SEVENTH EDITION

Clinical Hematology

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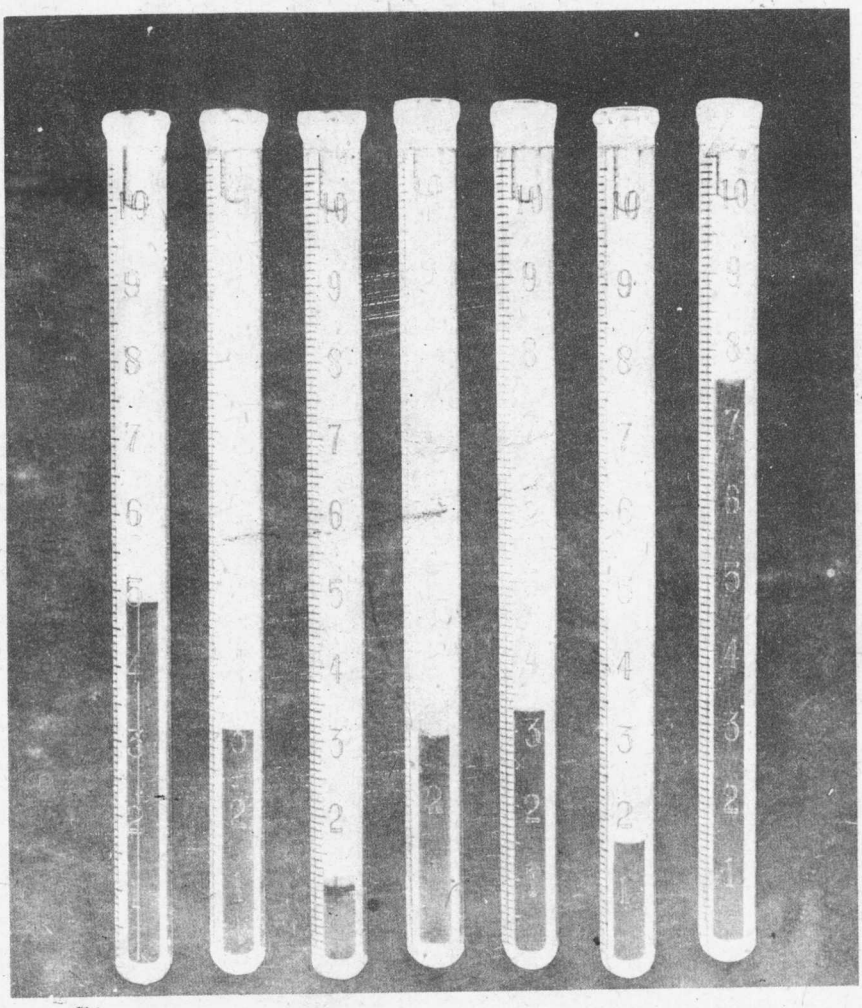
PLATE I



A B C D E F G

The appearance of centrifuged blood in various conditions.

A, Normal blood.

B, Anemia associated with chronic infection.

C, Iron-deficiency anemia. The blood plasma is very pale.

D, Chronic myelocytic leukemia. There are distinct layers of white corpuscles and of platelets above the red corpuscles.

E, Post-hepatic jaundice and moderate anemia. In this case the coloring of the blood plasma is due to biliary obstruction rather than to increased blood destruction.

F, Pernicious anemia. Note the small amount of packed red corpuscles, the very narrow layer of leukocytes and platelets, and the coloring of the blood plasma due to hyperbilirubinemia.

G, Polycythemia.

(The blood was collected and treated as described on page 110.)

Preface

MORE than three decades have passed since I first began the task of assembling what was known about hematology in book form. Even then, the undertaking was not easy. Since that time, hematology has developed to a degree unmatched by any other field of medicine, in scope as well as in the depth of our understanding. Hematology now encompasses broad aspects of cytology, biochemistry, molecular biology, biophysics and immunology, not to speak of the various ramifications of clinical medicine.

The first six editions of Clinical Hematology were written entirely by me. With each edition the task has become more challenging and it has been more and more difficult to do justice to all dimensions of this remarkable field.

In planning the Seventh Edition, therefore, I enlisted the collaboration of some of my present and former associates. Their names are given on the title page. They were chosen because of their special interest in certain aspects of hematology, in addition to their thorough understanding of the whole field of hematology and their proved qualifications.

The organization of the book has been revised in keeping with present-day needs. In Part I, the approach to hematologic problems is considered from the viewpoint of the clinician. The principles of hematologic examinations are discussed and the simpler methods are outlined for the physician's own use. In addition, the principles and pitfalls of modern machines are presented. These discussions are presented so that the person who carries the ultimate responsibility for the patient will have enough understanding to do so with confidence. This book, however, is not intended to be a laboratory manual.

In Part II a thorough account is given of the essentials of cytology, physiology, and biochemistry as they apply to the hematopoietic system. Such an understanding is essential for the intelligent and effective application of modern-day knowledge to medical practice. To attempt to practice hematology without an understanding of the normal hematopoietic system, as described in Part II, and without a physiologically basic concept regarding the approach to a hematologic problem would be like trying to sail in the open sea without landmarks or instruments and under a sky without stars.

To aid in the approach to the different varieties of hematologic problems, chapters and subsections which introduce the various areas or types of problems have been prepared; eg, the approach to the patient with anemia (Chapter 13), a kinetic approach to normocytic anemias (Chapter 19), an approach to hemolytic anemias (Chapter 20), a diagnostic approach to the bleeding disorders (Chapter 33), and the approach to the patient with disorders of the phagocytic and lymphatic systems (Chapter 40). In regard to treatment, the approaches are as diverse as hematologic conditions are varied.

In order to bring together in a single volume the ever-expanding body of information pertaining to clinical hematology, we have condensed some of the material found in earlier editions. Methodology, for example, has been given less space because advanced technology has produced sophisticated machines that have rendered it unnecessary for

the physician to carry out as many procedures as he used to perform. Yet he must understand these procedures—their purpose, their degree of reliability, and their pitfalls—and he must continue to be at home with elementary morphology, such as that required for examination of the blood smear and the bone marrow. Consequently, discussions of the latter topics have not been abbreviated. In hematology, morphologic examinations hold importance equal to the medical interview and the physical examination and should never be neglected. The morphologic descriptions are supported by 24 plates in color, most of which are new.

We have attempted to control the size of the book, but not at the expense of thoroughness and excellence. Furthermore, our original policy of providing, insofar as possible, careful and complete documentation, still obtains. As in past editions, reference lists are selective, as are citations in the text. When necessary, preference has been given to the latest report on a subject, in which the interested reader may find additional references to earlier literature. Whenever possible, comprehensive reviews and monographs have been listed. In citing the literature when a study has been carried out by more than two authors only the name of the first is given. Our apology is offered to those whose names are not listed.

In keeping with the decisions of the editorial boards of *Blood* and of the *British Journal of Haematology,* as well as other publications, we have adopted most of the units of the system recommended by the International Committee for Standardization in Hematology. These and their former equivalents appear inside the back cover of this book, as does our system of abbreviations. The style adopted for bibliographic material is that recommended by the Index Medicus of 1973.

Although each co-author, including the senior author, has assumed primary responsibility for certain chapters, no chapter is solely the work of one person, and all the material in this book has been thoroughly reviewed and edited by the senior author. Each member of the team has contributed in some degree to chapters written by others, and all have utilized the material of earlier editions when this was appropriate.

As always, the preparation of a new edition of this book has been a rewarding though arduous task. Today's young hematologist probably has no conception of the rate at which his specialty has developed, especially since the mid-twenties. Clinical hematology exemplifies the ways in which clinical medicine has fed the basic sciences with questions and with clues, and the basic sciences in turn have illuminated human disease. The science of nutrition, for example, was enormously stimulated by the investigations that established the role of vitamin B_{12} in pernicious anemia and those demonstrating the role of other vitamins in hematopoiesis. Exploration into the phenomenon of sickling opened the whole field of molecular biology and brought to light the many hemoglobinopathies of which we are now aware. These remarkable advances in turn prompted investigation of the pathogenesis of thalassemia, which revealed pathogenetic mechanisms hitherto unknown. Basic investigations of carbohydrate metabolism and of the metabolism of the red cell resulted in the recognition of enzyme deficiencies of the red cell, some of which have serious consequences. Many other examples of the interplay of basic science and clinical medicine could be cited.

We should like to express our gratitude to Dr. Arthur Haut of the University of Arkansas for two chapters; Dr. Wallace N. Jensen of George Washington University for one chapter; Dr. A. S. Wiener for reviewing the chapter on blood groups and blood transfusion and making valuable suggestions; Dr. Phaedon Fessas for valuable comments regarding the chapter on thalassemia; Dr. George Stamatoyannopoulos for his advice regarding hereditary polycythemias; Dr. W. A. Schroeder for his comments on hemoglobinopathies; and, for their comments and criticisms of various other chapters, Doctors E. J. Hershgold, Gerald Rothstein, R. E. Lynch, James Kushner, Dana Wilson and Joseph Sannella of the University of Utah, Phillip M. Allen, Byrd S. Leavell and Oliver

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It is a special pleasure, also, to acknowledge the skill and whole-hearted cooperation of the publishers, Lea & Febiger and their staff, especially Mr. T. J. Colaiezzi and Miss Emily Anderson.

As in the past, I must express my sincere appreciation of the understanding and unselfish support of my wife. With this edition, the support of the wives of my collaborators also is gratefully acknowledged.

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