Pyroaurite Group Rhombohedral	Chemical Composition	Sjögrenite Group Hexagonal
Pyroaurite a 6.20, c 46.63	$Mg_6Fe_2CO_3(OH)_{16}.4H_2O$	Sjögrenite a 6.21, c 15.60
Stichtite a 6.19, c 46.47	$Mg_6Cr_2CO_3(OH)_{16}.4H_2O$	Barbertonite a 6.18, c 15.55
Hydrotalcite a 6.14, c 46.24	$Mg_6Al_2CO_3(OH)_{16}.4H_2O$	Manasseite a 6.13, c 15.37

Investigation of drill core samples from Langmuir Township, Ontario has revealed the presence of pyroaurite and stichtite. No evidence of the sjögrenite group has been found.

The Langmuir stichtite is present as small, rounded masses with an average maximum dimension of about three mm. Some masses up to 15 mm have been observed but they are rare. Pyroaurite, on the other hand, is very abundant. It occurs as veinlets and as radiating masses. Pyroaurite makes up about 15% by volume of the 100 feet of core available for study. The pyroaurite is quite evidently an alteration product of magnetite. Grains of magnetite are often surrounded by radiating rims of pyroaurite.

TIN-BEARING GARNET AND PYROXENE FROM SKARN IN THE CASSIAR DISTRICT, B.C.

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Coarsely crystalline brown garnetite, found just north of the pass at Lat. 59° 17½N, Long. 130° 31W, yielded 1.1% tin on spectrographic analysis. The garnetite occurs among crystalline limestone and garnet, pyroxene, and vesuviantie skarns near their contact with granodiorite, but occupies only a single small area and may be exotic. Dark pyroxene-rich garnet-free skarn from a boulder a few hundred feet south of the pass contains 0.78% tin. A green pyroxene-rich skarn contains 0.04% tin and other vesuvianite-pyroxene-garnet skarns in the area yielded up to 0.026% tin. A vesuvianite sample contained 0.012% Be.

The tin-rich garnetite is composed of about 65% interlocking crystals of deep green garnet up to 25 mm across and about 35% finer brownish-green pyroxene. The garnet is finely banded in concentric zones parallel to the crystal outlines, the bands showing distinct but variable optical anisotropy. The pyroxene, near augite in optical properties, is mainly in anhedral interstitial masses and in thin bands along the zone boundaries within the garnet crystals.

Tin distribution in the co-existing skarn silicates has been studied by electron probe and spectrographic techniques. Analysis of the garnet indicates that it is virtually a pure stannian andradite end-member in which the depth of green coloration in the zones can be correlated with tin content.

TALC-CARBONATE ALTERATION OF SOME SERPENTINIZED ULTRAMAFIC ROCKS SOUTH OF TIMMINS, ONTARIO

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Serpentinized peridotite bodies south of Timmins, Ontario have been extensively altered to talc and carbonate. In some places, rocks altered in this way have subsequently been decarbonatized and converted back to a serpentine-magnetite assemblage. Textures in the rocks indicate that the alteration has involved no change in volume. Eleven variably altered rocks have been analyzed and the analyses re-calculated in terms of the

modified standard cell. In this way it is demonstrated that the bulk chemical changes involved in the talc-carbonate alteration have been the addition of CO_2 and removal of H_2O and a very small amount of O_2. Little or no magnesium, silicon, iron or nickel metasomatism has occurred. Consequently, the relative fugacities of H_2O and CO_2 in solutions passing through the rocks are likely to have been controlling factors for the alteration and subsequent de-carbonatization.

Talc-carbonate alteration shows no control other than the fabric of the rock and large scale geologic features such as shears about the margins of peridotite lenses and major faults. The contrasting nature of the de-carbonatization which is strictly controlled by joints and fractures suggests that this reversal in the alteration occurred at a later stage in the geological history of the area when the rocks were closer to the surface, the joints and fractures had opened up and were available as channel-ways for circulating solutions.

ATOMIC COORDINATION IN SULPHIDES

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In sulphide minerals the coordination of the cations by the surrounding sulphur atoms generally conforms to the geometry of the electron orbitals of the cations, as deduced from orbital bonding theories. The coordination of the sulphur atoms by the cations, on the other hand, does not always conform to the geometry of the sulphur electron orbitals. Those sulphides exhibiting peculiar sulphur coordination appear to be generally characterized by relatively short metal-metal distances, which implies metallic bonding. When the directions of these metallic bonds are related to those of the metal-sulphur bonds, it is found that the former correspond closely to the directions of cation electron orbitals not used in metal-sulphur bonding. It is concluded, therefore, that the structural configurations of many of the transition metal sulphides can be attributed, in part, to metallic bonding.

THE VARIATION OF MAGNETITE-ULVÖSPINEL AND HEMATITE-ILMENITE COMPOSITIONS IN A DIFFERENTIATED ALKALINE INTRUSIVE

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Mount Johnson is a nearly circular pipe-like hypabyssal member of the Monteregian Alkaline Igneous Province. The intrusive is located in the eastern part of the province of Quebec, Canada.

The lithology varies gradationally and concentrically in plan; from a subvolcanic hawaiite in the center to a porphyritic nepheline syenite on the circumference.

The magnetite-ulvöspinel and ilmenite-hematite solid solution pairs existing in the intrusive are used to trace a change of oxygen partial pressure in the system during crystallization. The change in oxygen partial pressure appears to be controlled by some process similar to the buffer pair Ni-NiO used in experimental petrology. Proof of the oxidation of ulvöspinel to magnetite and ilmenite, suspected from experimental work reported by others, is given.

NATIVE ARSENIC IN NEWFOUNDLAND

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Native arsenic has been found in the Whalesback and Little Bay copper mines on the Springdale Peninsula, Newfoundland. The largest mass, 3 feet long and 2 inches thick, fills a fracture in an altered basic dyke on the 1500 level of the Little Bay mine. The host-rocks are Ordovician basic volcanics cut by numerous dykes.