

CECIL

TEXTBOOK *of*
MEDICINE

Edited by JAMES B. WYNGAARDEN, M.D.

SIXTEENTH EDITION

CECIL TEXTBOOK *of* MEDICINE

Edited by **JAMES B. WYNGAARDEN, M.D.**

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PREFACE

This is the 16th edition of a book which began its existence more than half a century ago (1927). During these years its evolution has reflected the concurrent expansion of medical science and technology. But medical progress does not passively congeal into the pages of a book. On the contrary, a book comes into being with considerable editorial dystocia. It then is shaped over successive editions to assume ultimately a persona of its own. The current editors have received the oversight responsibility for a venerable book which has become itself an institution in medicine. The mark of its previous editors is still very much upon it: Russell Cecil (Editions 1-10), Robert Loeb (Editions 8-10), and Paul Beeson and Walsh McDermott (Editions 11-15). They were united in their ambition to provide an "authoritative clinical guidance and a reasoned, scientific basis for the pursuit of medicine." We firmly believe in that editorial policy. The reader will note that the format of this 16th edition of *Cecil* is a familiar one. Many names have changed, but the dedication to a comprehensive book of exceptional scholarship remains.

There are a number of changes, however, from the 15th edition, which was published in 1979. Two new associates, K. Frank Austen for immunology and rheumatology and David G. Nathan for hematology and oncology, have joined the distinguished panel of physicians who, as Consulting Editors, have added immeasurably to both editorial policy and execution. Approximately one third of the chapters have new authors, and many of the remainder have been extensively revised. The introductory essays to the various specialty sections have been expanded to allow a new emphasis on pathophysiology and the approach to the patient. Additional chapters have been added concerning areas in which rapid medical progress has been made (e.g., opioids, prostaglandins) or in which there is new interest (e.g., geriatrics, biomedical ethics). For the first time most of the references in the bibliographies have been briefly annotated. We hope that these annotations will both encourage the reading of these carefully chosen references and serve as a selective guide to them.

Cecil has reached the limit of size for a one-volume book; some may say that it has exceeded it. Yet considerably more knowledge, especially in the biomedical sciences, is necessary for modern medical practice. Rather than attempting to expand *Cecil* further, the editors (with A. H. Samiy) have elected to publish two associated books which, together with *Cecil*, form a system of medicine called the *International Textbook of Medicine*. Volume I, entitled *Pathophysiology, the Biological Principles of Disease*, edited with Samuel O. Thier, has been designed to give a comprehensive presentation of the most pertinent aspects of basic science relevant to medical practice, far beyond that compressed within *Cecil* alone. Volume II,

entitled *Medical Microbiology and Infectious Diseases*, edited by Abraham Braude, contains contributions by 58 participants from 27 countries outside the United States. More than any other single book now available, it describes the world experience with the parasitic and infectious diseases. Both of these books are linked to *Cecil* by design, format, and joint editorial policy and oversight.

During the past decade there has been increasing emphasis on the self-assessment of medical competence by the physician. Not only has this proved edifying in monitoring areas for further study, but the process of self-assessment itself has proved to be of great educational benefit. The editors therefore published *Review of General Internal Medicine* containing 1500 questions and answers linked to the 15th edition of *Cecil*. This book has been extensively revised in its second edition by members of the Departments of Medicine at the Duke University Medical Center and at the University of California San Francisco in parallel with the editing of the 16th edition of *Cecil*. Its use reinforces the value of *Cecil* as a reference text and offers a different entrée to its varied sections. Together with the volumes of the *International Textbook of Medicine*, *Review of General Internal Medicine* has now joined the "*Cecil* family."

The publication of such a large book depends upon the partnership of many people. We have been exceptionally fortunate to work directly with John J. Hanley, who has continued to be personally involved with *Cecil* despite his now enhanced responsibilities as President of the W. B. Saunders Company. David Kilmer, Special Projects Editor at Saunders, has once again brought his special skills and invaluable experience to this large undertaking. Preparation of the index was in the expert hands of Charlotte Fierman and Edna Dick. In a transcontinental collaboration Patricia Hodgson in North Carolina and Carolyn Strecker in California have worked flawlessly as editorial assistants in all stages of the preparation of the manuscripts and the review of proofs. Of course without the participation of our 286 associates in this enterprise, there would have been no manuscripts to review! *Cecil* ultimately expresses their experience and scholarship in their respective disciplines.

In closing we wish to cite in particular our immediate predecessors, Paul Beeson and the late Walsh McDermott. Although their names no longer appear on the editorial page, this 16th edition of *Cecil* is very much an extension of their splendid contributions of the past. It is an awesome responsibility and challenge to try to maintain their standard of excellence over editions yet to come.

JAMES B. WYNGAARDEN, M.D.
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Extraordinary efforts have been made by the authors, the editors, and the publisher of this book to ensure that dosage recommendations are precise and in agreement with the highest standards of practice.

It does happen, however, that dosage schedules are changed from time to time in the light of accumulating clinical experience and continuing laboratory studies. This is most likely to occur in the case of recently introduced products.

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tion data for the manufacturer's recommended dosage. In addition, there are some quite serious situations, each encountered only rarely, in which drug therapy must be individualized and expert judgment advises the use of a higher dosage or administration by a different route than is included in the manufacturer's recommendations. Throughout the text many such instances are indicated by a footnote.

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Gaucher's Disease; Niemann-Pick Disease

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Hypoglycemic Disorders

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Cardiac Arrhythmias

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The Compromised Host

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Cystic Diseases of the Kidney

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Advice to Travelers

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Chromosomes and Their Disorders; Congenital Malformations

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Focal Disturbances of Higher Nervous Function

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The Epilepsies

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Mechanisms of Renal Injury

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Anomalies of the Urinary Tract; Tumors of the Kidney

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Malabsorption: Pathophysiology and Diagnosis

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Cincinnati Hospital, Cincinnati, Ohio.

*Introduction to Interstitial Nephritis and Interstitial Nephropathy;
Chronic Gouty and Other Urate Nephropathies; Analgesic-Associated
Nephropathy; Balkan Nephropathy*

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Development and Morphology of Granulocytes and Macrophages

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Aging and Geriatric Medicine

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*Pulmonary Tuberculosis; Diseases Due to Mycobacteria Other Than
M. tuberculosis and M. leprae*

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Typhoid Fever

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Infiltrative Diseases of the Lung

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Electrocardiography

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Malaria in the Semi-immune Subject; African Trypanosomiasis

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Peptic Ulcer: Pathogenesis and Pathophysiology

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*Endorphins and Enkephalins: Their Significance in Physiology and
Medicine*

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Vascular Disorders of the Kidney

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Nonsyphilitic Treponematoses

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Scleroderma

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Parameningeal Infections

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Rabies

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Disorders of Lipid Metabolism

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Polymyalgia Rheumatica and Giant Cell Arteritis

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Variola and Vaccinia

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Dialysis

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Sleep and Its Disorders

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Salmonella Infections Other Than Typhoid Fever; Tularemia

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Trichinellosis

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The Glycogen Storage Diseases; Pentosuria; Essential Fructosuria and Hereditary Fructose Intolerance

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Peptic Ulcer: Diagnosis; Peptic Ulcer: Medical Treatment

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The Common Cold; Rhinoviral Respiratory Disease; Viral Pharyngitis, Laryngitis, Croup, and Bronchitis; Respiratory Syncytial Viral Disease; Parainfluenza Viral Diseases; Adenoviral Infections

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Hemolysis Due to Intracorporeal Abnormalities

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Sarcoidosis

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Diseases Caused by Chlamydiae: Introduction; Trachoma and Inclusion Conjunctivitis

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Arthropod-Borne Viral Fevers, Viral Encephalitides, and Viral Hemorrhagic Fevers: Introduction; Viral Hemorrhagic Fevers: Introduction; Hemorrhagic Fever Caused by Dengue Viruses; Tick-Borne Flavivirus Diseases; Crimean Hemorrhagic Fever; Hemorrhagic Diseases Caused by Arenaviruses; African Hemorrhagic Fever; Epidemic Hemorrhagic Fever

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Syphilitic Infections of the Central Nervous System

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Cutaneous Manifestations of Internal Malignancy; Skin Diseases

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Viral Infections of the Nervous System: Introduction; Viral Meningitis and Encephalitis; Herpes Zoster; Slow Infections of the Nervous System

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Malaria in the Nonimmune Subject; Toxoplasmosis; Babesiosis; Trichomoniasis

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Ethics in the Practice of Internal Medicine

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Allergic Rhinitis; Serum Sickness; Drug Allergy

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The Life-Cycle Perspective in Medicine; Development to Adulthood; Adulthood

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Whooping Cough; Measles; Rubella

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Infective Endocarditis

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Arthropods as Environmental Agents of Disease; Pentastomiasis; Leeches as Agents of Disease; Snakebite; Venomous Marine Animals

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Tetanus

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Varicella and Herpes Zoster

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Introduction to Viral Diseases; Influenza

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Alcohol Abuse and Alcohol-Related Illnesses

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Structure and Function of the Kidneys

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Neutrophil and Macrophage Function; Neutrophil Dysfunction Syndromes

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Chronic Renal Failure

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Connective Tissue Structure and Function

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Amebiasis; Amebic Meningoencephalitis

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Urinary Tract Infections and Pyelonephritis; Enteric Bacterial Infections

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Immune Diseases: Introduction

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Eye Diseases

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The Thyroid

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Oncology: Introduction

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Panniculitis and Disorders of the Subcutaneous Fat

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Pharmacologic Principles Related to the Autonomic Nervous System

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Pancreatitis

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Prevalence and Epidemiology of Cardiovascular Disease

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Mastocytosis

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Anaphylaxis; Insect Sting Allergy

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Adrenal Cortex

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Langerhans Cell (Eosinophilic) Granulomatosis and Related Syndromes

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Medical Aspects of Sexuality

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Trace Metal Poisoning

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Chagas' Disease

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Schistosomiasis

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Hemorrhagic Disorders: Abnormalities of Platelet and Vascular Function

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Cat Scratch Disease

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Protozoan and Helminthic Diseases: Introduction; Protozoan Diseases: Introduction; Trypanosomiasis: Introduction; Cutaneous Leishmaniasis of the New World; Other Protozoan Diseases: Introduction; Isosporiasis; Sarcosporidiosis; Helminthic Diseases: Introduction; The Nematodes: Introduction; Capillariasis; Cutaneous Larva Migrans; Trichostrongyliasis; Gnathostomiasis; Oesophagostomiasis; Toxocariasis; Anisakiasis; Angiostrongyliasis; Filariasis: Introduction; Dracontiasis; Loiasis; Mansonella Ozzardi; Dipetalonema Perstans; Dirofilariasis; Possible Human Meningonemiasis

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Occupational Pulmonary Disease

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Pneumocystosis

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Chemical Contamination of Water and Air

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The Major Histocompatibility Complex and Disease Susceptibility

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Dementia; Psychologic Illness in Medical Practice

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Disorders of Blood Coagulation

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Critical Care Medicine

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Dermatomyositis and Polymyositis

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Peptic Ulcer: Complications and Surgical Treatment

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Drug Abuse, Dependence, and Intoxication: Introduction; The Opiates; Central Nervous System Depressants; Central Nervous System Stimulants; Cannabis; Psychedelics; Miscellaneous Inhalants

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Respiratory Diseases: Introduction; Respiratory Structure and Function; Respiratory Failure

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Hematologic and Hematopoietic Diseases: Introduction

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Infectious Mononucleosis

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Hemoglobin Synthesis; The Thalassemias

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Principles of Drug Therapy

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Prostaglandins, Thromboxane A₂, and the Leukotrienes

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Endocrine Manifestations of Tumors; Ectopic Hormone Production

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Lymphatic Filariasis; Tropical Eosinophilia

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Renal Calculi

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Congenital Heart Disease

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Gastrointestinal Hemorrhage

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Disorders of Gastrointestinal Motility

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Marfan's Syndrome; Ehlers-Danlos Syndrome

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Neurologic and Behavioral Diseases: Approach to the Patient and

Principles of Diagnosis; The Neurologic Examination; Management of the Neurologic Patient; The Pathogenesis of Stupor and Coma; Sustained Impairment of Consciousness; Differential Diagnosis; Acute Sedative Drug Poisoning; Prognosis and Outcome in Severe Coma; Brief or Episodic Loss of Consciousness; Headache; Visual and Ocular Abnormalities; Ataxia and Related Gait Disorders; Asthenia, Fatigue, and Weakness; Acute Anterior Poliomyelitis

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Diseases of the Esophagus

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Nonmetastatic Effects of Cancer on the Nervous System; The Neurologic History; General Causes of Delirium, Stupor, and Coma; Approach to the Patient with Altered Consciousness; Emergency Management of the Patient in Coma; Pain; Differential Diagnosis of Muscle, Nerve Root, and Spinal Disorders; Mechanical Lesions of Nerve Roots and Spinal Cord

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Electric Injury

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Radiography of the Heart

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Obstructive Nephropathy

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The Control of Anterior Pituitary Secretion; The Pineal

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Introduction to Pneumonia; Pneumonia Due to Klebsiella; Pneumonia Caused by Other Aerobic Gram-Negative Bacilli; Aspiration Pneumonia

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Gastritis

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Unstable Hemoglobins; Abnormal Hemoglobins with Altered Oxygen Affinity; Methemoglobinemia and Sulfhemoglobinemia

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Diseases of the Spleen

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Antimicrobial Therapy

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Common Accidental Poisonings

ROSCOE R. ROBINSON, M.D.

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Approach to the Patient with Renal Disease; The Nephrotic Syndrome; Hereditary Chronic Nephritis

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Diphtheria

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Inflammatory Bowel Disease: Introduction; Crohn's Disease

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Inherited, Congenital, and Idiopathic Degenerative Diseases of the Nervous System

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Hodgkin's Disease

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The Ovaries

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Acquired Valvular Heart Disease

WENDELL F. ROSSE, M.D.

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Hemolytic Disorders: Introduction; Hemolysis Due to Acquired Abnormalities of Erythrocytes or Their Circulation

LEWIS P. ROWLAND, M.D.

Henry and Lucy Moses Professor and Chairman, Department of Neurology, College of Physicians and Surgeons, Columbia University. Director, Neurology Service, Presbyterian Hospital in the City of New York.
Diseases of Muscle and Neuromuscular Junction

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Professor of Psychiatry, Institute of Psychiatry, University of London. Honorary Consultant Psychiatrist, Bethlem Royal and Maudsley Hospitals, London, England.
Anorexia Nervosa

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James B. Duke Professor of Surgery and Chairman of the Department, Duke University Medical Center. Chief of Staff, Duke Hospital, Durham, North Carolina.
Surgical Treatment of Coronary Artery Disease

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Plasma Cell Disorders

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Plague; Rat-Bite Fever; Leptospirosis

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Psittacosis

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Bilirubin Metabolism and Hyperbilirubinemia; Parasitic, Bacterial, Fungal, and Granulomatous Liver Disease; Inherited, Infiltrative, and Metabolic Disorders Involving the Liver; Acute and Chronic Hepatic Failure with Encephalopathy; Hepatic Tumors

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Hemoglobin Structure and Function

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Biologic Effects of Tumors; Tumor Markers

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Hypokalemic Nephropathy; Hypercalcemic Nephropathy; Nephrogenic Diabetes Insipidus; Renal Tubular Acidosis; Bartter's Syndrome; Liddle's Syndrome; Renal Glycosuria; Renal Phosphate Wasting; Fanconi's Syndrome

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Systemic Lupus Erythematosus

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Nutrient Requirements; Assessment of Nutritional Status; Nutrition and Infection; Kwashiorkor, Marasmus, and Intermediate Forms of Protein-Calorie Malnutrition; Undernutrition, Starvation, and Hunger Edema; Deficiencies of Individual Nutrients: Vitamin Diseases

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Hyperaminoaciduria

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Hermaphroditic Flukes

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Intracranial Tumors and States Causing Increased Intracranial Pressure

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Gastrointestinal Endoscopy; Neoplasms of the Stomach

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Encephalitic Complications of Viral Infections and Vaccines; The Demyelinating Diseases

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Leukemoid Reactions; Myeloproliferative Disorders

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Oral Medicine

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Gastrointestinal Diseases: Introduction; Malabsorption: Management; Miscellaneous Inflammatory Diseases of the Intestine

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The Mucopolysaccharidoses

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Medicine as an Art; Renal Hyperaminoacidurias; Primary Hyperoxaluria; The Hyperphenylalaninemias; Histidinemia; The Hyperprolinemias and Hydroxyprolinemia; Diseases of the Urea Cycle; Branched-Chain Aminoaciduria; Disorders of Pyrimidine Metabolism; Phosphorus Deficiency and Hypophosphatemia; Disorders of Magnesium Metabolism

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Special Diagnostic Procedures in Pulmonary Disease

RALPH SNYDERMAN, M.D.

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Mechanisms of Inflammation and Tissue Destruction in the Rheumatic Diseases; Behçet's Disease

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Urticaria and Angioedema

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Sexually Transmitted Diseases

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Management of Common Problems in the Elderly

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Acute Renal Failure

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Giardiasis; Balantidiasis

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Diseases of the Thymus

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Streptococcal Diseases: Introduction; Group A Streptococcal Infection; Clinical Syndromes of Group A Streptococcal Infection; Treatment of Group A Streptococcal Infection and Chemoprophylaxis of Nonsuppurative Complications; Prophylaxis of Streptococcal Infection

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Bone Marrow Transplantation

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Bacterial Meningitis

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Sjögren's Syndrome

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Dengue; West Nile Fever; Phlebotomus Fever; Rift Valley Fever; Fevers Caused by Alphaviruses

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Medicine as a Very Old Profession

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Reference Ranges and Laboratory Values of Clinical Importance

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Primary Glomerular Disorders; Secondary Glomerular Disorders; Renal Involvement in Multisystem Disorders

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Nonmalignant Diseases of the Breast

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Wilson's Disease

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Acute Transverse Myelitis

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Radiation Injury

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Approach to the Patient with Cardiovascular Disease

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Peptic Ulcer: Clinical and Endocrine Aspects

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Diseases of the Prostate

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Diseases of the Gallbladder and Bile Ducts

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Disorders Due to Heat and Cold

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The Acute Leukemias

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Prevention and Treatment of Hospital-Acquired Infections

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Disorders of the Pericardium; Tumors of the Heart

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Foot and Mouth Disease; Mumps

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Angina Pectoris; Acute Myocardial Infarction; Sudden Cardiac Death

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Pulmonary Embolism; Fat Embolism Syndrome

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Neoplasms of the Large and Small Intestine

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Rickettsial Diseases: Introduction; The Typhus Group; Rocky Mountain Spotted Fever; Tick-Borne Rickettsioses of the Eastern Hemisphere; Rickettsialpox; Scrub Typhus

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The Cestodes

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Introduction to Microbial Diseases; The Febrile Patient

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Clostridial Diseases: Introduction; Clostridial Myonecrosis; Other Clostridial Diseases

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Atherosclerosis

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Medicine as a Science; Medicine as a Public Service; Human Heredity; Biochemical Genetics; Inborn Errors of Metabolism; Renal Hypouricemia; Cystinuria; Metabolic Diseases: Introduction; Fabry's Disease; Alcaptonuria; Albinism; Homocystinuria; Gout; Xanthinuria; The Lesch-Nyhan Syndrome; 2,8-Dihydroxyadenine Renal Stones; Myopathy Associated with Myoadenylate Deaminase Deficiency; Immune Dysfunction Associated with Purine Enzyme Deficiencies; Acatalasia; Hereditary Syndromes Involving Multiple Organ Systems; The Use and Interpretation of Laboratory-Derived Data

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