MICRO-ANALYSIS IN MEDICAL BIOCHEMISTRY

By

E. J. KING

M.A. (McMaster), Ph.D. (Toronto), D.Sc. (Lond.), F.R.I.C.

Professor of Chemical Pathology in the University of London at the Postgraduate Medical School

and

I. D. P. WOOTTON

Ph.D. (Lond.), M.A., M.B., B.Chir. (Camb.), F.R.I.C.

Lecturer in Chemical Pathology at the Postgraduate Medical School, London

THIRD EDITION

With 25 Illustrations

LONDON

J. & A. CHURCHILL LTD.

104 GLOUCESTER PLACE, W.1

1956

First Edition 1946
Reprinted 1947
Spanish Translation 1948
Italian Translation 1951

Second Edition 1951
Serbo-Croat Translation 1953

Third Edition 1956

Printed in Great Britain

PREFACE

I HAVE been joined in the third edition of 'Micro-Analysis in Medical Biochemistry' by my friend and colleague, Dr. I. D. P. Wootton, whom I welcome as a co-author. As a result of his efforts and researches, several new types of procedure have been introduced into the routine practice of this laboratory, and these have been included in new chapters. They are: a discussion of the control of laboratory accuracy and a system of quality control; electrophoresis of plasma proteins; techniques of metabolic balance studies; flame photometry of sodium, potassium and calcium; radioactive isotope tests.

New procedures include the following: free and ester cholesterol by a ferric chloride method; uric acid by uricase; true creatinine by adsorption and elution; the Markham micro-Kjeldahl method; biuret method for plasma proteins; a potentiometric chloride method; phosphatase by an amino-antipyrine determination of the liberated phenol; antipyrine for total body water; ethylenediamine tetra acetate determination of calcium; serum iron; the zinc sulphate turbidity test; proteolytic activity of fæces; paper chromatography of urinary sugars; lead and mercury in urine and fæces; the tubeless test meal; the pyruvate metabolism test; the water concentration test; inulin clearance (instead of thiosulphate); and a vitamin A absorption test. These have come into widespread use during the last five to ten years, and are now current practice at this School.

The chapter on colorimetric and spectrophotometric analysis has been largely rewritten. The sections on the Duboscq and simple colorimeters have been omitted and that on photoelectric practice expanded. Spectrophotometers are coming into increasing use, and an explanation and description of them has been given at some length, since it appears that a large proportion of analytical practice will centre round them in the next few years. These instruments extend photometric measurements into the ultraviolet and infrared, and procedures which measure light absorption in regions of the spectrum

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other than the visible can be expected to come into increasing use. Such methods described in this edition include: barbiturates, uric acid and vitamin A in the ultraviolet; oxy- and reduced hæmoglobin and carboxyhæmoglobin in the near infrared.

For all colorimetric methods, both new and those carried forward from the previous edition, the use of the Duboscq colorimeter and the resulting calculations have been dropped, and only the photoelectric included. This step appears justified because of the almost universal adoption of the latter type of instrument. On a similar score, the expression of all electrolyte concentrations is now given in milliequivalents, a practice which should have come into use long ago, but cannot even yet be considered to be world-wide.

Emphasis has been maintained on the micro aspects of analysis, without going into the field of what might be called the 'ultra-micro'. Such procedures, it is felt, have their principal use in the biochemistry of children's diseases, and not in ordinary biochemical practice. The quantities of blood used for most of the procedures have been cut from 0·2 ml. to 0·1 ml. (in some cases to 0·05 ml.), and this has been found to be particularly advantageous where finger-prick specimens are employed. Many of the methods are the same as, or only slightly modified from, those which were described in the former editions; they have been well proved by years of use in both routine and teaching laboratories. The book continues to represent the routine laboratory practice of chemical pathology at the Postgraduate Medical School. Although many 'research' investigations have had to be omitted, because of a desire to keep the book to the reasonably small dimensions required in a laboratory manual, most of what we do is described here. As before, we have assumed a reasonable knowledge on the part of the user of the fundamentals of chemical and analytical theory and practice.

My sincere thanks are due to others of my colleagues, besides my co-author, Dr. Wootton, and these include: Dr. W. Klyne, Dr. I. MacIntyre, Dr. D. J. R. Laurence, Dr. J. G. B. Fenton, Dr. J. Pryce, Dr. J. E. S. Bradley, Dr. R. Fraser and Dr. M. D. Milne. Thanks are renewed to Dr.

D. A. K. Black and Professor G. M. Bull for help with sections carried forward from the last edition. To Miss P. R. N. Kind I am especially grateful for her skilled and painstaking assistance in the task of rewriting, editing and proof-reading; and to Miss Beryl Currie and Mrs. Margaret Sutton for their unstinted and expert help with the typing of script and reading of proofs.

E. J. KING.

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