

CONTENTS

	PREFACE	v
CHAPTER ONE	RADIOACTIVITY	1
	ALPHA DECAY	5
	BETA DECAY	5
	ELECTRON CAPTURE	6
	BRANCHING DECAY	7
	SERIES DECAY	8
	IMMUTABILITY OF RADIOACTIVE DECAY RATES	8
CHAPTER TWO	NUCLEAR CLOCKS	10
	THE DECAY CLOCK	10
	<i>The Carbon-14 Clock</i>	11
	<i>The Tritium Clock</i>	14
	<i>Ratio Clocks for Ocean Sediments</i>	14
		vii

	THE ACCUMULATION CLOCK	17
	<i>The Gross Uranium-Lead Clocks</i>	19
	<i>The Helium Clock</i>	20
	<i>Pleochroic Halos</i>	21
	<i>The Lead-Lead Clock</i>	22
	<i>The Spontaneous-fission Clock</i>	23
CHAPTER THREE	LIMITS AND CONDITIONS OF THE ACCUMULATION CLOCK	29
	THE ORIGINAL DAUGHTER NUCLIDE (GENERAL)	29
	ARGON	32
	STRONTIUM	33
CHAPTER FOUR	CONCORDANT, DISCORDANT, AND MIXED AGES	39
	CONCORDANCE	39
	DISCORDANCE	40
	ARGON LOSSES	41
	ORIGINAL ARGON	45
	LEAD LOSS AND CONCORDIA	46
	MIXED AGES	49
CHAPTER FIVE	GEOLOGIC TIME SCALE	51
	LAYERED VOLCANICS	53
	BRACKETED INTRUSIVES	53
	SIMPLE INTRUSIVES	56
	QUESTIONABLE REFERENCE POINTS	56
CHAPTER SIX	PLUMBOLOGY AND THE "AGE OF THE EARTH"	62
	THE SIMPLE MODEL	63
	THE HOLMES-HOUTERMANS MODEL	64

	THE AGE OF THE EARTH	65
	DEVELOPMENT OF COMMON LEAD	67
CHAPTER SEVEN	THE HISTORY OF METEORITES	70
	FORMATION AGES	71
	EXPOSURE AGES	74
CHAPTER EIGHT	AGES OF THE STARS AND GALAXIES	76
	STELLAR RADIATION	78
	THE AGE OF GALAXIES AND THE EXPANDING UNIVERSE	83
APPENDIX A.	DECAY SERIES OF U^{238}, U^{235}, AND Th^{232}	85
APPENDIX B.	ANALYTICAL PROCEDURES	87
APPENDIX C.	WHAT WE MEAN BY "ERROR"	92
	INDEX	99