

## CONTENTS

CONTRIBUTORS TO VOLUME IV . . . . . v

PREFACE . . . . . vii

### Electron Scattering in Solids

By H. S. W. MASSEY, *F.R.S., Department of Mathematics, University College,  
London, England*

I. Introduction . . . . .	2
II. Elastic Scattering . . . . .	3
III. Inelastic Scattering . . . . .	17
IV. Multiple Scattering . . . . .	32
V. Energy Loss of Electrons in Passage through Solids . . . . .	48
VI. The Mobility of Electrons in Metals, Alloys and Semi-Conductors . . . . .	58
References . . . . .	66

### The Scintillation Counter

By G. A. MORTON, *Radio Corporation of America, RCA Laboratories Division,  
Princeton, New Jersey*

I. Introduction . . . . .	69
II. The Photomultiplier . . . . .	71
III. Multiplier Performance . . . . .	78
IV. Phosphor Crystals . . . . .	88
V. Scintillation Counter Applications . . . . .	94
References . . . . .	106

### Fluctuation Phenomena

By ALDERT VAN DER ZIEL, *Department of Electrical Engineering, Institute of Technology,  
University of Minnesota, Minneapolis, Minnesota*

I. Introduction . . . . .	110
II. Fourier Analysis of Fluctuating Quantities . . . . .	112
III. Application to Various Noise Generators . . . . .	117
IV. Noise in Receivers . . . . .	147
References . . . . .	153

### Electronic Digital Computers

By C. V. L. SMITH, *Office of Naval Research, Washington, D. C.*

I. Introduction . . . . .	157
II. Input-Output . . . . .	160
III. Internal Storage . . . . .	161
IV. Arithmetic and Control Organs . . . . .	171
V. Whirlwind . . . . .	174

VI. SEAC . . . . .	180
VII. Conclusion . . . . .	185

### Modulation of Continuous-Wave Magnetrons

BY J. S. DONAL, JR., *Radio Corporation of America, RCA Laboratories Division,  
Princeton, New Jersey*

I. Introduction . . . . .	188
II. Frequency Modulation or Control by Spiral Electron Beams . . . . .	194
III. Frequency Modulation by Electron Clouds. . . . .	201
IV. Voltage Tuning. . . . .	207
V. Amplitude Modulation Using Absorption by a Spiral Electron Beam. . . . .	211
VI. Amplitude Modulation by Means of the Electron Coupler . . . . .	219
VII. Control or Modulation by Injection Phase Locking . . . . .	225
VIII. Amplitude Modulation by Plate Modulation of a Magnetron with Simultaneous Frequency Control. . . . .	234
IX. The Injection Magnetron as the Possible Means of Producing Amplitude or Frequency Modulation. . . . .	247
X. Conclusions. . . . .	253
References . . . . .	254

### The Magnetic Airborne Detector

BY WINFIELD E. FROMM, *Airborne Instruments Laboratory, Inc., Mineola,  
New York*

I. Introduction . . . . .	258
II. Types of Magnetic Anomaly Detectors. . . . .	263
III. Historical Development of the Magnetic Airborne Detector. . . . .	267
IV. The Saturable-Core Magnetometer . . . . .	268
V. Magnetic Stabilization and Orientation. . . . .	279
VI. Magnetic Airborne Detector System. . . . .	292
VII. The Noise Problem . . . . .	295
VIII. Conclusion . . . . .	298
References . . . . .	298

### Multichannel Radio Telemetering

BY M. G. PAWLEY AND W. E. TRIEST, *National Bureau of Standards, Corona,  
California, and International Business Machines Corporation,  
Poughkeepsie, New York*

I. Introduction . . . . .	301
II. Evolution of Radio Telemetering . . . . .	302
III. Basic Systems of Radio Telemetering . . . . .	304
IV. Typical Telemetering Systems. . . . .	312
V. Future Trends in Telemetering . . . . .	328
References . . . . .	329
Author Index. . . . .	331
Subject Index. . . . .	336