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Composition of a dolerite dyke, Mingulay, Outer Hebrides

THE Lewisian gneiss complex of the island of Mingulay, near the southern end of the Outer Hebrides, is cut by three large dolerite dykes of presumed Tertiary age (Bowes and Hopgood, 1968, fig. 2). Those on Dùn Mingulay and Rudha Liath trend approximately north–south consistent with the regional pattern of Tertiary dykes in this part of the Hebridean igneous province and that on Guarsay Beg follows a crush belt. The texture of the dykes is subophitic and they consist of labradorite (An_{58}), titanaugite, olivine, and opaque iron ores. Major element, trace element, normative, and modal data for the Dùn Mingulay dyke are given in table I. These data are recorded so that they can be used in studies of igneous activity in a wider context.

The number of the analysed specimen refers to the rock catalogue of the Hunterian Museum, University of Glasgow, and the information follows from the Glasgow University Exploration Society Expedition to Mingulay (Robertson *et al.*, 1964).

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TABLE I. *Olivine dolerite, Dùn Mingulay (9700). Anal. D. L. Skinner*

	Chemical analysis	Trace elements (in ppm)		Weight norm		
SiO_2	44·28	Li	8	Q		—
TiO_2	2·15	V	192	Or		3·19
Al_2O_3	16·33	Cr	38	Ab		22·38
Fe_2O_3	2·60	Co	52	An		26·72
FeO	13·49	Ni	59	Ne		4·46
MnO	0·21	Cu	86	Di	Wo	5·04
MgO	6·80	Ga	28		En	2·32
CaO	8·20	Rb	63		Fs	2·67
Na_2O	3·62	Sr	295	Ol	Fo	10·24
K_2O	0·54	Y	11		Fa	12·97
P_2O_5	0·32	Zr	206	Mt		3·77
H_2O +	1·59	Sn	< 5	Il		4·08
CO_2	0·25	Cs	< 25	Ap		0·76
Total	100·38	Ba	225			
		La	< 35			
		Pb	< 7			

Modal analysis

Labradorite (An_{58})	55·5	Titanaugite	18·3
Olivine	20·2	Opaque ore	6·0

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Computerized data processing from an X-ray texture-goniometer

OVER the last few years, the classical interest in the orientation properties of mineral crystals has received a new impetus, but in a somewhat non-classical direction. Universal stage techniques, which are suitable but time-consuming and tedious for examinations of structural and crystallographic features in larger minerals, are much less suitable for studying in detail any preferred orientation in fine-grain mineral aggregates comprising components down to clay grade sizes. New applications of X-ray diffraction techniques appear to offer the greatest potential.

Metamorphic and structural geologists have a fundamental interest in rock fabrics but a situation has now arisen in which soils engineers are gradually appreciating the importance of clay mineral orientation and re-orientation in problems concerned with