Contents

OBITUARY V

ACKNOWLEDGEMENT VI

PART I. GRANITE PETROLOGY 1

CHAPTER 1. INTRODUCTION 3
Review of the evolution of early granite petrology 8
Magmatic views in granite petrology 11

CHAPTER 2. THE RELATION BETWEEN OROGENIC MOVEMENTS, DEEP-SEATED METAMORPHISM AND GRANITES 17
The depth of deep-seated metamorphism 18
The thickness of the acidic layer of the earth's crust 20
The thickness of granite bodies 22

CHAPTER 3. TECTONIC GROUPS OF GRANITES 25
Synkinematic granites 26
Late-kinematic granites 26
Postkinematic granites 27
Some other classifications 27

CHAPTER 4. SYNKINEMATIC GRANITES 31
General 31
Homogeneous portions of the synkinematic areas 37
Synkinematic granites 39
Porphyroblastic sialic rocks 42
Potash feldspar of porphyroblastic granitic rocks 48
The mineralogy of synkinematic granites 52
The duration of the "synkinematic stage" as deduced from radiogenic age determinations 55

CHAPTER 5. GRANITIZATION OR GRANODIORITIZATION 58
Historical review 58
Granitization or granodioritization 63
The role of sodium during granodioritization 66
Granitization 70
Granodiorite and quartz diorite composition 72
Basic front 73
Granitized synkinematic rocks 74
The interpretation of field data 76
Summary 81

CHAPTER 6. LATE-KINEMATIC GRANITES 82
General 82
The field relations of late-kinematic granites 84
Mineralogy of late-kinematic granites 91
Microcline 91
Plagioclase 94
Epidote-bearing late-kinematic granites 96
The origin of epidote 98

CHAPTER 7. THE TRANSPORT PROBLEM 103
General 103
Solid diffusion 105
The role of water in the genesis of granites 107
Metasomatic approach 107
Magmatic approach 109
Palingenetic or not 111
Anatectic model 111
Interpretation of anatexis 114
Experimental anatexis 116
Temperature of formation 119

CHAPTER 8. POSTKINEMATIC GRANITES 121
General 121
Rapakivi 122
Mineralogical characteristics 125
Ovoids 127
Tirilite 130
Alpine granites 132
Riebeckite- and related granites 133
The fluorine content of granites 136
Trace elements and accessory minerals 137
Hypersolvus and subsolvus granites 141

PART II. THE GRANITE PROBLEM 145

CHAPTER 9. INTRODUCTION 147
The assembly of potash feldspar with albite 150
Single-feldspar—perthite—separate grains 154
The origin of albite 157
Myrmekite 161
Microcline or orthoclase 167
Potash feldspar replacing plagioclase 171
Homogeneous microcline granites 171
Apophyses 172
High- and low-temperature plagioclase 177
The source of potassium 179
Homogeneity of granite bodies 181

CHAPTER 10. HYDROTHERMAL MODEL 184
Material and transport problems 184
Interpretation of transport 187
Sedimentary pile 190
Deformed sedimentary pile 192
Hydrothermal granitization and granodioritization 194

Orthoclase—microcline—albite 197
Direction of granitization 199
The aplitic granite bodies 200
Hydrothermal model 202

CHAPTER 11. GRANITES AND ORES 203
Approach to the problem 203
Granites and hydrothermal ores 205
Molybdenite-bearing granites 208

CHAPTER 12. CLASSIFICATION OF GRANITES 210
Composite classification (1) 211
Kinematic classification 212
Synkinematic granites 212
Late-kinematic granites 213
Postkinematic granites 213
Petrological classification 214
One-feldspar granites 216
Orthoclase granites 216
Microcline—oligoclase granites 217
Microcline—albite granites 217
Granitized microcline—oligoclase granites 217
Porphyroblastic microcline—oligoclase granites 218
Alkali granites 218
Composite classification (2) 219

REFERENCES 220

INDEX 235