

HUMAN

BLOOD COAGULATION

AND ITS DISORDERS

by

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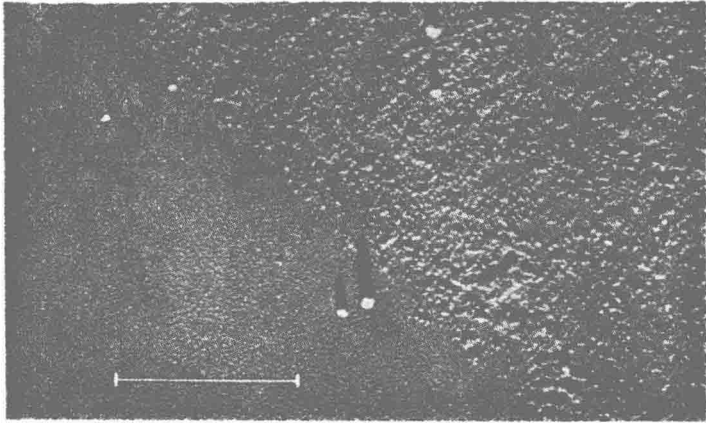
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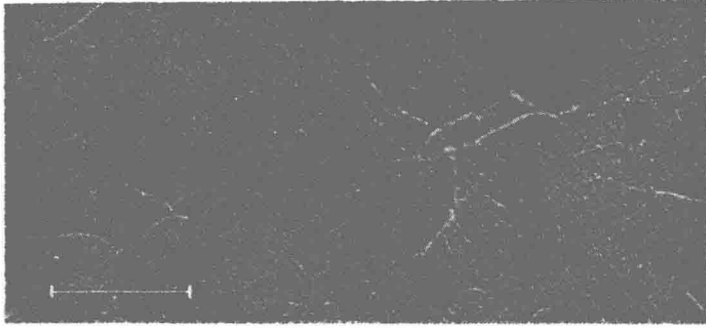
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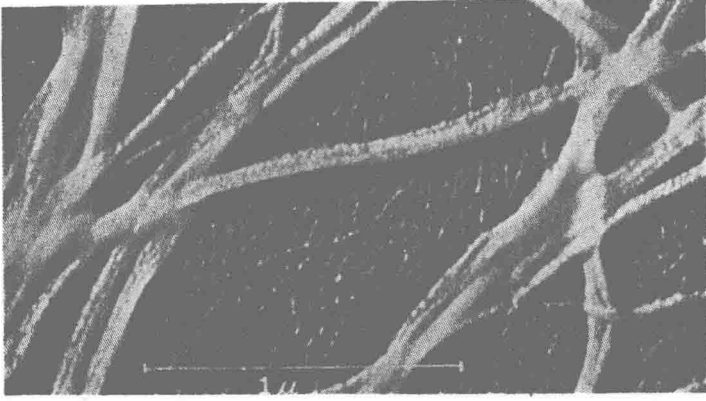
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(a)



(b)



(c)

PLATE I

Electron microscope photographs of fibrinogen and fibrin

- (a) Electron micrograph of the margin of a dried droplet of fibrinogen solution, to show the particulate non-fibrillar character of the dried material.
- (b) Electron micrograph of a mixture of thrombin and fibrinogen showing linear arrangement of particles (protofibrils) and the development of unit fibres apparently from the lateral union of several protofibrils.
- (c) Micrograph of fibrin with the formation of compound fibres. Fine fibres lie in parallel with coinciding densities giving a striated appearance to large fibres.

These figures were shadowed with gold. In unshadowed preparations the cross striation of compound fibrin fibres is a striking feature (from van Zandt Hawn and Porter 1947 and Porter and van Zandt Hawn 1949).

He thought he saw an Argument
That proved he was the Pope:
He looked again, and found it was
A Bar of Mottled Soap.
'A fact so dread', he faintly said,
'Extinguishes all hope!'

LEWIS CARROLL

PREFACE

In producing a book on blood coagulation, there is a risk of falling between two stools. On the one hand it is difficult to make a book sufficiently advanced in time and thought to interest the established workers in the subject, while on the other it is likely to be too voluminous and erudite for the clinician, pathologist or physiologist who, though not primarily interested in coagulation, would like to know what developments are taking place.

Being aware of these difficulties, we have tried to avoid them; with what degree of success remains to be seen. The book presents, for instance, a number of hitherto unpublished experiments which, particularly those relating to the new concept of plasma thromboplastin, may interest other workers. There are descriptions of the technical methods that must be used in the investigation of clotting defects, and attempts to explain their rational basis (or the lack of it) which may be useful to pathologists. Nearly half the book is given up to descriptions of the clinical states which arise from, or produce, defective clotting and to the problems of their diagnosis and treatment. Lastly, any general survey of research on coagulation provides for the student of the scientific method magnificent examples of the dangers of incomplete experiments and unjustified conclusions. The fact that we ourselves have probably fallen into such pitfalls as often and as heavily as anyone else does not detract in the least from the value of the lessons that can be learnt from such a survey.

Much of the cost of the experimental work described has been met from grants from the Medical Research Council, and from the Nuffield Foundation Haematological Research Fund. We wish to thank Dr. E. Bidwell and Dr. A. S. Douglas for their great help in reading both the manuscript and the proofs, and also Miss Evelyn Beer for the line drawings. We are grateful to Professor L. J. Witts for permission to describe two cases. The following authors, editors and publishers have kindly

allowed reproduction of illustrations: Drs. van Zandt, Hawn and Porter, and the editors of the *Journal of Experimental Medicine* (Plate 1); Dr. Bessis and the editors of *Blood* (Plate 2a); Drs. Braunsteiner, Febvre and Klein and Messrs. Grune and Stratton (Plate 2b); Drs. Grégoire and Florkin and the editors of *Physiologia Comparata et Oecologia*; the editor of the *Journal of Clinical Pathology* (Figs. 10, 47 and 48); Dr. Owren and Messrs. Grune and Stratton (material in Table 12); Messrs. Grune and Stratton, Heinemann, J. B. Lippincott and Charles C. Thomas, the editors of the *Journal of Biological Chemistry*, the *Archives internationales de physiologie*, *Archives internationales de pharmacodynamie (et de thérapie)*, the *Journal of the Missouri State Medical Association*, the *Acta medica Scandinavica* and to Drs. P. H. Owren, A. J. Quick, P. Nolf, W. H. Seegers, A. G. Ware, J. H. Olwin and J. L. Fahey for permission to quote passages of published works.

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