In the classic Memoir on the Haliburton and Bancroft Areas, Ontario, Adams & Barlow (1910) described "eucolite" from Egan Chute on the York River. I collected a number of small crystals of what were thought to be this mineral from that locality, but on mentioning this to the late Dr. T. L. Walker (in 1922), learned that the crystals described by Adams & Barlow had been identified by him as zircon, and that subsequent field and laboratory study had failed to verify Adams' & Barlow's report as to the presence of eucolite in the area.

Re-examination of the crystals then (and again recently by x-ray powder analysis) confirmed Dr. Walker's identification of zircon. The crystals, about 5 mm. in size, have a deceptive pseudo-hexagonal habit. Adams & Barlow mention "apparently low double refraction" (of "eucolite") as differentiating eucolite from garnet, which it resembles otherwise. Although altered zircon too sometimes shows low double refraction, these crystals, though somewhat turbid, appear to have normal optical properties.

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HEAZLEWOODITE IN THE PORCUPINE DISTRICT (ONTARIO)

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Heazlewoodite (Ni_3S_2) has been identified in 6 samples from the serpentinized peridotite hanging wall of the old Alexo nickel mine. The mine is situated in Dundonald Township, 25 miles northeast of Timmins.

Heazlewoodite was first described by Petterd (1910) who considered it to be an iron-nickel sulphide, a variety of pentlandite. Peacock (1946) describes a sample from Tasmania that is thought to be from the type locality, Heazlewood. He gives its x-ray powder spectrum and shows that it has the unique chemical composition Ni_3S_2. Williams (1958) reports that it has also been identified in a serpentinite at Trial Harbour, Tasmania. Stanton (Hawley, 1962) tentatively identified it in ore from the Frood mine, Sudbury, but amounts were so small that this occurrence was never confirmed by *x*-ray methods. This material differs in its reflection pleochroism and reaction with $FeCl_3$ etch solution to that described by Peacock and Williams and to that found at Alexo.

At the Alexo mine, heazlewoodite occurs as very small grains, in most cases less than 0.02 mm in diameter, although a few grains up to 0.1 mm are present. It is yellowish cream in colour, appearing distinctly yellow alongside pentlandite. Glare from silicates surrounding the small grains makes the anisotropism very difficult to distinguish without an oil immersion lens but, with the assistance of this, anisotropic colours ranging from a delicate lilac to pale green are visible. No reflection pleochroism is apparent. Most of the grains consist of single crystals although one or two of the larger grains are made up of a mosaic of small interlocking crystals (possibly twins according to Peacock). No parting or cleavage is observed.

With 1:1 HNO_3 the mineral turns a uniform grey-brown and with 5 per cent $HgCl_2$ it is slowly stained brown to iridescent. No reaction is apparent with HCl, $FeCl_3$, KOH and KCN. In addition to the reactions with HNO_3 and $HgCl_2$, Peacock reports faint brown staining with $FeCl_3$ and KOH and, in some cases only, a faint brown stain with HCl.

Heazlewoodite was confirmed at Alexo by its *x*-ray powder pattern, the five strongest lines of which are tabulated below.

Powder pattern from Heazlewoodite at Alexo
(obtained with 57.3 mm diam. powder camera using CuK_1 radiation)

Intensity	*d* spacing (Å)
7	4.111
10	2.888
5	2.039
8	1.831
8	1.670

The Alexo ore body is composed of a 5 to 10-foot wide zone of massive sulphides localized by a shear close to the peridotite-volcanic contact and a surrounding envelope of disseminated ore between 5 and 15 feet thick. Pyrrhotite and pentlandite are the principal sulphides of the ore zone. Magnetite and very minor amounts of chalcopyrite are also present. On the hanging wall side only (that is into the peridotite and away from the volcanics) the disseminated ore is flanked by a 5-foot zone of pentlandite, then a 15-foot zone of pentlandite and heazlewoodite and finally a zone of heazlewoodite alone which extends 50 feet and more away from the ore.

Heazlewoodite is restricted to the peridotite of the hanging wall and co-exists with no sulphide other than pentlandite. It is sparsely distributed, never exceeding 0.25 per cent in amount. It is thought to have formed as a result of reaction between sulphur and nickel in the silicates of the peridotite. This problem, together with the implications that this and other data obtained in this study of nickel deposits of the Porcupine have on the genesis of the deposits are the subject of a forthcoming paper.

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X-RAY CRYSTALLOGRAPHY OF AURICHALCITE AND HYDROZINCITE

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Although both aurichalcite, $(Zn,Cu)_5(CO_3)_2(OH)_6$, and hydrozincite, $Zn_5(CO_3)_2(OH)_6$, contain zinc as the dominant cation and are otherwise chemically similar, they do not form a solid solution series. The range of copper substitution in aurichalcite is rather limited, and the composition does not closely approach that of a theoretically possible zinc end-member. On the other hand, hydrozincite, which is crystallographically and mineralogically distinct from aurichalcite, does not contain significant amounts of copper (Palache *et al.*, 1951, p. 247).

Aurichalcite, $(Zn,Cu)_5(CO_3)_2(OH)_6$

Frondel & Wolfe (Palache *et al.*, 1951, p. 250) tentatively assigned to aurichalcite from Magdalena, New Mexico, an orthorhombic *A*-centered cell with $a = 6.40$, $b = 27.78$, $c = 5.25$ kX. Shimazaki (1957), on the basis of *c*-axis Weissenberg photographs of material also from Magdalena, New Mexico, reported cell dimensions of $a = 6.45$, $b = 13.60$, $c = 5.27$ Å, space group *Pmma*. However, all lines of the powder pattern cannot be satisfactorily indexed with this cell and space group.

In the present study, Weissenberg and precession examination of