

CONTENTS

I	INTRODUCTION	I
	The problem. Historical.	
2	THE HYDROGEN ATOM	4
	Series. Interpretation by diagram. Bohr's theory. The wave mechanics. Ionized helium.	
3	THE ALKALI DOUBLETS	13
	Detection of series. Rydberg-Ritz combination principle. Doublet series. The spinning electron. Sommerfeld's intensity rule. Fine structure of hydrogen and helium lines.	
4	THE ALKALINE EARTHS	35
	Arc and spark spectra. Two systems—the singlets. The triplet system. Inter-system lines. Spectrum of helium. Systems of higher multiplicity. Landé's interval rule.	
5	ABSORPTION SPECTRA	53
	Absorption spectra. Ionization and resonance potentials. Spectra excited by electron impact. Spectra excited by monochromatic light.	
6	THE ZEEMAN EFFECT	64
	The normal Zeeman triplet. Anomalous Zeeman effect. The Bohr magneton. The quantum theory. The spinning electron. Intensity rules. Term analysis.	
7	PASCHEN-BACK EFFECT	85
	Empirical patterns. The Vector model. Partial Paschen-Back effect. Intermediate fields. Matching weak and strong terms. Invariance of the g sum. Invariance of the Γ sum.	
8	THE PERIODIC SYSTEM	104
	The table. Valency. The displacement law. Electronic structures. X-ray spectra. Pauli's exclusion principle.	
9	THE DOUBLET LAWS	135
	Moseley's law. Screening doublets. Spin doublets. Landé's doublet formula.	
10	DISPLACED TERMS	147
	The alkaline earths. Selection rule. Beryllium and magnesium. Zinc, cadmium and mercury.	
11	COMBINATION OF SEVERAL ELECTRONS	153
	Combination of unlike electrons. Combination of equivalent electrons. Deep terms of the short periods. Two energy rules. Inverted terms.	
12	ELEMENTS OF THE SHORT PERIODS	163
	Elements to be considered. Irregularities and their cause. The earth metals. Column IV. Column V. Column VI. The halogens. The inert gases.	

13	LONG PERIODS	183
	The ground terms. Configurations and analysis. Individual spectra. The three rows compared.	
14	THE LANTHANIDES	208
	Place in the periodic system. Chemical evidence. Paramagnetic ions. Absorption spectra. Fluorescent spectra. Analysis of a line spectrum. Arc and spark spectra.	
15	THE ACTINIDES	226
	The actinides and lanthanides compared. Chemical evidence. Absorption spectra. Fluorescent spectra. Paramagnetic ions. Arc and spark spectra.	
16	LINE INTENSITIES	234
	Measurement of relative intensities. Measurement of absolute intensity. The normal multiplet. The super-multiplet. The iron frame elements. Alkali doublets. The Zeeman multiplet. <i>Rates ultimes</i> .	
17	THE SUM RULES AND (jj) COUPLING	264
	Deviations from Russell-Saunders coupling. Invariance of the g sum. Invariance of the Γ sum. The intensity sum. General coupling of two electrons. (jj) coupling. Calculation of g for any coupling. Electronic displacements. Abnormal intensities. Perturbed terms.	
18	SERIES LIMIT	294
	J values. Hund's theories.	
19	HYPERFINE STRUCTURE	299
	Introduction. Empirical. Influence of nuclear mass. The extended vector model. Zeeman and Paschen-Back effects. Intensities. Isotope displacement. Deviations from the interval rule. Electric quadrupole moment. Atomic beam spectra. The structure of the nucleus.	
20	QUADRUPOLE RADIATION	331
	Forbidden lines. Quantum mechanics. Zeeman effect.	
	APPENDICES	
	1 Natural atomic units	341
	2 Bibliography	345
	3 Rydberg term table	347
	4 Grotrian diagrams	351
	5 Tables of protonic, neutronic, and deutonic nuclei	393
	INDEX	401