CLINICAL BIOCHEMISTRY

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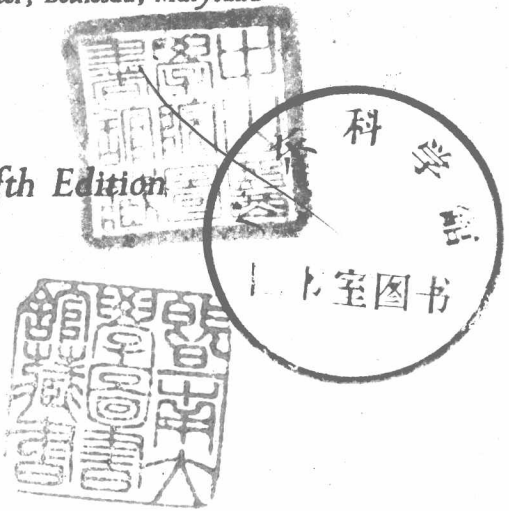

Fifth Edition

1955

Preface to the Fifth Edition

Twenty-five years have elapsed since the authors undertook the preparation of the manuscript of the first edition of this book. At that time there was a lamentably wide gap between the literature of so-called "fundamental" biochemistry and physiology and that of clinical medicine. The majority of students, undergraduate and graduate, particularly practicing physicians, had great difficulty in bridging this gap and, consequently, in taking full advantage of current contributions to knowledge in the basic medical sciences.

The originally stated purpose of this book was to aid in making these correlations. This remains its purpose. However, the gap has narrowed considerably during the past twenty-five years. Clinicians generally have come to realize the truth of the statement by Claude Bernard, almost a century ago, that medicine does not end in the hospital, but rather begins there; that problems raised in the clinic should be passed to the laboratory for investigation and elucidation. Appreciation of this fact has led to closer integration of clinical medicine with the basic medical sciences, and a generation of clinicians has grown up whose routine reading matter is in the language of modern science.

It is possible now to discuss problems of acid-base balance and intermediary metabolism in relation to clinical disorders without much danger of employing terms and concepts incomprehensible to the majority of practicing physicians. In our experience, treatment of these subjects at the elementary level required twenty-five years ago is no longer necessary or desirable. For this reason, normal aspects of metabolism and biochemical mechanisms are discussed here more extensively than previously. It is hoped that this will provide a better basis for an understanding of aberrations of these processes in disease.

The text of the present edition has been virtually completely rewritten. Every chapter has been revised, and much new material has been added, particularly on the following topics: liver function; kidney function; plasma protein abnormalities; biological significance of nucleic acids; uric acid metabolism; porphyrin metabolism; biochemical aspects of diet; iodine metabolism; lipoproteins; fatty liver; potassium metabolism; acid-base balance; endocrine functional diagnosis, especially thyroid and adrenal.

As in previous editions, no attempt has been made to include material that has no relevance to biochemical approaches to the diagnosis or management of clinical disorders. This applies, for example, to most of the vitamins. One feature of previous editions has been eliminated; namely, the separate listings of biochemical abnormalities in various disease states. These were omitted mainly because the index provides this information in essentially the same form. Brief

lists of selected reading references have been substituted for the previously longer bibliographies, and direct references have been omitted from the text. It is felt that the purposes of this book are served better by indicating authoritative reviews and monographic discussions of various important topics rather than a large number of original contributions.

As formerly, an attempt has been made to present controversial subjects in an impartial manner, supplemented wherever possible by an expression of personal opinion. There are few statements regarding the clinical significance of biochemical findings that are not supported by personal experience. Thanks are due to many friends and associates for helpful suggestions and advice, and to the publishers for their unfailing cooperation.

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Preface to the First Edition

Modern advances in physiology and biochemistry have developed a need, not for another laboratory manual, but for a book designed to correlate established facts with problems encountered daily in internal medicine. The rapidity and magnitude of these developments have resulted in the growth of a highly specialized branch of laboratory medicine, namely, chemical pathology. The evolution of this specialty within a specialty has unfortunately tended to remove the clinician still further from a thorough understanding of those phases of internal medicine that require the assistance of the biochemical laboratory for their complete solution.

The remarkably fruitful researches of recent years in the fields of experimental physiology and pathology, by demonstrating the significance of biochemical observations in a constantly increasing number of abnormal states, have correspondingly increased their value to clinical medicine and surgery as well as to the laboratory. Modern practice demands the application of present knowledge regarding aberrations of endocrine, renal and hepatic function, abnormalities of organic and inorganic metabolism, nutritional defects, edema, dehydration, etc., in all branches of medicine as well as in pre- and postoperative treatment. The enormous increase in the use of chemicals in industry and in the treatment of disease and the growing appreciation of the possibly deleterious effects of such agents upon the organism have also increased the service that the biochemical laboratory may render to the clinician. The intelligent employment of these facilities will be of fundamental value in the increasingly important field of industrial toxicology.

The essential function of the laboratory is to supply the clinician with information which will complement that which he may obtain by other methods. Each patient presents a problem which cannot possibly be appreciated on the basis of dissociated laboratory studies. However, in order to take full advantage of the findings of the biochemist, the clinician must have a clear understanding of the significance and limitations of the results of laboratory investigation. This must be based upon an appreciation of the biochemical and physiologic factors involved in the preservation and alteration of organ and tissue function, for it may be stated, more truly than ever before, that physiology is the handmaid of medicine.

The progress made in the fields of biochemistry, metabolism, nutrition, colloidal and physical chemistry is based largely upon observations of a highly specialized and technical nature. This often renders the original literature unavailable to the majority of students and clinicians. As a result they usually either accept the brief interpretative statements made in most works on diagnosis by laboratory methods or they rely upon the chemical pathologist for an interpre-

tation of his findings. The position of the latter is little better than that of the clinician who is required to explain the significance of an enlarged liver in an individual whom he has not seen and concerning whose clinical history and physical condition he knows nothing. Experience in the laboratory and in the clinic has impressed the authors with the difficulty which students and physicians experience in bridging the wide gap between abstract biochemistry or physiology and clinical medicine. Books and articles in abundance have been written for and by specialists, but only a few have attempted to interpret specialized knowledge for the physician. The undergraduate student of medicine and the progressive physician wish to be familiar with the applications of biochemistry to clinical medicine and surgery. They should be as well acquainted with the limitations as with the significance of biochemical findings in any given case. This volume constitutes an attempt to supply this information.

Haldane has stated that the aim of physiology is to consider how the internal environment of the body is kept constant in spite of continual alterations in the external environment. The aim of this treatise is to consider how the internal environment of the body is altered by certain specific changes in tissue and organ physiology. It is further intended to indicate the manner in which the physician may best avail himself of information which can be obtained by biochemical studies. To this end the subject of functional diagnosis by chemical methods has been considered in considerable detail. With few exceptions, the technic of laboratory methods has not been discussed, being available in many admirable standard texts on that subject. The discussion has been restricted to those phases of biochemistry which are concerned with problems commonly encountered in clinical medicine and, therefore, purely abstract and theoretical considerations have been excluded.

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