ORIGIN OF THE GOLD AND SILVER IN THE GOLD DEPOSITS OF THE MEGUMA SERIES, NOVA SCOTIA

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The gold deposits of the Meguma Series of Nova Scotia are of the 'Bendigo type' and occur mainly in quartz saddle reefs, angulars, and veins on the crests and flanks of anticlines and synclines composed of slates, argillites, quartzites, and greywackes. Most of the deposits favour incompetent slate beds.

Geochemically the deposits represent major concentrations of SiO_2, Fe, S, As, Au, and Ag. A few, as at West Gore, are greatly enriched in antimony, and others contain tungsten combined as scheelite. The principal minerals are quartz, pyrite, and arsenopyrite, with minor amounts of chalcopyrite, galena, sphalerite, and scheelite. At West Gore, stibnite is abundant. Most of the gold and silver occur as the native gold-silver alloy. The average grade of the deposits mined to date is about 0.35 oz. Au/ton. The Au/Ag ratio of deposits varies considerably but generally falls in the range 4 to 20.

The slates and some of the quartzites and greywackes of the Meguma Series are greatly enriched in sulphur and arsenic, bound mainly in pyrite, arsenopyrite, and pyrrhotite. The slates tend to carry mainly pyrite and pyrrhotite; arsenopyrite is often concentrated in greywacke but also occurs in the slates. Some beds carry up to 3% sulphur and up to 2% arsenic along strike for distances measured in miles. Such an extensive distribution of sulphur and arsenic suggests that the two elements are of sedimentary origin, deposited in a reducing environment in the Meguma sea.

Sedimentary pyrite and arsenopyrite separated from the slates and quartzites are enriched in gold and silver. The pyrite in places averages 0.15 ppm Au and 1.2 ppm Ag; the arsenopyrite averages 2.0 ppm Au and 0.5 ppm Ag. There is a definite tendency for gold to follow arsenic and to be concentrated in arsenopyrite.

The research on the gold deposits to date suggests that the sulphide-bearing Meguma rocks are the source of the gold, silver, and arsenic. During their folding and metamorphism dilatant zones appeared on the crests of anticlines, along the limbs of the folds, in dragfolded slates, and in small angular faults and fractures. These constituted low chemical potential zones which drew in from the sedimentary country rocks—silica, sulphur, arsenic, iron, gold, silver and the other elements in the gold-quartz deposits.

NEW PALLADIUM MINERALS FROM NORIL'SK, WESTERN SIBERIA*

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MINERALS FROM THE DESOURDY QUARRY, MT. ST. HILAIRE, QUEBEC

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Seventy-nine positively identified and ten unknown minerals from the nepheline syenite at the Desourdy Quarry, Mt. St. Hilaire are briefly described. They are found (1) in veins showing no sign of alteration; (2) in highly altered veins; (3) in silicate vugs; (4) in carbonate vugs; (5) in inclusions type A (greyish green hornfels); (6) in inclusions type B (pectolite-calcite-amphibole association); and (7) in inclusions type C (calcite-vesuvianite-pyrite association).

X-ray and spectrographic data of the ten unknown minerals are given in the following table.

Mineral	Major elements	Space Group	Cell dimensions in Å	Strongest lines in Å/visual intensity
UK 4	Ca, Al, Mn, Mg, Be, Si	*P4/mmm*, ?	$a = 7.54$, $c = 7.31$	3.39/100, 3.32/70, 2.65/70, 5.32/45
UK 5	Si, Mn, Mg, Na, Ca, Fe	*C2/m*	$a = 14.256$, $b = 13.813$ $c = 7.804$, $\beta = 116°44'$	3.18/100, 2.59/100, 3.10/90, 6.98/80
UK 6	Y, Yb, Mn, Al, Si	Pseudocell *Pmmb*	$a = 13.980$, $b = 23.825$ $c = 2 \times 6.556$	2.87/100, 3.05/95, 6.99/80, 4.41/75
UK 12	Be, Fe, Al, Si			3.19/100, 3.51/90, 2.55/60, 4.34/40
UK 13	Si, Na, Zr			7.99/100, 9.04/80, 2.82/80, 3.57/75
UK 15	Na, Ca, K, Si	*Cmmm*	$a = 18.67$, $b = 18.74$ $c = 16.70$	8.36/100, 4.19/100, 5.58/100, 4.84/70
UK 17	Mn, Mg, Nb, Si, Be, Ti, Al			3.47/100, 2.87/50, 3.19/40, 2.60/40
UK 18	Mn, Mg, Nb, Be, Ti, Si			6.80/100, 13.86/90, 13.27/90, 6.68/90
UK 19	Mn, Mg, Na, Ti, Si			7.12/100, 3.29/70, 6.56/50, 3.19/45
UK 20	Na, Ca, Zr, Si			3.04/100, 5.29/85, 6.02/80, 3.17/70