SHORT COMMUNICATIONS

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Edingtonite from Squilver quarry, Shropshire, England

THE rare barium zeolite edingtonite was first described by Haidinger (1825) from a single specimen found by him in the collection of Mr. Edington of Glasgow. The specimen, which was from the Kilpatrick Hills near Glasgow, showed crystals of edingtonite on thomsonite associated with calcite and harmotome. An analysis by Edward Turner showed it to be a calcium aluminosilicate with 'almost 10 or 11% of some alkali, the nature of which I have not been able to ascertain'. Heddle (1855) later showed it to be a barium zeolite, although the Kilpatrick Hills edingtonite does contain appreciable calcium (Hey, 1934). Later, edingtonite was found at quarries 1 km and 8 km north of Old Kilpatrick and at Bell's quarry and Bowling quarry (Heddle, 1901), all of which are in the Kilpatrick Hills.

Since then edingtonite has been found at a number of other occurrences, the most notable being the Ice River Complex, British Columbia, Canada. Here edingtonite occurs as a late-stage mineral associated with natrolite and calcite lining cavities in nepheline-syenite (Grice and Gault,

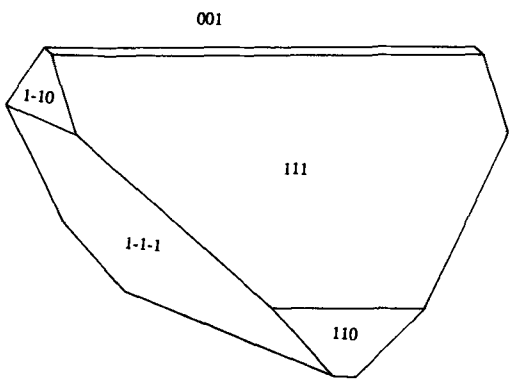

FIG. 1. Sketch of bipyramidal habit of Squilver quarry edingtonite.

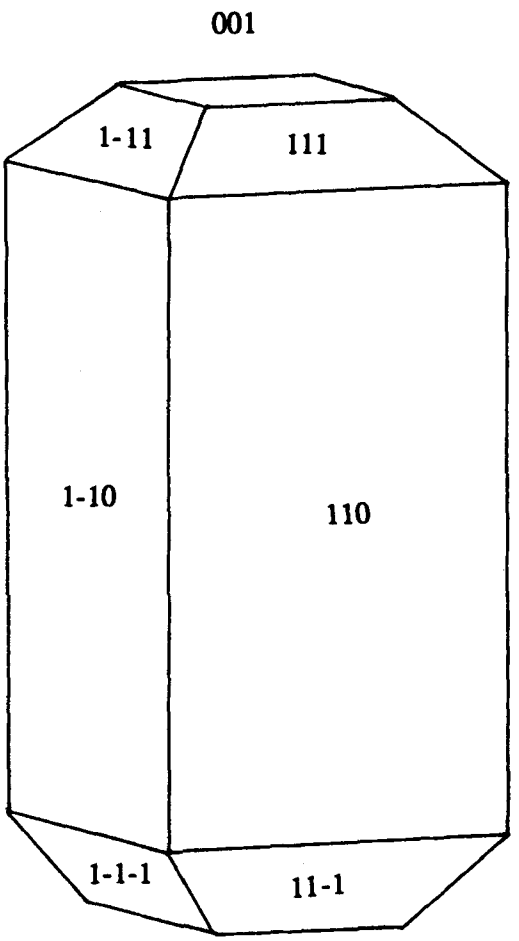

FIG. 2. Sketch of pseudotetragonal habit of Squilver quarry edingtonite.

Table 1 Edingtonite X-ray diffraction data.

Squilver quarry Shropshire		Ice River* British Columbia	
d (Å)	I/I_0	*d* (Å)	I/I_0
6.80	9	6.79	13
6.56	18	6.54	39
5.42	18	5.40	37
4.82	60	4.81	75
4.72	20	4.70	47
4.301	15	4.29	17
		3.867	4
3.591	100	3.587	100
3.397	40	3.392	46
		3.262	6
3.097	10	3.085	12
3.038	65	3.027	47
3.013	15	3.011	33
2.948	15	2.939	17
2.755	100	2.753	83
2.664	10	2.658	14
2.603	25	2.594	36
2.467	9	2.461	8
		2.397	3
2.286	20	2.284	29
2.263	50	2.261	75
		2.222	3
2.194	25	2.192	17
2.144	25	2.139	23

*** From Gottardi & Galli (1985).**

1981). Other occurrences include Böhlet mine, Westergotland, Sweden (Nordenskjold, 1885), near Stare Ranski, East Bohemia, Czechoslovakia (Novak, 1970), the Podol'skoye, Urals, Russia (Ismagilov, 1977), Brunswick No. 12 mine, New Brunswick, Canada (Grice *et al.*, 1984), Jacupiranga, Sao Paulo, Brazil (Menezes and Martins, 1984) and Mont St. Hilaire, Quebec, Canada (Mandarino and Anderson, 1989). Edingtonite has now been found in Squilver quarry, Disgwylfa Hill, Shropshire, England, the first recorded English occurrence.

Squilver quarry is a small roadstone quarry immediately North of the A488 road and 9 km

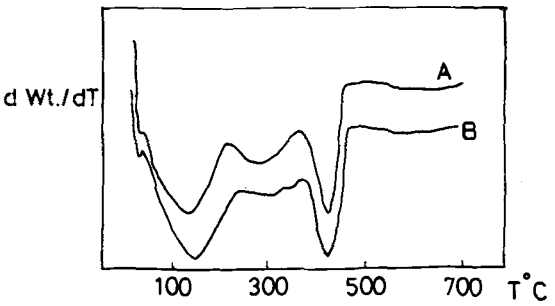

FIG. 3. Differential thermograms of edingtonites: A—Ice River, British Columbia; B—Squilver quarry, Shropshire.

North of Bishop's Castle, at National Grid Ref. SO 325 933, which was started in the late 1920s but is now disused and much overgrown. Disgwylfa Hill is the northern outcrop of a doleritic mass, about 1.5 km long in a north-west direction, intruded into Lower Ordovician mudstones and shales (Blythe, 1943). 200 m West of Squilver quarry, a very small disused quarry exposes the upper contact of the dolerite with the mudstones and shales (Hope shales) which have been metasomatised at the contact. Just East of Squilver quarry the contact with the Hope shales, which are much broken here, is obscured, but the fractured nature of the shales suggest that the boundary is a fault. The southern boundary of the intrusion is an unconformity bringing the dolerite up against Silurian rocks.

The presence of finer-grained dolerite outcropping above the quarry suggests that little of the dolerite has been eroded away. The lowest part of the quarry shows a darker more basic dolerite, indicating that it is near the base of the intrusion. Thus the quarry exposes a nearly complete section of the intrusion.

The rock is a coarse-grained andesine dolerite consisting of more than two thirds plagioclase

Table 2 Electron probe microanalysis of edingtonites Unit cell composition based upon 20 oxygens.

	Squilver quarry	Ice River
Si	5.99	5.94
Al	4.50	4.60
Ba	1.27	1.23
H_2O*	7.53	7.43

* from thermogravimetry.

with 10–20% pyroxene, 2–4% iron oxides and a little chlorite and other minerals.

Edingtonite occurs as colourless to white crystals covering areas up to 50 cm across on conspicuous southerly-dipping joint planes which were probably formed by cooling stresses in the dolerite; it also lines voids in small localised brecciated zones. The crystals are usually of bipyramidal habit dominated by the disphenoid {111} with minor or absent pinacoid {001} and minor prism {110} (Fig. 1). They are usually less than 10 mm although exceptionally they can reach 20 mm. Prismatic pseudotetragonal crystals also occur (Fig. 2), usually smaller than the bipyramidal crystals (≤5 mm). Rarely the pyramid faces are absent giving the crystals an almost cubic appearance. Occasionally small prismatic crystals are found growing on the bipyramidal crystals. Both the bipyramidal and prismatic crystals occasionally show twinning.

The joint planes are commonly coated with thin crusts of pale yellow–green prehnite crystals with which the edingtonite is often associated. Where the two minerals occur together the edingtonite has been deposited after the prehnite. Calcite of at least two generations can be observed but is not common. An early generation of pyramidal (scalenohedral) calcite crystals is frequently coated by prehnite or rarely edingtonite, while a later generation fills voids lined with prehnite or edingtonite or occurs as small rhombic crystals on prehnite. Harmotome occurs infrequently as colourless to white prismatic crystals up to 7 mm, some of which show twinning; it is usually associated with the edingtonite and occasionally crystals of harmotome are partially enclosed in edingtonite. Epidote occurs very rarely as tiny crystals in altered dolerite associated with prehnite.

The XRD powder pattern of the Squilver quarry sample was obtained using a Philips PW 1050/25 diffractometer (Cu-Kα radiation). Table 1 compares the *d* values with those cited in Gottardi and Galli (1985).

Fig. 3 compares the differential thermogram (DTG) of the Shropshire sample with that of edingtonite from Ice River, Canada, and Table 2 contains data from electron probe microanalysis (EPMA) of the same samples (using a Link Analytical QX 2000 with ZAF software).

All the analytical results show that the Squilver quarry sample is an edingtonite of high purity and it should be noted that the DTG results agree very well with those quoted by Gottardi and Galli (1985). EPMA also confirms the absence of likely impurity elements (e.g. Na, K, Ca, Sr, Fe, etc.).

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