Textbook of

MEDICAL PHYSIOLOGY

GUYTON

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MEDICAL PHYSIOLOGY

SECOND EDITION, Illustrated

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DEDICATED TO

MY FATHER

for the uncompromising principles that have guided his life

MY MOTHER

for leading her children into intellectual pursuits

MY WIFE

for her magnificent devotion to her family

MY CHILDREN

for making everything worth while

PREFACE

Writing the first edition of this textbook was a formidable task that required both a broad study into all fields of physiology and prolonged collating, organizing, and casting of the material into a final form. But, however formidable this was, the task of the second edition has been even greater, principally because the widespread acceptance of the text demanded that I do all I could, first, to insure accuracy of the factual material and, second, to preserve or improve the clarity of presentation as much as possible.

To achieve the first objective, I submitted almost every chapter of the first edition to several authorities and teachers in each special field, asking for critical appraisal and, particularly, suggested improvements both in factual material and manner of presentation. More than 120 different physiologists were thus approached, and, in the light of their appraisals, as well as in the light of a tremendous amount of additional study on my own part, essentially all parts of the book have been entirely recast and rewritten *de novo*. The result is a book that gives me infinitely more satisfaction than did the first edition and, I hope, a book whose teaching value is greatly enhanced.

To achieve the second objective of the new edition, that is, to improve the clarity of the text, I have kept records of our own students' comments on the parts of the text that caused difficulty, and have made special attempts to reinforce, to simplify, and to clarify the presentations of those physiological mechanisms that are habitually poorly understood by students. Also, I have made a real effort to avoid ambiguities of thought and have even endeavored to learn, as any author must always learn, new methods for presenting in concise and clear form the scientific perplexities of the human body.

Even the figures of the previous text have not gone unmolested; most of these have been changed to fit the new presentation. Over half are entirely new, and two hundred additional figures have been included. In general, the figures have been designed to illustrate bodily mechanisms, particularly mechanisms that can be depicted pictorially much more concisely, scientifically, and accurately than they can be described verbally.

Another feature of the book, which I believe sets it apart from other physiology texts, is the presentation of the human body as a single functioning organism controlled by a myriad of regulatory systems, with emphasis on the automaticity of the life processes. Throughout the text, the principles of control theory are discussed as they apply to specific bodily mechanisms, and much attention has been given to the interrelationships of functions of the different organ systems of the body. The formulation of such interrelationships and the presentation of physiology as a functional subject rather than as a descriptive subject can be far more fully realized, I am convinced, in a single author textbook than in a multiple contributor book. It is my belief that a course in physiology, after all, is meant to teach these interrelationships equally as much as to describe the individual units. And were it not for my faith in the all importance of this principle, I could not justify the time and effort that have gone into the development of this textbook of physiology.

A word of explanation is needed about the bibliographies, for I have used a different system from that in most other textbooks of physiology. The references are chosen for their coverage of the specific subjects, their up-to-dateness, and also for their own bibliographies. By using both these references and cross-references from them, I believe

that a student can cover almost any phase of physiology. I have chosen this system of references because I recall that, when I was a medical student, I used the references from my physiology textbooks only twice, even though I referred to the physiological literature perhaps more than most of my fellow students. I soon gave up consulting the textbook references in favor of better sources because the references had been chosen to prove minor points rather than for their reading value. Remembering this, I have tried to provide the student with the type of reading list that I had wanted.

Once again, I owe much to many others who have helped in the preparation of this book. Particularly am I grateful to Miss Sue Cathey and Mrs. Grace Gulledge for all their excellent secretarial aid, to Mrs. Carolyn Hull and Mr. Brantley Pace for the new illustrations, to the staff of the W. B. Saunders Company for its continued help, and, most of all, to the many physiologists who have helped me clarify my own understanding of many physiological mechanisms, thereby contributing immeasurably to whatever success may be achieved in the revision of this book.

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Jackson, Mississippi

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