

Contents

Preface

1	Introduction	1
2	Systems of Classification.	5
2.1	Empirical Classification.	6
2.1.1	Lithological	6
2.1.2	Major Element Geochemistry.	8
2.1.3	Mineralogical	9
2.1.3.1	The Magnetite-Ilmenite Series.	9
2.1.3.2	Zircon.	10
2.2	Typological Systems.	10
2.3	Geochemical-Tectonic.	12
2.4	Comments on the Question of Source Related Nomenclatures	14
2.5	Additional Nomenclatural Terms.	15
2.5.1	Tectonic	15
2.5.2	Orogenic	15
2.5.3	Structural.	15
3	Granite Geology.	17
3.1	The Nomenclature of Plutons and Batholiths.	17
3.2	The Anatomy of Batholiths.	17
3.3	The Structure of Plutons.	19
3.4	Granite Units, Super-Units and Suites.	19
3.5	Granite Belts and Provinces.	20
3.6	Contacts.	20
3.7	Magmatic Textures.	21
3.7.1	Equilibrium Textures.	21
3.7.2	Disequilibrium Textures.	23
3.8	Layering and Schlieren.	28
3.9	Residual Fluids.	32
3.10	Aplites, Pegmatites and Granite Veins.	33
3.11	Enclaves in Granites.	34

3.12	The Question of Coeval Felsic and Mafic Magmas	35
3.13	Mafic Microgranular Enclaves.	36
3.14	Restite.	38
3.15	High Level Interaction of Felsic and Mafic Material.	41
3.16	Dark Margins at Igneous Contacts in Granites.	43
3.17	Mafic Dykes.	44
3.18	Emplacement of Plutons.	45
	3.18.1 Stopping.	46
	3.18.2 Diapirism and Ballooning.	47
	3.18.3 Emplacement along Strike-Slip Faults.	48
	3.18.4 Feeder Dykes and Pipes.	50
3.19	Deformation.	50
	3.19.1 Field Recognition of Deformational Structures.	53
3.20	Core Complexes.	54
3.21	Vein Complexes.	55
3.22	Migmatites.	56
3.23	Metamorphic Aureoles.	58
3.24	Mineralisation.	59
	3.24.1 Endogenous Mineralisation.	60
	3.24.2 Exogenous Mineralisation.	61
	3.24.3 Skarns.	61
	3.24.4 Breccias and Breccia Pipes.	61
	3.24.5 Porphyry Copper Deposits.	62
	3.24.6 Alteration Zones.	62
	3.24.7 Epithermal Veins.	62
	3.24.8 Flow Domes.	63
	3.24.9 Field Recognition.	63
3.25	Terrains.	63
3.26	Polarity.	64
4	Characteristics of Granite Typologies.	67
4.1	Origin of the Concept	67
4.2	The I-M Type Family.	68
	4.2.1 M-Types.	70
	4.2.2 Cordilleran I-Types.	71
	4.2.3 Post CoUisional Uplift-Molasse Associated I-Types	73
4.3	The A-type Association.	75
	4.3.1 A-Types.	76
4.4	The S-Type Family.	78
	4.4.1 S-Types.	81

5	Field Mapping	.83
5.1	Reconnaissance Mapping, Preparation for Field Work	.83
5.2	Use of the Description Sheet	.84
5.3	Mapping by Textures	.87
5.4	Field Procedures	.88
5.5	Mapping in Jungles	.89
5.6	Mapping in Deserts	.91
5.7	Collection of Samples	.92
6	Handling the Data	.95
6.1	Selecting Samples	.95
6.2	Essential Geochemistry	.96
6.2.1	Classification	.96
6.2.2	Comparison	.97
6.2.3	Differentiation	.98
6.3	Typology	.98
6.4	Tectonic Setting	.98
6.5	Isotope Studies	.99
6.5.1	The Potassium/Argon Method	.99
6.5.2	The Rubidium/Strontium Method	.100
6.5.3	The Niodymium/Samarium Method	.100
6.5.4	The Uranium/Lead Method	.101
7	Integrating the Data	.103
7.1	Storage of Specimens	.103
7.2	The Workplace	.103
7.3	The Portrayal of Granites on Geological Maps	.104
7.4	Writing the Report	.105
7.4.1	Geology	.106
7.4.2	Geochemical	.106
7.4.3	Isotopic	.106
7.4.4	Summary and Conclusions	.107
7.5	Archiving the Data and Material	.107
8	The Granite Controversy and its Aftermath	.109
9	Epilogue	.117