CONTRIBUTORS

Masazumi Adachi, M.D., Sc.D.

Professor of Pathology, State University of New York, Health Science Center at Brooklyn, Director of Laboratories, Kingsbrook Jewish Medical Center, Brooklyn, New York

Peter Angritt, M.D.

Chief, AIDS Pathology Division, Armed Forces Institute of Pathology, Washington, District of Columbia

Javier Arias-Stella, M.D.

Professor of Pathology, Cayetano Heredia Medical School, Lima, Peru

Roberto Barrios, M.D.

Professor of Pathology, National University of Mexico, Mexico City, Mexico, Visiting Professor of Pathology, Baylor College of Medicine, Pathologist, The Methodist Hospital, Houston, Texas

Carlos W. M. Bedrossian, M.D.

Professor of Pathology, Wayne State University School of Medicine, Chief of Cytopathology, Detroit Medical Center, Detroit, Michigan

Colin M. Bloor, M.D.

Professor of Pathology, Director, Molecular Pathology Graduate Program, University of California, San Diego School of Medicine, Attending Pathologist, UCSD Medical Center, VA Medical Center, San Diego, California

Stephen M. Bonsib, M.D.

Associate Professor of Pathology, University of Iowa College of Medicine, University of Iowa Hospitals and Clinics, Iowa City, Iowa

Allen P. Burke, M.D.

Staff Pathologist, Department of Cardiovascular Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Philip T. Cagle, M.D.

Associate Professor of Pathology and Medicine, Baylor College of Medicine, Associate Pathologist, The Methodist Hospital, Houston, Texas

Jacqueline J. Coalson, Ph.D.

Professor of Pathology, The University of Texas Health Science Center at San Antonio, San Antonio, Texas

John E. Craighead, M.D.

Professor of Pathology, University of Vermont College of Medicine, Associate Pathologist, Medical Center Hospital of Vermont, Burlington, Vermont

Rosa M. Davila, M.D.

Assistant Professor of Pathology, Washington University School of Medicine, Staff Pathologist, The Jewish Hospital of St. Louis, St. Louis, Missouri

Joseph H. Davis, M.D.

Professor of Pathology, University of Miami School of Medicine, Chief Medical Examiner, Dade County Medical Examiner Department, Miami, Florida

Daphne deMello, M.D.

Professor of Pathology and Pediatrics, St. Louis University School of Medicine, Associate Pathologist, Cardinal Glennon Children's Hospital, St. Louis, Missouri

Ricardo Drut, M.D.

Professor of Pathology, Facultad de Ciencias Médicas, Universidad Nacional de La Plata, Chief, Department of Pathology, Hospital de Niños, La Plata, Argentina

Andrew Farb, M.D.

Department of Cardiovascular Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Adolfo Firpo-Betancourt, M.D.

Professor of Pathology, University of Puerto Rico School of Medicine, Medical Director, Puerto Rico Medical Services Administration, San Juan, Puerto Rico

Marcus S. Fisher, Jr., D.D.S., M.D.

Resident, Department of Pathology, Wilford Hall Medical Center, Lackland Air Force Base, San Antonio, Texas

Michael James Gaffey, M.D.

Assistant Professor of Anatomic and Clinical Pathology, University of Virginia Health Sciences Center, Charlottesville, Virginia

Anthony A. Gal, M.D.

Assistant Professor of Pathology and Laboratory Medicine, Emory University School of Medicine, Pathologist, Emory University Hospital, Atlanta, Georgia

Gordon N. Gephardt, M.D.

Pathologist, Kennestone Hospital, Marietta, Georgia

John J. Godleski, M.D.

Associate Professor of Pathology, Harvard Medical School, Director, Pulmonary Pathology Division, Department of Pathology, Brigham and Women's Hospital, Boston, Massachusetts

F. Gonzalez-Crussi, M.D.

Professor of Pathology, Northwestern University School of Medicine, Head of Laboratories, Children's Memorial Hospital of Chicago, Chicago, Illinois

Steven M. Gordon, M.D.

Assistant Staff Physician, Division of Medicine, Department of Infectious Diseases, Cleveland Clinic Foundation, Cleveland, Ohio

Nicholas J. Hruby, M.D.

Associate Pathologist, Michigan State University College of Human Medicine, Saginaw, Michigan

Michael N. Koss, M.D.

Professor of Pathology, University of Southern California School of Medicine, Los Angeles, California; Chairman, Department of Pulmonary and Mediastinal Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Benjamin H. Landing, M.D.

Pathologist, Children's Hospital, Los Angeles, California

J. T. Lie, M.D., M.S., F.A.C.C., F.A.C.A., F.A.C.R., F.C.C.P. Professor of Pathology, University of California, Davis, School of Medicine, Davis, California, Director of Anatomic Pathology, University of California, Davis, Medical Center, Sacramento, California

Charles M. Lombard, M.D.

Clinical Assistant Professor of Pathology, Stanford University School of Medicine, Stanford, California; Staff Pathologist, El Camino Hospital, Mountainview, California

Bruce Mackay, M.D., Ph.D.

Professor of Pathology, The University of Texas Health Science Center, Pathologist, M. D. Anderson Cancer Center, Houston, Texas

J. Carlos Manivel, M.D.

Associate Professor of Laboratory Medicine and Pathology, University of Minnesota Medical School, Associate Director, Anatomic Pathology, University of Minnesota Hospital, Minneapolis, Minnesota

Alberto M. Marchevsky, M.D.

Director, Division of Anatomic Pathology, Cedars Sinai Medical Center, Los Angeles, California

Eugene J. Mark, M.D.

Associate Professor of Pathology, Harvard Medical School, Associate Pathologist, Massachusetts General Hospital, Boston, Massachusetts

Aileen M. Marty, M.D., F.A.C.P.

Adjunct Professor of Pathology, Uniformed Services University of the Health Sciences, Bethesda, Maryland, Chief, Infectious Disease Branch, Department of Infectious Disease, Armed Forces Institute of Pathology, Washington, District of Columbia

Osamu Matsubara, M.D., Ph.D.

Department of Pathology, Faculty of Medicine, Tokyo Medical and Dental University, Tokyo, Japan

Stacey E. Mills, M.D.

Professor of Pathology, Associate Director of Surgical Pathology, University of Virginia Health Sciences Center, Charlottesville, Virginia

Joan M. Mones, D.O.

Clinical Assistant Professor of Pathology, University of Miami School of Medicine, Miami, Florida; Attending Pathologist, Parkway Regional Medical Center, North Miami Beach, Florida

Cesar A. Moran, M.D.

Chief, Mediastinal Pathology, Department of Pulmonary and Mediastinal Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Richard L. Naeye, M.D.

Chairman, Department of Pathology, Milton S. Hershey Medical Center of the Pennsylvania State University College of Medicine, Hershey, Pennsylvania

Ronald C. Neafie, M.S.

Chief, Parasitic Disease Pathology Branch, Department of Infectious and Parasitic Diseases Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Edwina J. Popek, D.O.

Assistant Professor of Pathology, Baylor College of Medicine, Staff Pathologist, Texas Children's Hospital, Houston, Texas

Philip C. Pratt, M.D.

Emeritus Professor of Pathology, Duke University School of Medicine and Medical Center, Durham, North Carolina

Lynne M. Reid, M.D.

Wolbach Professor of Pathology, Harvard Medical School, Pathologist-in-Chief, Children's Hospital, Boston, Massachusetts

Miguel Reyes-Mugica, M.D.

Research Associate, Department of Pathology, Children's Memorial Hospital, Chicago, Illinois

Victor L. Roggli, M.D.

Associate Professor of Pathology, Duke University Medical Center, Staff Pathologist, Durham Veterans Affairs Medical Center, Durham, North Carolina

Yale Rosen, M.D.

Professor of Clinical Pathology, State University of New York Health Science Center at Brooklyn, Brooklyn, New York; Chief of Anatomic Pathology, Winthrop University Hospital, Mineola, New York

Mario J. Saldana, M.D.

Professor of Pathology, University of Miami School of Medicine, Attending Pathologist, Jackson Memorial Hospital, Miami, Florida

Lloyd L. Smrkovski, Ph.D.

Commander, Medical Services Corps, United States Navy, Retired, Maryland

Richard E. Sobonya, M.D.

Professor of Pathology, University of Arizona Health Sciences Center and University Medical Center, Tucson, Arizona

Kasi S. Sridhar, M.D.

Professor of Medical Oncology, Division of Hematology and Oncology, University of Miami School of Medicine and Sylvester Comprehensive Cancer Center, Miami, Florida

J. Thomas Stocker, M.D.

Senior Deputy Director, Armed Forces Institute of Pathology, Adjunct Professor of Pathology, Georgetown University Medical School, Washington, District of Columbia

Ramiah Subramanian, M.D.

Adjunct Associate Professor, Georgetown University Medical Center, Washington, District of Columbia; Medical Officer, Center for Devices and Radiological Health, United States Food and Drug Administration, Rockville, Maryland

/ Saul Suster, M.D.

Clinical Associate Professor of Pathology, University of Miami School of Medicine, Medical Director, Surgical Pathology Laboratory, The Arkadi M. Rywlin Department of Pathology and Laboratory Medicine, Mount Sinai Medical Center of Greater Miami, Miami, Florida

Richard J. Thurer, M.D.

Professor of Surgery, Division of Thoracic and Cardiovascular Surgery, University of Miami School of Medicine, Miami, Florida

Joseph F. Tomashefski, Jr., M.D.

Associate Professor of Pathology, Case Western Reserve University School of Medicine, Head of Surgical Pathology, Metro Health Medical Center, Cleveland, Ohio

William D. Travis, M.D.

Chief, Pulmonary Pathology Section, Laboratory of Pathology, National Cancer Institute, Bethesda, Maryland; Department of Pulmonary and Mediastinal Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Raymond R. Tubbs, D.O.

Professor of Pathology, Ohio State University College of Medicine, Columbus, Ohio; Staff Pathologist, Director, Immunotyping Laboratory, Cleveland Clinic Foundation, Cleveland, Ohio

Renu Virmani, M.D.

Chairperson, Department of Cardiovascular Pathology, Armed Forces Institute of Pathology, Washington, District of Columbia

Louis H. Weiland, M.D.

Professor of Pathology, Mayo Medical School, Rochester, Minnesota; Consultant, Surgical Pathology, Mayo Clinic Scottsdale, Scottsdale, Arizona

Joanne L. Wright, M.D.

Professor of Pathology, University of British Columbia Faculty of Medicine, Divisional Head, Anatomic Pathology, St. Paul's Hospital, Vancouver, British Columbia, Canada

Samuel A. Yousem, M.D.

Chief Pathologist, Department of Pathology, Montefiore University Hospital, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania

PREFACE

Lung pathology is a notoriously difficult subject to master; in the matter of diagnosis, the problem is compounded by the small size of specimens usually available to pathologists (*i.e.*, endobronchial and transbronchial biopsies and cytology smears). Many of these specimens are often nonrepresentative of the lesions, and considerable experience is needed to discern artifacts from normal structures.

There are many reasons for the difficulties in the practice of pulmonary pathology, and therefore I will not dwell further on the subject here. In my opinion, however, one of the main limitations stems from the lack of a system of classification of pulmonary diseases that is comprehensive and is still understandable and attractive. Ideally, such a system should allow the pathologist to readily identify the major area where a diagnostic problem lies and from there to identify the group of entities and the specific disorder that fits the case at hand.

As one would expect from a book of this kind, the organization of such sections as the pathology of tumors and pediatric lung disorders is based on morphologic criteria. Nonpathologic criteria (e.g., clinical, radiological, functional) have been used where appropriate in other sections of the book. Etiology has also been given consideration (e.g., infections, pneumoconiosis); however, the fact that the etiologies of most lung diseases are not known renders this criterion necessarily limited. The same applies for pathogenesis (e.g., immunologic diseases), simply because the pathogenesis of most pulmonary diseases is largely ignored. Finally, certain diseases peculiar to determined regions in the respiratory tract have been discussed on a topographic basis alone, in a section on miscellaneous topics.

I hope that this book will be of value to pathologists and pathologists-in-training in the work-up of their cases and also when preparing for the boards. I also hope that the book will stimulate the curiosity of chest physicians, radiologists, and surgeons for further reading.

To accomplish the goals of this book, I have selected a fine faculty of collaborators composed of both academics and pathologists in private practice. Senior contributors are world-renowned by their scholarship and scientific production; more youthful authors have been chosen for their freshness of approach and their desire to excel. I am extremely appreciative of their contributions.

Good books of pathology rely on fine illustrations, and the present book is no exception. Fundamental gross and microscopic features of pulmonary diseases have been generously illustrated in both color and black and white pictures. There is, however, a departure from most textbooks in the matter of providing exact magnifications for microscopic pictures, which are frequently inaccurate. Instead, I have opted for only five different final enlargements after comparing each picture with known controls or standards. Thus, most of the pictures are designated as: panoramic view (<20); low magnification ($\times20-\times199$); intermediate magnification ($\times20-\times399$); high magnification ($\times400-\times999$); and oil immersion views ($\ge\times1000$). Electron microphotographs, however, are given with their exact magnifications. I hope this approach is beneficial to the reader.

Mario J. Saldana, M.D.

ACKNOWLEDGMENTS

I wish to express my appreciation to each of the authors and coauthors in this book. They are ultimately responsible for its contents and justly deserve recognition for their contributions.

It was a distinct pleasure to work with the staff of the J. B. Lippincott Company, and I particularly wish to thank Mr. Richard Winters, Ms. Jody Schott, Ms. Molly Dickmeyer, and Ms. Nina McElroy for their ability, dedication, and professionalism. The cover of the book is the product of Mr. Doug Smock's artistry.

The staff of the Louis Calder Medical Library at the University of Miami School of Medicine, Miami, Florida, under the

direction of Mr. Henry L. Lemkau and Ms. Suzetta C. Burrows, were very supportive of this project and provided valuable advice and help. I am also grateful to them and their associates for help with bibliographic matters.

Finally, I wish to express my appreciation for secretarial help to Ms. Annamarie Dix, from the Louis Calder Medical Library, and to the staff of Action Typing, Miami, Florida, under the able direction of Ms. Barbara Gonzalez.

Mario J. Saldana, M.D.