

SECOND EDITION

WATER, ELECTROLYTE, and ACID-BASE BALANCE

*Normal and Pathological Physiology as a Basis for
Therapy*

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THE WILLIAMS & WILKINS COMPANY
Baltimore • 1962

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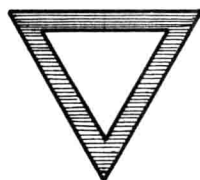
Made in the United States of America

First edition 1953
Reprinted April, 1954
Reprinted July, 1954
First Spanish edition 1954

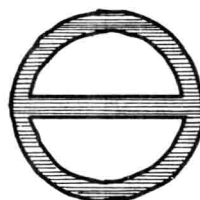
Library of Congress
Catalog Card Number
62-14626

COMPOSED AND PRINTED AT THE
WAVERLY PRESS, INC.
BALTIMORE 2, MD., U. S. A.

WATER, ELECTROLYTE, and ACID-BASE BALANCE



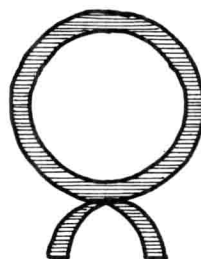
WATER



SALT
("Electrolyte")



ACID



ALKALI
("Base")

Ancient chemical symbols for water, salt ("electrolyte"), acid, and alkali ("base").^{426, 700}

PREFACE TO SECOND EDITION

It is almost nine years since the first edition of this monograph was published. Why, then, a second edition at this date? Especially when so many other books on the same subject have appeared on the scene each year. It is obvious that various opinions are held on how to present the subject of water, electrolyte, and acid-base balance; the books range from single- to multiple-contributor authorship and from essays to reference tomes.

It is very easy to state that the present edition contains the most recent information, has about two times as many tables, four times as many references, six times as many figures, a larger and more prominent glossary, *etc.* These facts may be of interest to those who were familiar with the first edition but do not constitute sufficient reason for the appearance of a new heir. Each complete reference shows on which page or in which table or figure it has been cited. This will enable the reader to make better use of the references, rather than to have the reference section as a tribute to erudition or to plagiarism. The index is detailed and lists the various aspects of a particular disease, compensating for the omitted single locus discussion of the disease entity *per se*. Use has been made of cartoons, *etc.*, to help clarify certain aspects of the subject material.

It has been very gratifying to me to have practicing physicians and medical students express their appreciation at the conferences, lectures, scientific exhibits, and seminars in which I have participated. Comments concerning the first edition have been of great benefit in the preparation of the second edition. My aim has been to present the material in as simple a manner as I could in order to help the reader (or listener) to understand the subject.

The goal of "understanding" is well illustrated in the following quotation, "Wisdom is the principal thing; therefore get wisdom: and with all thy getting get understanding." (*Proverbs 4: 7*). This, then, is the better reason for the present edition.

Chicago, Illinois

H. F. W.

PREFACE TO FIRST EDITION

It is imperative that the medical student and physician be familiar with both the *basic* facts and the current developments in water and electrolyte balance. It encroaches upon and/or is part of every branch of clinical medicine. Some of our "accepted" facts may not hold up in the very near future; the average "classical" values of the body water compartments have been modified as a result of more recent techniques. This subject is not readily grasped by one superficial reading.

In March 1950 the author presented a Seminar in General Medicine at the Mount Sinai Hospital of Chicago on the subject, *Water and Electrolyte Balance*, which was published in the hospital Bulletin. The Seminars are attended by the visiting and house staffs of the hospital and by the faculty and students of the Chicago Medical School. In response to requests from physicians and medical students the articles have been revised, corrected and brought up to date. The literature has been surveyed to correlate the essential physiological and chemical facts, as brought out by human, animal, and laboratory investigations, and to apply those facts to clinical medicine.

All too often one does not have the proper textbooks nor time to check or review basic facts which have long since been forgotten. This monograph is intended to serve as a review and source book so that the reader will have the major subject material in one volume. The various tables and figures should serve, after studying the text, for a rapid summary of the book. The extensive list of references is intentional; the glossary and index are included for the reader's convenience. It is hoped that the student will be stimulated to read some of the original articles and that the physician will be able to find answers to his questions.

At their annual meeting in October 1952, the College of American Pathologists and the American Society of Clinical Pathologists jointly sponsored an exhibit and symposium on *Fluid and Electrolyte Balance*. Dr. W. S. Hoffman, chairman of the committee, selected Drs. J. D. Boggs, C. Cohn, and H. F. Weisberg to help prepare and present the scientific exhibit and to help organize the symposium. Prior to the meeting, the College membership received a series of three reprints for home study; one of these was an abstract of the author's articles published in the Bulletin of Mount Sinai Hospital of Chicago. The pertinent data delivered at the exhibit and symposium are contained within the present monograph.

Among those who have aided this undertaking, the following deserve special thanks: Drs. I. Davidsohn, M. M. Kirshen, and C. Cohn, Mrs. Alice Rupen, and Miss Charlotte M. Kaplan. The reader is invited to forward his comments and suggestions; these will be gratefully received.

Chicago, Illinois

H. F. W.

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SECTION ONE

**NORMAL
PHYSIOLOGY**