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Dedication
Once again, my children, Ann, James and Larry,
waited patiently while this monograph took shape.
It is living testimony to the lesson that my parents
stressed: Nothing is impossible!
To all of them, for their love and understanding, this effort is dedicated.

Acknowledgements
I am fortunate that I have practiced cytology only since the invention of the fiberoptic bronchoscope. I cannot imagine life without it! To those who came before, I salute their skill in dealing with more art than science. To all those at UCLA who believe in cytodiagnosis of lung disease, my sincere thanks. Particular gratitude is owed to Dr. Donald Tierney, Chief of Pulmonary Disease at UCLA, and his flexible bronchoscopists, first Dr. Fouad Ben-Isaac, and now Dr. Henry Gong. Their productive collaboration is reflected in these pages; without them and the Pulmonary Fellows, this book would not have been possible. To the cytotechnologists on the UCLA Otology Service, my special thanks for their care in the preparation and interpretation of the challenging specimens we receive on a daily basis.

A cytology text is only as good as its illustrations. Carol Appleton's skills in developing the negatives are obviously superb, and are only exceeded by her patience at my demands. The secretarial efforts of Rochelle Greenwald and Giok Brandt are much appreciated. Denise Greder and her editorial staff at Karger paid meticulous attention to the details which make a scientific text readable. My thanks to the UCLA pathology residents who humorously tolerated the time that this work stole from their education; my collective experience with them is in large part responsible for the final product. Finally, to Dr. George L. Wied and Mr. Thomas Karger, who convinced me that another book on respiratory cytology was needed, I hope this volume affirms their conviction.

Introduction
Respiratory cytology has assumed a primary diagnostic place in the order of the work-up for the patient with pulmonary disease. The importance placed upon the cytologic diagnosis has resulted from a cumulative experience of the past 25 years [115, 118, 130, 131, 139, 285]. The early years of cytology, from the 1940s through the 1950s, were devoted to samples from the female genital tract, and definitely established the discipline as diagnostically reliable. The simplicity and low cost of cytologic sampling made the technique attractive for other body sites. The coincidence of the now obvious world-wide epidemic of carcinoma of the lung, and the development of the fiberoptic bronchoscope [103, 228] accelerated the experience of cytopathologists with samples from the lower respiratory tract. Today, such specimens constitute the second most popular body site in most cytopathology laboratories which deal with both gynecologic and nongynecologic samples.

Although there are scattered early reports of diagnosis of lung cancer based on cell samples from expectorated sputum, it was not until the past quarter century that the need for screening of patients at risk for lung cancer saw the establishment of mass population screening programs, utilizing sputum cytologies. The great hope that such programs would effect
the diagnosis of early lesions and thus improve the dismal salvage rate, did not prove true, and most of the general lung cancer screening projects have folded.

In current protocols for the work-up of patients with pulmonary disease, especially lung cancer, sputum cytology still plays a major role, and the diagnostic yield from sputum cytology alone in a patient with clear evidence of a lung neoplasm can be as high as the yield from bronchoscopically obtained specimens, depending on the cell type [113]. Sample adequacy is enhanced if the specimens are induced [185].

However, current practice has established the immediate use of the fiberoptic bronchoscope [37; 118, p. 8; 234] when a patient with evidence of pulmonary disease, either benign or neoplastic, presents to the pulmonologist.

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The overall diagnostic yield of fiberoptic bronchoscopy is too great to delay the procedure, waiting for diagnosis of a sputum sample. With cost-effectiveness being the keystone to medical survival, this technique is definitely one whose time is now.

While cancer diagnosis automatically comes to mind when considering respiratory cytodiagnosis, numerous infectious diseases can be definitely diagnosed or strongly suspected based on samples recovered either via fiberoptic bronchoscopy, bronchoalveolar lavage, or transthoracic needle aspiration. As the patient population becomes more complex, including the numerous immunocompromised patients from whatever cause, the need for astute non-neoplastic/infectious diagnosis is a mandate that the cytopathology laboratory cannot ignore. While special stains are a classic crutch, the portions of this book devoted to infectious disease will hopefully convince the reader that much information, frequently definitive, can be gained from material stained in the standard Papanicolaou manner. This allows treatment to begin within a few hours of collection of the diagnostic sample, with minimal expense.

When all factors are considered, the role of the cytotechnologist and cytopathologist in the management of patients with respiratory disease is key to the successful outcome of these patients. The high diagnostic yield of pulmonary cytodiagnosis is, without question, the result of a team approach. From our experience at UCLA, we strongly and enthusiastically emphasize the importance of close collaboration of the cytology staff with the bronchoscopy team and the thoracic radiologists. The excellent and highly diagnostic specimens which illustrate this book are the result of this cooperative effort.