Preface

This book first appeared 30 years ago, and it has been well received and translated into 13 languages. It is appropriate to briefly review the objectives.

First, the book is intended as an introductory text for medical students and allied health students. As such, it will normally be used in conjunction with a course of lectures, and this is the case at University of California, San Diego (UCSD) School of Medicine. Indeed, the first edition was written because I believed that there was no appropriate textbook at that time to accompany the first year physiology course.

Second, the book is written as a review for residents and fellows in such areas as pulmonary medicine, anesthesiology, and internal medicine, particularly to help them prepare for licensing and other examinations. Here the requirements are somewhat different. The reader is familiar with the general area but needs to have his or her memory jogged on various points, and the many didactic diagrams are particularly important.

It might be useful to add a word or two about how the book meshes with the lectures to the first year medical students at UCSD. We are limited to about twelve 50-minute lectures on respiratory physiology supplemented by two laboratories and three discussion groups. The lectures follow the individual chapters of the book closely, with most chapters corresponding to a single lecture. The exceptions are that Chapter 5 has two lectures (one on normal gas exchange, hypoventilation, and shunt; another on the difficult topic of ventilation-perfusion relationships); Chapter 6 has two lectures (one on blood-gas transport and another on acid-base balance); Chapter 7 has two lectures (on statics and dynam-

ics), and if the schedule of the course allows, the section on polluted atmospheres in Chapter 9 is expanded to include an additional lecture on defense systems of the lung. There is no lecture on Chapter 10 "Tests of Pulmonary Function" because this is not part of the core course. It is included partly for interest and partly because of its importance to people who work in pulmonary function laboratories.

Several colleagues have suggested that Chapter 6 on gas transport should come earlier in the book because knowledge of the oxygen dissociation curve is needed to properly understand diffusion across the blood-gas barrier. In fact, we make this switch in our lecture course. However, the various chapters of the book can stand alone, and I prefer the present ordering of chapters because it leads to a nice flow of ideas as the cartoons at the beginning of each chapter indicate. The order of chapters also probably makes it easier for the reader who is reviewing material.

It is sometimes argued that Chapter 7 "Mechanics of Breathing" should come earlier, for example, with Chapter 2 "Ventilation." My experience of over 35 years of teaching is strongly against this. The topic of mechanics is so complex and difficult for the present-day medical student that it is best dealt with separately, and later in the course when the students are more prepared for the concepts. Parenthetically, it seems that many modern medical students find concepts of pressure, flow, and resistance much more difficult than was the case 25 years ago, whereas, of course, they breeze through any discussion of molecular biology.

Some colleagues have recommended that more space should be devoted to sample calculations using the equations in the text and various clinical examples. My belief is that these topics are well-suited to the lectures, which can then embellish the basic information. Indeed, if the calculations and clinical examples were included in the book, there would be precious little to talk about. Many of the questions at the end of each chapter require calculations.

The present edition has been thoroughly updated including changes in the sections on structure and function, hypoxic pulmonary vasoconstriction, gas transport by the blood, relaxation pressure-volume curve, dynamic compression of the airways, lung receptors, and perinatal respiration. Several of the diagrams have been improved. Extensive changes in the format have been made to help the reader. These include summaries at the beginning of each chapter. In addition the questions have now been recast in the USMLE format and they have been placed at the end of each chapter.

Heroic efforts have been made to keep the book lean, in spite of enormous temptations to fatten it. Occasionally, medical students wonder if the book is too superficial. I disagree; in fact, if pulmonary fellows beginning their training in intensive care units fully understood all the material on gas exchange and mechanics, the world would be a better place.

Many students and teachers have written to query statements in the book or to make suggestions for improvement. I respond personally to every point that is raised and much appreciate this input.