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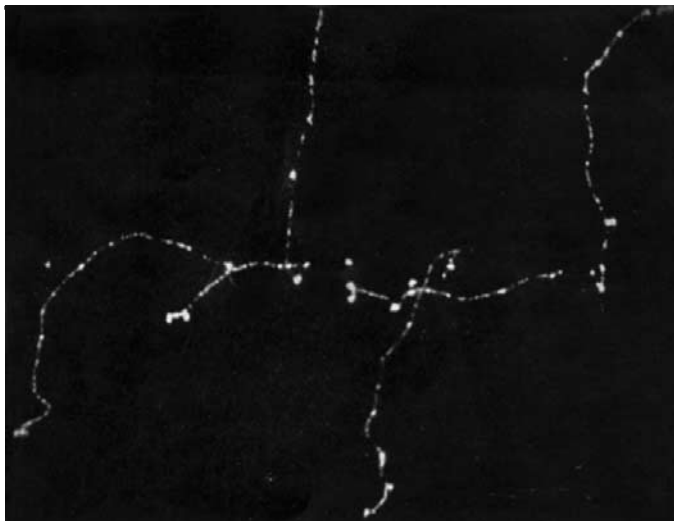
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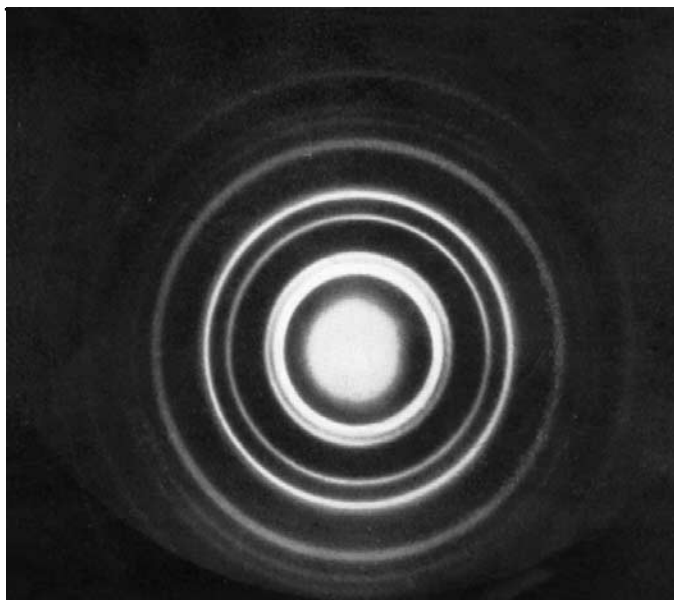
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(1)

*C. T. R. Wilson*

(2)

*C. P. Thomson*

ELECTRONS BEHAVING AS (1) *Particles*, in passing through a gas ;  
(2) *Waves*, in passing through a thin metal film (p. 203)

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# The New Background of Science

by

SIR JAMES JEANS

M.A., D.Sc., Sc.D.

LL.D., F.R.S.



*Second edition*

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## PREFACE TO THE FIRST EDITION

After undergoing a succession of kaleidoscopic changes, theoretical physics appears to have attained a state of comparative quiescence, in which there is fairly general agreement about essentials. In the following pages I have tried to depict the present situation in broad outline and in the simplest possible terms. I have drawn my picture against a roughly sketched background of rudimentary philosophy—the philosophy of a scientist, not of a metaphysician—because I believe, in common with most scientific workers, that without a background of this kind we can neither see our new knowledge as a consistent whole, nor appreciate its significance to the full. Statements made without reference to such a background—as, for instance, that “an electron consists of waves of probability” or that “the principle of indeterminacy shews that nature is not deterministic”—can convey at best only a minute fraction of the truth.

I have tried to exhibit the new knowledge in such a way that every reader can form his own judgment as to its philosophical implications. There is room for much legitimate difference of opinion as to what precisely these are; yet few, I think, will be found to doubt that some re-orientation of scientific thought is called for. I have not suppressed my own view that the final direction of change will probably be away from the materialism and strict determinism which characterised nineteenth-century physics, towards something which will accord better with our

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## PREFACE

everyday experience. This part of my work may be regarded as an amplification and clarification of parts of my earlier small book, *The Mysterious Universe*.

I have hoped that the present book may serve a serious scientific purpose, and prove of interest and value both to students of physics and to other more general readers. Unhappily I found it impossible to attain the necessary precision of thought and statement without occasionally using a few mathematical symbols and formulae; at the same time I have tried to arrange that the general purport of these shall be made clear to the non-mathematical reader, who will, I hope, find most of the book intelligible.

J. H. JEANS

DORKING

*January 19th, 1933*

## PREFACE TO THE SECOND EDITION

In preparing a new edition, I have taken advantage of many suggestions made by reviewers and readers, for all of which I offer my thanks. Thus I hope that my presentation of the subject has gained in smoothness and lucidity. The scientific discoveries of the past year—especially those of the uncharged neutron and the apparently short-lived positive electron—have necessitated some restatement in matters of detail, but none in the main argument of the book.

J. H. JEANS

DORKING

*January 15th, 1934*