Diagnosis, School of Dentistry, University of Pittsburgh, Pittsburgh.

ALEX SAHAGIAN-EDWARDS, M.D.

Associate Attending Physician, Francis Delafield Hospital, New York.

JACK EISERT, M.D.

Assistant in Dermatology, College of Physicians and Surgeons, Columbia University, New York.

SIDNEY EPSTEIN, D.D.S.

Associate Professor, Clinical Pharmacology, College of Physicians and Surgeons, School of Dentistry, University of the Pacific, San Francisco.

FRANK G. EVERETT, M.S., D.M.D., M.D.

Professor and Head, Department of Periodontology, University of Oregon Dental School, Portland.

JEAN FONTAINE, D.D.S.

Professor, Oral Diagnosis Department, Faculty of Dental Surgery, University of Montreal, Montreal, Canada.

RUDOLPH H. FRIEDRICH, D.D.S.

Professor of Dentistry and Director, Division of Oral Surgery, School of Dental and Oral Surgery, Columbia University, New York.

HYMAN J. V. GOLDBERG, D.M.D.

Research Associate, Department of Periodontology, Eastman Dental Dispensary, Rochester, New York.

LEONARD J. GOLDWATER, M.D.,

MED.SC.D.

Professor of Occupational Medicine, College of Physicians and Surgeons, Columbia University, New York.



**ROBERT J. GORLIN, D.D.S., M.S.**

Professor and Chairman, Department of Oral Pathology, School of Dentistry, University of Minnesota, Minneapolis.

**ROBERT GOTTSEGEN, D.D.S.**

Associate Clinical Professor of Dentistry, School of Dental and Oral Surgery, Columbia University, New York.

**PAUL GROSS, M.D.**

Professor of Dermatology, College of Physicians and Surgeons, Columbia University (Retired); Consulting Dermatologist, Presbyterian Hospital, Columbia-Presbyterian Medical Center, New York.

**LOUIS I. GROSSMAN, D.D.S., D.M.D.**

Professor of Oral Medicine and Director of Endodontics Section, School of Dentistry, University of Pennsylvania, Philadelphia.

**DONALD H. HARTER, M.D.**

Assistant, Department of Neurology, College of Physicians and Surgeons, Columbia University, New York.

**WENDELL B. HATFIELD, M.D.**

Instructor, Department of Medicine, College of Physicians and Surgeons, Columbia University, New York.

**ROLAND R. HAWES, D.M.D.**

Head of Clinics, Eastman Dental Dispensary, Rochester, New York.

**HENRY O. HEINEMANN, M.D.**

Assistant Professor of Medicine, College of Physicians and Surgeons, Columbia University, New York.

**LELAND C. HENDERSHOT, D.D.S., PH.D.**

Editor, Journal of the American Dental Association, Chicago.

**DAVID K. HENNON, D.D.S.**

Assistant Professor of Basic Sciences, Indiana University School of Dentistry, Indianapolis.

**FRED A. HENNY, D.D.S.**

Chief, Division of Oral Surgery and Dentistry, Henry Ford Hospital, Detroit.

**MAYNARD K. HINE, D.D.S., M.S.**

Dean, School of Dentistry, Indiana University, Indianapolis.

**LAWRENCE B. HOBSON, M.D., PH.D.**

Formerly, Medical Director, The Squibb Institute for Medical Research, New Brunswick, New Jersey.

**DONALD A. HOLUB, M.D.**

Associate in Medicine, College of Physicians and Surgeons, Columbia University, New York.

**CALDERON HOWE, M.D.**

Professor of Microbiology, College of Physicians and Surgeons, Columbia University, New York.

**ROBERT M. HUI, M.D.**

Assistant Clinical Professor of Otolaryngology, College of Physicians and Surgeons, Columbia University, New York.

**JOSEPH L. KANIG, PH.D.**

Professor of Pharmacy, College of Pharmacy, Columbia University, New York.

**IRVIN KERLAN, M.D.**

Formerly Director, Division of Research and Reference, Bureau of Medicine, Food and Drug Administration, Department of Health, Education, and Welfare, Washington, D.C.

**DONALD A. KERR, D.D.S., M.S.**

Professor and Chairman, Department of Oral Pathology and Periodontia, School of Dentistry, University of Michigan, Ann Arbor.

**WALTER R. KESSLER, M.D., PH.D.**

Assistant Professor in Pediatrics, College of Physicians and Surgeons, Columbia University, New York.

**HOLMES T. KNIGHTON, D.D.S.**

Professor of Dentistry and Microbiology, School of Dentistry, Medical College of Virginia, Richmond.

**GUSTAV O. KRUGER, A.M., D.D.S.**

Professor of Oral Surgery, School of Dentistry, Georgetown University, Washington, D.C.

**RONALD W. LAMONT-HAVERS, M.D.**

Formerly, Medical Director, Arthritis and Rheumatism Foundation, New York.

**STANLEY L. LANE, M.D., D.D.S.**

Associate Professor of Surgery, Albert Einstein College of Medicine, Yeshiva University, New York.

**JOSEPH M. LEAVITT, D.D.S.**

Associate Clinical Professor, Department of Restorative Dentistry, School of Dental and Oral Surgery, Columbia University, New York.

**MICHAEL J. LEPORE, M.S., M.D.**

Director, Upjohn Gastrointestinal Service, Roosevelt Hospital, New York.

**PHILIP I. LERNER, M.D.**

Assistant Physician, Pratt Clinic, New England Center Hospital, Boston.

**LOUIS J. LOSCALZO, D.D.S.**

Chief, Oral Surgery Section, Bronx Veterans Administration Hospital, New York.

**IRWIN D. MANDEL, D.D.S.**

Associate Clinical Professor, Division of Stomatology, School of Dental and Oral Surgery, Columbia University, New York.

**LOUIS MANDEL, D.D.S.**

Assistant Clinical Professor, Division of Oral Surgery, School of Dental and Oral Surgery, Columbia University, New York.

**JOHN H. MANHOLD, JR., D.M.D., M.A.**

Professor and Director, Department of Pathology and Oral Diagnosis, Seton Hall College of Medicine and Dentistry, Jersey City, New Jersey.

**MICHAEL Z. MARDER, D.D.S.**

Assistant in Dentistry, Division of Stomatology, School of Dental and Oral Surgery, Columbia University, New York.

**LESTER C. MARK, M.D.**

Associate Professor of Anesthesiology, College of Physicians and Surgeons, Columbia University, New York.

**ALFRED M. MARKOWITZ, M.D.**

Assistant Professor of Clinical Surgery, College of Physicians and Surgeons, Columbia University, New York.

**JOHN T. McCARTHY, M.D.**

Formerly, Instructor, Department of Dermatology, College of Physicians and Surgeons, Columbia University, New York.

**GEORGE R. MERRIAM, JR., M.D.**

Assistant Professor of Clinical Ophthalmology, College of Physicians and Surgeons, Columbia University, New York.

**GEORGE A. MINERVINI, D.D.S.**

Assistant Clinical Professor of Dentistry in Oral Surgery, School of Dental and Oral Surgery, Columbia University, New York.

**LEONARD M. MONHEIM, M.S., D.D.S.**

Professor and Head, Department of Anesthesiology, School of Dentistry, University of Pittsburgh, Pittsburgh.

**ALVIN L. MORRIS, D.D.S., PH.D.**

Dean and Professor of Oral Diagnosis and Oral Medicine, College of Dentistry, University of Kentucky, Lexington.

**JOSEPH C. MUHLER, D.D.S., PH.D.**

Professor of Research, Indiana University Medical Center, Indianapolis.

**IRVING J. NAIDORF, D.D.S.**

Assistant Clinical Professor, School of Dental and Oral Surgery, Columbia University, New York.

**CARL T. NELSON, M.D.**

Professor of Dermatology, College of Physicians and Surgeons, Columbia University, New York.

**PAUL NUMEROF, SC.D.**

Manager, Radiopharmaceutic Services, E. R. Squibb and Sons, Inc., New York.

**F. DARL OSTRANDER, D.D.S., M.S.**

Professor of Dentistry, School of Dentistry, University of Michigan, Ann Arbor.

**JULIUS R. OZICK, D.D.S.**

Assistant Professor of Pedodontics, New York University School of Dentistry, New York.

**NILKANTH M. PHATAK, PH.D.**

Professor and Head, Department of Pharmacology, Dental School, University of Oregon, Portland.

**KERMIT L. PINES, M.D.**

Associate Professor of Clinical Medicine, College of Physicians and Surgeons, Columbia University, New York.

**RAYMOND POGGE, M.B., M.D.**

Formerly, Director of Medical Research, Wm. S. Merrell Company, Cincinnati.

**THOMAS PORTWAY, D.D.S.**

Associate Professor of Dentistry, School of Dental and Oral Surgery, Columbia University, New York.

**ROBIN M. RANKOW, M.D., D.D.S.**

Assistant Attending Surgeon, Presbyterian Hospital, Columbia-Presbyterian Medical Center, New York.

**HELEN M. RANNEY, M.D.**

Associate Professor of Medicine, Albert Einstein College of Medicine, Yeshiva University, New York.

**ROBERT L. REEVES, D.D.S.**

Head, Department of Oral Pathology and Periodontics, School of Dentistry, University of Southern California, Los Angeles.



**MICHAEL T. ROMANO, D.D.S.**

Associate Professor and Chairman, Department of Operative Dentistry, College of Dentistry, University of Kentucky, Lexington.

**SOLOMON N. ROSENSTEIN, D.D.S.**

Professor of Dentistry and Director of Division of Pedodontics, School of Dental and Oral Surgery, Columbia University, New York.

**S. LEONARD ROSENTHAL, D.D.S.**

Professor of Oral Diagnosis, School of Dentistry, Temple University, Philadelphia.

**RUSSELL ROSS, D.D.S., PH.D.**

Assistant Professor of Pathology and Oral Pathology, School of Medicine and Dentistry, University of Washington, Seattle.

**FRED ROTHENBERG, D.M.D., D.D.S.**

Assistant Clinical Professor of Dentistry, Division of Oral Surgery, School of Dental and Oral Surgery, Columbia University, New York.

**SAUL L. SANDERS, M.D.**

Instructor, Department of Dermatology, College of Physicians and Surgeons, Columbia University, New York.

**ALBERT SCHATZ, PH.D.**

Formerly, Director of Research, Radburn Research Institute, Fair Lawn, New Jersey.

**PAUL SCHNEIDER, D.D.S., M.SC.**

Oral Surgeon, St. Clare's Hospital, New York.

**LASZLO SCHWARTZ, D.D.S.**

Clinical Professor of Dentistry, School of Dental and Oral Surgery, Columbia University, New York.

**IRWIN W. SCOPP, D.D.S.**

Chief, Dental Service, Veterans Administration Hospital, Manhattan, New York.

**EDWARD B. SELF, M.D., MED. SC.D.**

Assistant Professor of Clinical Surgery, College of Physicians and Surgeons, Columbia University, New York.

**BOAZ M. SHATTAN, D.D.S.**

Instructor in Dentistry, Division of Oral Surgery, School of Dental and Oral Surgery, Columbia University, New York.

**IRWIN I. SHIP, D.M.D.**

Associate Professor of Oral Medicine, School of Dentistry, University of Pennsylvania, Philadelphia.

**HERBERT F. SILVERS, D.D.S.**

Assistant Clinical Professor, Division of Stomatology, School of Dental and Oral Surgery, Columbia University, New York.

**MEYER H. SLATKIN, M.D.**

Assistant Clinical Professor of Dermatology, Presbyterian Hospital, Columbia-Presbyterian Medical Center, New York.

**AUSTIN SMITH, M.D.**

President, Pharmaceutical Manufacturers Association, Washington, D.C.

**STANLEY R. SPIRO, D.D.S.**

Assistant Clinical Professor of Dental Surgery (Anesthesiology), Albert Einstein College of Medicine, Yeshiva University, New York.

**S. SIGMUND STAHL, D.D.S., M.S.**

Professor, Department of Periodontia and Oral Medicine, College of Dentistry, New York University, New York.

**GILBERT STANTON, D.D.S., M.S.**

Consultant in Dental Research, Veterans Administration Hospital, Northport, New York.

**IRVING B. STERN, D.D.S.**

Associate Professor, Department of Periodontics, School of Dentistry, University of Washington, Seattle.

**HAROLD M. SYROP, D.D.S.**

Professor of Oral Diagnosis, School of Dentistry, Medical College of Virginia, Richmond.

**LUCIAN SZMYD, D.M.D., M.S.**

Oral Surgeon, Aerospace Medical Center, Brooks Air Force Base, Texas.

**ROBERT W. TANKERSLEY, JR., PH.D.**

Assistant Professor of Microbiology, Medical College of Virginia, Richmond.

**PATRICK D. TOTO, M.S., D.D.S.**

Professor of Oral Pathology and Director of Research, Chicago College of Dental Surgery, Loyola University, Chicago.

**HAROLD M. M. TOVELL, M.D.**

Clinical Professor of Obstetrics, College of Physicians and Surgeons, Columbia University; Director of Obstetrics and Gynecology, Woman's Hospital, Division of St. Luke's Hospital, New York.

**JOHN E. ULTMANN, M.D.**

Assistant Professor in Medicine, College of Physicians and Surgeons, Columbia University, New York.

**WILLIAM W. WAINWRIGHT, D.D.S., M.S.**  
Director of Biological and Nuclear Sciences, George M. Hollenback Research Associates, Encino, California.

**DONALD A. WALLACE, PH.D.**  
Professor of Therapeutics, College of Dentistry, University of Illinois, Chicago.

**HENRY O. WHEELER, M.D.**  
Associate Professor of Medicine, College

of Physicians and Surgeons, Columbia University, New York.

**F. B. WIEBUSCH, D.D.S.**  
Chairman, Department of Oral Diagnosis and Therapeutics, School of Dentistry, Medical College of Virginia, Richmond.

**DORAN D. ZINNER, D.D.S.**  
Research Associate Professor, Department of Microbiology, School of Medicine, University of Miami, Coral Gables, Florida.

## **Publisher's Foreword**

Much of this book is a condensation of material which appeared in PHARMACOTHERAPEUTICS OF ORAL DISEASE, edited by Austin H. Kutscher, D.D.S., Edward V. Zegarelli, D.D.S., M.S., and George A. Hyman, M.D., published in 1964 by the McGraw-Hill Book Company, which company has kindly allowed the editors to condense and adapt the book for the use of dental hygienists.

Some additional material has been added to this presentation.

It is hoped that the dental hygienist, whether in practice or in training, will find this book of real value.

*Lea & Febiger  
Philadelphia*

## Preface

We hope that this book will provide a source of information to fill a serious void in the training of dental hygienists. In addition, we hope that dental hygienists will find this an accurate and usable reference when they finish their schooling and begin to practice.

Parts I and II deal with broad generalizations concerning pharmacology and the application of this field to the therapy of oral disease. Within these sections are relatively brief introductory expositions of pharmacologic principles and the pharmacotherapeutics of drug groups and individual drug substances of particular importance in the treatment of oral lesions.

Part III is concerned almost entirely with

the treatment of specific oral and dental diseases.

The reader's attention is called especially to Part IV, the Epitome section, which appears on tinted paper. It is our belief that this section will prove to be a valuable and unique supplement to the text, for it offers:

1. A unification of therapeutic information which is basically applicable to many areas of the text

2. A means of avoiding the reading of repetitious details

3. A simple, practical, and easily found reference for obtaining the more common and necessary information about certain drugs and drug groups and their applications to oral disease.

*The Editors*

## Acknowledgments

In assuming the editorship of this text, it was readily admitted that no single individual can any longer be expected to prepare an "authoritative" textbook covering one, let alone two, entire disciplines—oral medicine and pharmacotherapeutics. Thus, it was evident from the outset that if this book were to fulfill the objective of being truly authoritative, the editors would have to be dependent upon specialists or experts in each of a very considerable number of specific fields. The 132 contributors, all of whom are identified and acknowledged in the list of contributors, were carefully selected so that we could obtain scholarly manuscripts in these many and varied areas. To our contributors, we express our deep gratitude for the diligent manner in which they undertook and completed their assigned tasks; and also for their constant cooperation throughout the enterprise.

We are indebted to numerous individuals for their advice and aid in regard to the accuracy of textual material, particularly that contained in the manuscripts of contributors in peripheral and allied fields. These efforts are acknowledged with sincere appreciation. Many of our colleagues at the School of Dental and Oral Surgery and the College of Physicians and Surgeons of Columbia University were more than generous with their help and criticism.

The contributions of Michael Z. Marder,

D.D.S., Henry O. Heinemann, M.D., and John L. Buchanan, M.D., all three of whom also wrote chapters of the book, require special comment. Our warmest thanks are extended to them for their inestimable aid in reading and criticizing each manuscript for its factual information. Not only was this task performed upon initial receipt of the manuscript, but it was also repeated in the galley and page proof stages of the book. They, together with Dr. John H. Middendorf, Associate Professor of English, Columbia University, helped to make many portions of the text say what the authors had intended.

The many and difficult tasks which are inherent in the compilation and preparation of a book of this type are such as to require continued enthusiasm, drive, and perhaps, also, inspiration. An ever-ready and vital source of the latter was constantly derived from persons who may not have been directly associated with the formidable tasks involved. It is with these thoughts in mind that the authors express their deep appreciation to their wives and families for their encouragement, forbearance, sacrifices, and sustenance.

Finally, we are indebted to Dr. Joseph M. Ragosta, who gave unstintingly of his time and effort in diligently performing a great many of the details necessary to the compilation of the manuscript.

*The Editors*

MANUSCRIPT EDITOR

*Michael L. Barnett*

# Contents

## Part I. General Principles of Pharmacology

	PAGE
1. Actions, Effects, and Administration of Drugs .....	17
Actions, Dose, Dose Response, and Therapeutic Index ( <i>The Editors</i> ) ....	17
Chemical Structure ( <i>The Editors</i> ) .....	19
Routes of Administration ( <i>The Editors</i> ) .....	20
Absorption ( <i>F. Darl Ostrander</i> ) .....	22
Distribution, Fate, and Elimination ( <i>The Editors</i> ) .....	23
Frequency and Speed of Administration; Physical Factors ( <i>The Editors</i> )	25
Concomitant Administration of Drugs ( <i>The Editors</i> ) .....	26
Some Other Factors Affecting Response to Drugs ( <i>The Editors</i> ) .....	28
Purity; Excipients, Flavorings, Binders; Care and Handling of Drugs; Dosage Forms ( <i>Edward C. Dobbs</i> ) .....	29
The Patient's History; Supplemental Reading ( <i>The Editors</i> ) .....	31
2. Prescription Writing; Weights and Measures .....	33
Basic Principles of Prescription Writing ( <i>Joseph L. Kanig</i> ) .....	33
Metrology ( <i>Joseph L. Kanig</i> ) .....	37
Excerpts from Important Laws ( <i>Joseph L. Kanig</i> ) .....	39
3. Untoward Effects of Drugs .....	41
Types and Characteristics of Untoward Actions ( <i>The Editors</i> ) .....	41
Allergy ( <i>John T. McCarthy</i> ) .....	42
Urticaria ( <i>Roslyn Barbash</i> ) .....	44
Serum Sickness ( <i>Walter R. Kessler</i> ) .....	45
Asthma ( <i>Walter R. Kessler</i> ) .....	45
Reactions to Drugs ( <i>Saul L. Sanders and Marvin Brodey</i> ) .....	46
Toxicology ( <i>Leonard J. Goldwater</i> ) .....	47
Tolerance, Habituation, and Addiction ( <i>Gerald A. Deneau</i> ) .....	47
Chemical Burns ( <i>Frank G. Everett</i> ) .....	49
Agents Used to Treat Allergic Diseases of the Mouth ( <i>Donald A. Kerr</i> ) ..	50
Toxic Mucosal Reactions to Drugs ( <i>Alvin L. Morris</i> ) .....	51
Oral Pigmentations Resulting from Drug Therapy ( <i>Clifton O. Dummett</i> )	53
Oral Reactions from Drugs Used in the Treatment of Cancer ( <i>Alex Sahagian-Edwards</i> ) .....	53
The Liver ( <i>George A. Hyman</i> ) .....	53
Problems Related to Drug Therapy During Pregnancy ( <i>Harold M. M. Tovell</i> )	55
4. Drug Classification .....	58
Classification, Nomenclature, Official Drugs, and Nonofficial Drugs ( <i>Donald A. Wallace</i> ) .....	58
Federal Food, Drug and Cosmetic Act ( <i>Irvin Kerlan</i> ) .....	59
Role of the American Dental Association in the Evaluation of Drugs ( <i>Leland C. Hendershot</i> ) .....	61

## Part II. General Considerations of Drug Groups

5. Anesthetics .....	65
General Anesthetics and Premedication; General Anesthesia ( <i>Lester C. Mark</i> ) .....	65



	PAGE
General Anesthetics: Office Procedures ( <i>Stanley R. Spiro</i> ) .....	73
Respiratory Complications of General Anesthesia ( <i>Lester C. Mark</i> ) .....	76
Analgesia: Inhalation ( <i>Michael T. Romano</i> ) .....	82
6. Local Anesthetics .....	83
General Considerations ( <i>Leonard M. Monheim</i> ) .....	83
Selection of a Local Anesthetic Agent ( <i>John P. H. Clark</i> ) .....	85
Viral Hepatitis ( <i>Holmes T. Knighton and Robert W. Tankersley, Jr.</i> ) .....	87
Agents to Alleviate Discomfort of Teething ( <i>M. Michael Cohen</i> ) .....	89
7. Central Nervous System Depressants .....	91
Sedatives and Hypnotics ( <i>Nilkanth M. Phatak; Lester C. Mark;</i> <i>Donald H. Harter</i> ) .....	91
Analgesics and Antipyretics ( <i>Nilkanth M. Phatak; Michael T. Romano;</i> <i>Lester C. Mark; Donald H. Harter</i> ) .....	97
Addiction and Related Phenomenon ( <i>Gerald A. Deneau</i> ) .....	101
Non-Narcotic Antitussive Agents ( <i>Hylan A. Bickerman</i> ) .....	101
Tranquilizers ( <i>Nilkanth M. Phatak</i> ) .....	103
Drugs and Behavioral Disorders ( <i>James P. Cattell</i> ) .....	105
8. Central Nervous System Stimulants ( <i>Nilkanth M. Phatak</i> ) .....	109
9. Autonomic Drugs ( <i>Shu Chien</i> ) .....	111
10. Cardiovascular Agents ( <i>Wendell B. Hatfield</i> ) .....	122
11. Drugs Acting on Blood and Blood-Forming Organs ( <i>John E. Ulmann</i> ) ....	130
12. Agents Used in the Management of Bleeding and Agents Affecting Coagulation	135
Promotion of Coagulation: Locally and Systemically Active Agents ( <i>Stanley L. Lane</i> ) .....	135
Hemostatics ( <i>Roland R. Hawes</i> ) .....	135
Transfusion ( <i>George A. Hyman</i> ) .....	136
Anticoagulant Therapy ( <i>Stanley J. Behrman</i> ) .....	141
Hemophilia and Hemophilia-Like Diseases ( <i>Helen M. Anderson</i> ) .....	143
13. Water, Salts, Ions, Parenteral Fluids and Parenteral Feeding .....	145
Drugs Affecting Body Fluids and Urine ( <i>Henry O. Heinemann</i> ) .....	145
Intravenous Feeding; Dehydration; Fluid and Electrolytes ( <i>Robin M. Rankow</i> ) .....	149
14. Oxygen and Carbon Dioxide ( <i>Hylan A. Bickerman</i> ) .....	150
15. Heavy Metals ( <i>Leonard J. Goldwater</i> ) .....	153
16. Agents Acting Locally on Skin or Mucous Membranes ( <i>Harris B. Bernstein</i> )	155
17. Antacids, Digestants, Cathartics, Emetics, and Carminatives ( <i>Harris B. Bernstein</i> ) .....	163
18. Expectorants ( <i>Hylan A. Bickerman</i> ) .....	169

	PAGE
19. Agents Active Against Microorganisms .....	171
Antiseptics, Disinfectants, and Deodorants ( <i>F. Darl Ostrander</i> ) .....	171
Chemical Agents in Sterilization ( <i>Doran D. Zinner</i> ) .....	173
Prevention of Cross-Infection ( <i>Doran D. Zinner</i> ) .....	175
Preparation of Hands and Site of Operation ( <i>Harold Baurmash</i> ) .....	176
Cavity Sterilization ( <i>Doran D. Zinner</i> ) .....	177
Antibiotics and Sulfonamides ( <i>Philip I. Lerner; Meyer H. Slatkin</i> ) .....	178
Discoloration of Teeth Due to Tetracycline ( <i>Joseph A. Cuttita</i> ) .....	186
Dissemination: Bacteremia and Septicemia ( <i>I. B. Bender</i> ) .....	187
Antituberculosis Agents ( <i>Calderon Howe</i> ) .....	189
20. Vitamins and Malnutrition .....	191
Malnutrition ( <i>Michael J. Lepore</i> ) .....	191
Vitamins and Nutritional Requirements ( <i>Gilbert Stanton</i> ) .....	191
Vitamin Deficiencies .....	193
Vitamins B <sub>1</sub> and B <sub>2</sub> ( <i>Hyman J. V. Goldberg</i> ) .....	193
Niacin, Pyridoxine, and Pantothenic Acid ( <i>Theodore E. Bolden</i> ) .....	196
Vitamin C ( <i>Theodore E. Bolden</i> ) .....	197
Vitamin A ( <i>Theodore E. Bolden</i> ) .....	198
Vitamin D ( <i>Theodore E. Bolden</i> ) .....	199
Hypervitaminoses ( <i>F. B. Wiebusch</i> ) .....	201
21. Hormones .....	202
Hypophysis—Anterior Pituitary and Posterior Pituitary ( <i>Henry Aranow, Jr.</i> ) .....	202
Hyperpituitarism ( <i>Donald A. Holub</i> ) .....	203
Hypopituitarism ( <i>Donald A. Holub</i> ) .....	204
Thyroid ( <i>Henry Aranow, Jr.; Donald A. Holub</i> ) .....	204
Gonads and Placenta ( <i>Henry Aranow, Jr.</i> ) .....	206
Pancreas ( <i>Henry Aranow, Jr.</i> ) .....	207
Diabetes Mellitus ( <i>Robert Gottsegen</i> ) .....	209
Adrenal Medulla ( <i>Henry Aranow, Jr.</i> ) .....	211
Parathyroids ( <i>Henry Aranow, Jr.</i> ) .....	211
Hyperparathyroidism and Hypoparathyroidism ( <i>Donald A. Holub</i> ) .....	211
Corticosteroids ( <i>Nicholas P. Christy and William D. Drucker</i> ) .....	212
Diseases of the Adrenal Cortex ( <i>Donald A. Holub</i> ) .....	216
Endocrine Effects on Oral Soft Tissues ( <i>Jean Fontaine</i> ) .....	217
Desquamative Gingivitis ( <i>Irwin W. Scopp</i> ) .....	218
22. Antihistaminics ( <i>Lucian Szmyd</i> ) .....	220
23. Agents Affecting the Salivary Glands ( <i>Robert J. Gorlin</i> ) .....	222
24. Sialography ( <i>Louis Mandel</i> ) .....	223
25. Cancer Chemotherapeutic Agents: Malignant Tumors of the Soft Tissues of the Oral Cavity, the Jaws, and the Salivary Glands ( <i>Alfred M. Markowitz</i> ) ..	225
26. Radioisotopes ( <i>William W. Wainwright</i> ) .....	228
27. Intoxicants ( <i>Leonard J. Goldwater</i> ) .....	231
28. Therapeutic Aids for the Dental Hygienist ( <i>Michael Z. Marder</i> ) .....	233

### Part III. Clinical Therapeutics for the Dental Hygienist

29. The Hospitalized or Bedridden Patient ( <i>Robin M. Rankow</i> ) .....	243
30. Bone ( <i>Kermit L. Pines</i> ) .....	245
31. Periodontal Disease .....	247
Chronic Marginal Gingivitis ( <i>Frank E. Beube</i> ) .....	247
Marginal Periodontitis ( <i>Maynard K. Hine</i> ) .....	248
Periodontal Abscess ( <i>D. Walter Cohen</i> ) .....	250
Surgical Treatment of Periodontal Lesions: Dressings ( <i>Neal W. Chilton</i> ) .....	250
Necrotizing Ulcerative Gingivitis (Vincent's Infection) ( <i>Irving B. Stern</i> ) ..	252
Acute Primary Herpetic Gingivostomatitis ( <i>Harold M. Syrop</i> ) .....	254
32. Anticalculus Agents ( <i>Irwin D. Mandel</i> ) .....	256
33. Dental Caries .....	257
Fluorine ( <i>Joseph C. Muhler and David K. Hennon</i> ) .....	257
Fluoride Dentifrices, Topical Fluorides and Fluoridation ( <i>Michael G. Buonocore and Basil O. Bibby</i> ) .....	263
Prophylactic and Therapeutic Approaches to Dental Caries ( <i>Irwin D. Mandel</i> ) .....	269
Hyperemia of the Pulp and Pulpitis ( <i>Jack Budowsky</i> ) .....	272
Miscellaneous Agents Used in Restorative Dentistry ( <i>Edward A. Cain, Jr.,         Thomas Portway, and Roy Boelstler</i> ) .....	273
Management of Sensitive Dentin ( <i>Patrick D. Toto</i> ) .....	274
Bleaching Agents for the Pulpless Tooth ( <i>Joseph M. Leavitt and         Irving J. Naidorf</i> ) .....	275
34. Pulp Capping and Pulpotomy ( <i>Solomon N. Rosenstein</i> ) .....	276
35. Oral Surgery .....	279
Agents Used ( <i>Rudolph H. Friedrich</i> ) .....	279
Approach to the Patient ( <i>Sidney Epstein</i> ) .....	280
Packings and Dressings ( <i>Fred Rothenberg</i> ) .....	283
36. Halitosis ( <i>S. Leonard Rosenthal</i> ) .....	285
37. Eye, Ear, Nose, and Throat .....	288
The Eye ( <i>George R. Merriam, Jr.</i> ) .....	288
Ear, Nose and Throat ( <i>Robert M. Hui</i> ) .....	288
Part IV. Epitome (The Editors) .....	291
INDEX .....	332
Emergency Drugs and Armamentarium ( <i>John L. Buchanan</i> )     Inside Back Cover	