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FERROMAGNETIC DOMAINS

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CAMBRIDGE
AT THE UNIVERSITY PRESS

1954

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University Printing House, Cambridge CB2 8BS, United Kingdom

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www.cambridge.org

Information on this title: www.cambridge.org/9781107662995

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First published 1954

First paperback edition 2016

A catalogue record for this publication is available from the British Library

ISBN 978-1-107-66299-5 Paperback

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GENERAL PREFACE

The Cambridge Physical Tracts, out of which this series of Monographs has developed, were planned and originally published in a period when book production was a fairly rapid process. Unfortunately, that is no longer so, and to meet the new situation a change of title and a slight change of emphasis have been decided on. The major aim of the series will still be the presentation of the results of recent research, but individual volumes will be somewhat more substantial, and more comprehensive in scope, than were the volumes of the older series. This will be true, in many cases, of new editions of the Tracts, as these are republished in the expanded series, and it will be true in most cases of the Monographs which have been written since the War or are still to be written.

The aim will be that the series as a whole shall remain representative of the entire field of pure physics, but it will occasion no surprise if, during the next few years, the subject of nuclear physics claims a large share of attention. Only in this way can justice be done to the enormous advances in this field of research over the War years.

N. F.
D. S.

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All the plates show patterns obtained by applying colloidal magnetite to carefully polished crystal surfaces.

Plates I–V show patterns obtained on crystals of 3% silicon-iron alloy. The directions of the [100] axes of the crystals are indicated below each plate and the scale is shown by arrows representing 1/10 mm.

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Plates III, IV and V appeared in a paper by Williams, Bozorth and Shockley (*Physical Review*, **75**, 155, 1949) and Plates I, II, VI and VII in one by Bozorth (*Journal de Physique et le Radium*, **12**, 308, 1951); they are reproduced here by courtesy of the authors and editors.

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PREFACE

If this book had been written ten years ago, it could have been little more than a summary of Becker and Döring's *Ferromagnetismus*. Now, though any account of ferromagnetism must start from the basic ideas they set out so clearly, it is possible to describe much recent work which extends and modifies earlier ideas on ferromagnetic domains. Much that was previously a matter of conjecture and qualitative argument has become, in the last ten years, certain or open to exact discussion, but greater precision has inevitably brought fresh problems to light. This book attempts to give a coherent outline of the fundamentals of domain behaviour but not to give detailed consideration to all parts of the subject. I have naturally selected for fuller treatment those topics in which I have been most directly interested. Many of the subjects dealt with sketchily in the present book are given greater emphasis in K. Hoselitz's *Ferromagnetic Properties of Metals and Alloys*, while for an encyclopaedic account of present knowledge reference can be made to R. M. Bozorth's *Ferromagnetism*; both these books appeared while the present one was in preparation.

I acknowledge gratefully the help I have had from many in writing this book, but above all that from Dr D. Shoenberg, F.R.S., who introduced me to the subject and has given much valuable encouragement and advice at all stages. I am also very grateful to Dr R. M. Bozorth and his colleagues for their generosity in allowing me to use as illustrations some of their beautiful photographs of domain patterns.

K.H.S.

October 1953