



# THE BIOCHEMISTRY *of* CLINICAL MEDICINE

*by*

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SECOND EDITION

## Preface to the Second Edition

**I**N ORDER to keep pace with the rapid developments in biochemistry and their application to a better understanding of clinical medicine, the revision of the book has had to be extensive. A number of topics not previously discussed because the biochemical information available had been too vague have now become clearly enough defined to warrant some exposition. They include serum mucoproteins, malignant carcinoid syndrome, Wilson's disease, agammaglobulinemia, galactosemia, cryoglobulinemia, oral hypoglycemic agents, oral diuretics, hypofibrinogenemia, serum transaminase, and many other subjects. Many sections have been completely rewritten, including those on aminoaciduria, serum proteins, multiple myeloma, glucagon, oxidation of fatty acids, serum lipoproteins, potassium metabolism, bilirubin metabolism, clotting of blood, porphyrin metabolism, formation of bone, biosynthesis of thyroid hormones, biosynthesis of adrenal hormones, 17-ketosteroids, plasma and urinary corticosteroids, adrenal virilism, and the newer synthetic steroids. So many new concepts and relations had to be discussed and old ones modified or discarded that very few pages have escaped major or minor modifications. A number of new tables and figures have been added.

Yet the aim of the book has remained the same; namely, to present in a lively and readable manner the important and fundamental biochemical aspects of clinical medicine, so as to help the physician who has no more than the usual training in chemistry and physiologic sciences to understand and apply the available information for diagnosis, prognosis, and treatment. In spite of the fact that much of the new material offered is of a fundamental chemical nature requiring the use of many new structural formulae, the integration has continued to be at a clinical level. The author has felt that one of the principal reasons for the gratifying acceptance of the two printings of the first edition has been the presentation of the several diseases from the point of view of a biochemically trained clinician rather than a clinically minded biochemist. Therefore he has retained the method of the clinical essay with emphasis on biochemical dynamics in relation to clinical course.

The author is indebted to many clinicians and investigators, particularly those connected with Cook County Hospital and/or the University of Illinois College of Medicine, for help in crystallization of some of the newer con-

cepts. He wishes also to express his thanks to those authors who have permitted reproductions of figures from their publication. Again to Dr. Armand Littman the author is indebted for a new authoritative chapter on gastric and pancreatic secretions. To Miss Natalie Swimmer the author is grateful for the excellent work on the typescript and tables. And to the staff of the Year Book Publishers the author expresses his appreciation for their kindness, patience, and co-operation.

## Preface to the First Edition

**I**T IS THE function of a modern book on the biochemistry of clinical medicine to elucidate that portion of the vast array of recently accumulated information in biochemistry that will help the clinician in the practice of medicine. Such is the aim of this work. Its specific purpose is to acquaint the students and practitioners of the various branches of medicine with the qualitative and quantitative alterations of the biochemically determinable body constituents that occur in the diseased state and to show them how to utilize that information in diagnosis, prognosis and treatment. The book will try to go beyond drawing a static picture; it will attempt to show the dynamics of the disease process from the biochemical point of view. Just as the pathologist must describe the anatomic lesion in three dimensions from the two dimensions of the microscopic slide, so the interpreter of clinical biochemistry must add the dimension of time to his appraisal of the blood and urine chemical analyses in a particular patient.

Our knowledge of the metabolism of some of the body constituents is still too meager to allow a completed picture to be drawn of the physiologic significance of the deviations from normal. In such instances it is necessary to be satisfied with the empiric relationships that have been discovered or to speculate on their possible significance. The author will occasionally present such a "working hypothesis," the express purpose of which will be to tie the known facts together in a useful manner. It is hoped that such apparent dogmatism will be atoned for by the aid offered the reader in attaining a biochemical philosophy. In other words, the author would like to offer, for what they are worth, his own ideas on what the body is trying to do.

The book is aimed at the level of the general practitioner with no more than the usual training in chemistry and the physiologic sciences. The author's experience in lecturing to hospital staffs and to postgraduate students,

in supplementation of his undergraduate teaching, has assured him that it is possible to bring an understanding of the clinical application of biochemistry without utilizing highly technical explanations and without an overwhelming array of organic chemical formulae. Even the older practitioner whose training in chemistry and physiology is of a much earlier and more primitive era should be able to read the material offered without his usual panic at the sight of an organic formula or a logarithmic sign. On the other hand, the book aims to be thorough rather than elementary and should more than cover the ground of basic science review for the various American specialty boards. It is hoped too that the clinical pathologist and his trained biochemical technician will derive a special benefit from the book in that mention will frequently be made of the relation of the limitation of technical accuracy to the clinical interpretation.

The problem of content and emphasis has not been easy to solve. Naturally the better understood and more common subjects with which the physician has to deal are included and are given greater play. The criterion which the author has chosen has been his own experience as director of biochemistry in a general hospital for acute diseases of 3,400 beds and director of biochemical research in an institute devoted to clinical investigation. To practicalize the discussion and to help achieve the desired dynamic development, illustrative cases from the author's weekly biochemical clinical conferences are occasionally used. The sections devoted to the more obscure functions and substances are made briefer, but their content should be adequate enough to satisfy the scientific curiosity of most readers.

Because the author has had considerable clinical experience with several diseases in which a biochemical point of view is helpful, he has written the discussion of these diseases as complete clinical essays. These diseases are diabetes mellitus, Bright's disease, hepatitis, cirrhosis, and gout. For other diseases the clinical discussion is necessarily briefer, but in a number of instances, outlines are offered of the clinical findings with emphasis on the relation of these findings to the altered physiologic state. Special attention has been paid throughout the book to the principles of treatment based on the restoration of the normal physiologic and nutritional state and on the specific experience that the author has gained, either directly or indirectly, as a member of an institute devoted to clinical investigation.

The book is not a series of monographic surveys of the literature. The approach is entirely didactic. Therefore no effort has been made to make the bibliography documentary or exhaustive. References are given to books and monographic articles which have good bibliographies and which give proper credit for original information. Other references are principally those of recent articles which have been somewhat arbitrarily mentioned by the author in the development of a new trend in any subject. It is hoped that the arbitrariness and inconsistency in the names mentioned or omitted will not be regarded as discourteous to the scores of investigators whose important contributions have been seemingly ignored. The inclusion of several of the author's own papers in the references has no other implication than that he has been active in the particular field.

The author is grateful to Dr. Harold M. Schoolman who read the embryonic manuscript and made many valuable suggestions. To him and to Mr. Alvin Dubin, his chief chemist, and to a number of staff members of the Cook County Hospital who saw parts of the manuscript, go many thanks for their encouragement and help. The author also expresses his appreciation to Mrs. Vera Berliner, Mrs. Genevieve Guske, and Miss Jeanne McCrumby for the typescript and tables, to Mr. Harold L. Miller for the photographs, and to Miss Lillian Hunter and Mrs. Sophie C. Koch-Weser for the charts, and to the Hektoen Institute for Medical Research of the Cook County Hospital, the facilities of which have been an inestimable contribution in the development of the book. He would like also to acknowledge his thanks to the authors and publishers who have graciously allowed reproduction of figures, tables and photographs from their publications, and to Dr. Murray Franklin, of the Department of Medicine, University of Illinois College of Medicine, for the loan of several excellent charts. To Dr. Armand Littman the author owes a special debt for his contribution of the chapter on gastric and pancreatic secretions in relation to clinical medicine, a field in which he has had extensive experience as a clinician, investigator, and former member of the Department of Clinical Science of the University of Illinois College of Medicine. And to the editorial staff of The Year Book Publishers the author wishes to express his appreciation for their encouragement and co-operation.

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