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Article abstract

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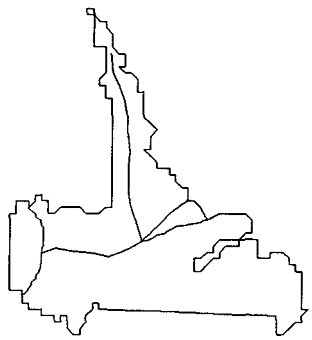

GEOLOGY OF LABRADOR

ABSTRACTS

FEBRUARY 16, 1990

CERR\DEPARTMENT OF EARTH SCIENCES
MEMORIAL UNIVERSITY OF NEWFOUNDLAND

The Centre for Earth Resources Research (CERR) in conjunction with the Labrador Section, Geological Survey Branch, Newfoundland Department of Mines and Energy held a one-day meeting on the Geology of Labrador on February 16, 1990. This session was part of the activities planned to celebrate the opening of the new Alexander Murray building.

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Quaternary geology and glacial history of Labrador: an overview

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This presentation focused on the Quaternary environment of Labrador, particularly as it applies to mineral exploration. Despite the long history of exploration in Labrador, real progress in understanding the glacial history has only occurred recently, largely as a result of the 1984-89 Canada-Newfoundland Mineral Development Agreement.

Much of Labrador has evidence for at least two phases of ice movement. These are probably related to shifting Late Wisconsinan dispersal centres. Towards the coast, ice movement was topographically controlled during late glacial stages. In the Melody Lake area, for instance, there is strong evidence for east-flowing valley glaciers post-dating northeast-flowing ice on surrounding highlands.

Glacial sediments are common. Till is generally thin, discontinous and of local provenance. Till characteristics are commonly related to the underlying bedrock. Glaciofluvial sands and gravels fill major valleys that were conduits for glacial meltwater or drainage channels for proglacial lakes. Below marine limit, which is up to about 130 m a.s.l., marine silts and clays are common.

The complex flow patterns and the variable sediment types with their individual geochemical characteristics mean that mineral exploration in drift covered areas of Labrador should undertake Quaternary orientation studies on the property level. Results should be assessed within the frameworks developed by regional Quaternary mapping to determine the most suitable exploration strategy.

The Fleming chert-breccia, Labrador Trough, Labrador

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The Fleming Formation of the Lower Proterozoic Kaniapiscau Supergroup of the Labrador Trough is composed of cherts, chert breccias, and chert-quartz sandstones. The strata of the Fleming Formation are poorly bedded to locally well bedded. The rocks of the Fleming Formation overlie a cherty phosphatic unit, traditionally considered part of the underlying dolomitic Denault Formation. The cherts and chert breccias of the Fleming Formation are primary silica precipitates from the Lower Proterozoic ocean, and are best considered as precursors to banded iron formations. Some links to evaporites are evident, although selective precipitation of silica rather than wholesale evaporation of solutes is a more likely mechanism to produce rocks such as those of the Fleming Formation. The chert-quartz sandstones with floating quartz clasts are penecontemporaneously reworked portions of the silica sequence.

U-Pb geochronology and the evolution of the Grenville Province of western Labrador

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The Grenville Province of western Labrador comprises the Lac Joseph Terrane (LJT) (dominated by two leucosome migmatites intruded by granite and gabbro), structurally underlain to the northwest by the Molson Lake Terrane (MLT) comprising only metaigneous rocks.

Monazite from both melt generations within LJT migmatites formed during leucosome crystallization between 1640-1600 Ma (Labradorian Orogeny); most zircon fractions from these melts show premetamorphic inheritance. However, zircons from shear zones within the migmatites are concordant around 1630 Ma, implying that shearing and the synkinematic mineral assemblage sillimanite-biotite-garnet within these shear zones, and by extension the same assemblage ubiquitous throughout the LJT migmatites outside the shear zones, must be of Labradorian age. Granites and gabbros within the LJT are also of Labradorian age. Although no U-Pb evidence was found to suggest that the LJT

experienced significant Grenvillian heating, foliated Grenville-age granitic dykes cross-cut migmatitic layering.

Granites within the adjacent MLT formed at about 1645 Ma and have therefore been correlated with the Trans Labrador Batholith. MLT gabbro of the Shabogamo Intrusive Suite crystallized at about 1429 Ma (zircon). New mineral growth and partial resetting of zircon in both MLT rock types indicate they were strongly affected during the Grenvillian Orogeny between about 1000-990 Ma.

Shear zones at the MLT-LJT boundary contain Grenville-age titanite and strongly reset zircon documenting Grenvillian shearing. The Labradorian LJT was therefore emplaced, with only minor structural reworking, during the Grenvillian Orogeny against the MLT while it was being deformed.

Geochemical and geophysical images of Labrador

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The use of high-resolution video display techniques for geophysical and geochemical data provides fresh insights into regional geology. The ability of these techniques to accentuate subtle spatial patterns and at the same time to encompass the broad scale of many geochemical and geophysical surveys gives a new and objective perspective on regional tectono-stratigraphic correlation.

Images are prepared from existing digital gravity data and National Geochemical Reconnaissance (NGR) data, obtained from the Geological Survey of Canada. The original site data, which have a uniform random distribution are interpolated to a regular grid. The gridded data are smoothed by the application of various filters, and linear features enhanced through the use of a technique to provide a shaded-relief effect on the final images. The new geological compilation map of Labrador has been digitized and is overlaid on the geophysical and geochemical images.

The resulting images reflect many of the main elements of bedrock geology. In several places, however, discontinuities in the geochemical or geophysical surfaces are not explained by near-surface geology, suggesting that they represent deeper basement features. These deep features may well have controlled the crustal evolution of Labrador, and the distribution of its mineral deposits.

Middle Proterozoic evolution of the eastern Grenville Province and Grenvillian-Sveconorwegian orogenesis

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There have been five principal developments in the understanding of the eastern Grenville Province in the last decade: (i) the recognition of a major magmatic and orogenic event between 1710 and 1620 Ma, that includes Trans-Labradorian magmatism and the Labradorian orogeny, (ii) greater knowledge of the extent of Middle Proterozoic anorogenic magmatism, (iii) the recognition of Grenvillian plutonism, (iv) the identification of distinct crustal segments (lithotectonic terranes) that achieved their final configuration during the Grenvillian orogeny, and (v) the refinement of Middle Proterozoic intercontinental correlations between Laurentia and Baltica, and the accompanying development of craton-scale tectonic models.

Although extending from 1710 Ma to 1620 Ma, the Labradorian orogeny culminated between 1680 and 1640 Ma, resulting in the formation of extensive new crust south of the previously stabilized Archean-Lower Proterozoic cratons. Large volumes of granitoid plutonic rocks and layered mafic to anorthositic intrusions were emplaced into widespread, dominantly pelitic metasedimentary rocks that were formed adjacent to an older cratonic margin to the north. All rocks were subsequently metamorphosed to high-grade assemblages during Labradorian orogenesis. The northern region of granitoid plutonism, marginal to and within the Grenville Province, has been referred to as the Trans-Labrador batholith, but plutonic rocks of similar age probably extend across much of the eastern Grenville Province. High precision U-Pb geochronology has suggested cycles of plutonism and orogenesis in eastern Labrador between 1680 and 1660 Ma, and between 1655 and 1630 Ma.

Middle Proterozoic anorogenic magmatism in eastern Canada was a period of massif-type anorthosite-granite emplacement, mafic sheet intrusion, felsic and peralkaline magmatism, mafic volcanism and associated terrestrial sedimentation, all of which are best displayed north of the Grenville Province. Representatives of these types of activity are also found within, or bordering the eastern Grenville Province, and include the following, (i) mafic sheets variously referred to as the Michael Gabbro (ca. 1426 Ma), Shabogamo Gabbro (>1379 Ma) and Mealy dykes (ca. 1380 Ma), (ii) intrusions (mainly felsic and peralkaline) of the Arc Lake, Arrowhead Lake and Upper North River plutons (1337 Ma, 1307 Ma and 1296 Ma, respectively) and Red Wine Intrusive Suite (ca. 1317 Ma) and compositionally similar volcanic rocks of the Letitia Lake Group (ca. 1327 Ma), (iii) volcanic and sedimentary rocks of the Seal Lake and Wakeham groups (ca. 1323 Ma and ca. 1271 Ma, respectively). The presence of these rocks emplaced within ca. 1650 Ma crust strengthens comparisons between eastern Laurentia, Baltica and mid-continental U. S. A.

From comparison with Baltica, it was predicted that, as mapping and geochronological studies extended knowledge of the interior eastern Grenville Province, evidence for plutonism of Grenvillian age would be found. Such plutonism is now known to be extensive in the eastern Grenville Province; 11 plutons, having ages between 1130 to 956 Ma, have been dated and many others can be readily interpreted from magnetic patterns, even in areas yet to be mapped.

A greater structural emphasis in mapping of the Grenville Province in the last decade has resulted in proposals for the existence of discrete terranes, identified by specific internal characteristics and bounded by zones of deformation. A gradation exists between the more northerly terranes (Groswater Bay, Lake Melville, Churchill Falls, Gagnon, Molson Lake) and the southerly terranes (Mealy Mountains, Hawke River, Wilson Lake, Lac Joseph), in that the northerly terranes experienced more severe Grenvillian deformation and metamorphism. This is interpreted to indicate overthrusting and burial of the northerly terranes by the more southerly terranes, which themselves escaped Grenvillian burial.

Continued investigations have affirmed Lower and Middle Proterozoic protolith correlations between Laurentia and Baltica. U-Pb geochronology has shown that parts of the Transscandinavian Granite-Porphyry belt are older than previously thought (ca. 1780 Ma rather than 1650 Ma) and similarly that some plutons previously regarded as Trans-Labradorian (ca. 1650 Ma) are now known to be post-Makkovikian (ca. 1800 Ma). In both the eastern Grenville Province and Sveconorwegian orogenic belt, the presence of widespread, newly-formed late Lower Proterozoic crust, intruded by later crustally-derived Middle Proterozoic anorogenic magmatic products has been demonstrated and the widespread existence of Grenvillian-age plutonism documented.

Mapping has provided geological evidence in support of proposals for Middle Proterozoic rotation of the Baltic Shield relative to North America. This evidence includes a distinct departure in structural and magnetic trends in easternmost Labrador from the remainder of the Grenville Province and evidence of southwest-directed uplift and thrusting of the Hawke River terrane onto more interior terranes in the eastern Grenville Province. A model of separation, combined with rotation, of the Baltic Shield to initiate intermittent Middle Proterozoic rifting/crustal thinning is developed further from published suggestions. The rotation of the Baltic Shield eventually led to progressive mutual collision along the (previous) southern sides of the North American and Baltic Shields (about an eastern Labrador pivot?) and caused a crustal pile-up where the Archean Superior Province bulges into the central Grenville Province (hence explaining the large negative gravity anomaly along the Grenville front in Quebec). By this model, the Grenville and Sveconorwegian fronts were sited over parts of the same tectonic margin during the first part of the Middle Proterozoic, but became opposing tectonic margins during Grenvillian orogenesis. Farther north, rotation of the Baltic Shield led to crustal 'tearing' between North America and the Baltic Shield, which, as it propagated south, led to the formation of Iapetus ocean.

Crustal evolution in the Makkovik Province of Labrador: evidence from geochemical and isotopic studies of plutonic rocks

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The regionally extensive plutonic rocks of the Early Proterozoic Makkovik Province are divisible into two broad groups, both of which can be correlated with volcanic sequences of similar age and affinity. The Makkovikian Assemblage is dominated by syn- and post-tectonic granitoid rocks of ca. 1800 Ma age, that probably represent a single magmatic pulse that outlasted final deformation associated with the Makkovikian orogeny. Distinctive post-tectonic granites of ca. 1720 Ma age are regarded as late Makkovikian intrusions of partly anorogenic character. Plutonic rocks of both age-groups are highly evolved, and have strong affinities with so-called "A-type" or "within-plate" granites. The less abundant Labradorian Assemblage is of ca. 1650 Ma age, and includes gabbro-diorite-monzonite-syenite suites, derived from mafic parent magmas, and a variety of leucocratic granites. The mafic rocks resemble high-K calc-alkaline to shoshonitic basalts. Labradorian granitoid rocks mostly lack the "A-type" affinity of their Makkovikian counterparts.

Makkovikian igneous suites display striking geographic variation in their initial Nd isotopic compositions, expressed as ε_{Nd}CHUR. In the West, negative ε values indicate ancient (probably Archean) crustal material in their sources, but they were not derived entirely from such material. In the east, positive ε_{Nd} values indicate juvenile, Proterozoic sources, and gneissic rocks representing possible basement have depleted-mantle model ages of ca. 2100 Ma. These contrasts define a fundamental subsurface boundary between the Archean Nain Craton and a younger (accreted?) Proterozoic crustal domain. Makkovikian magmas were probably produced via melting and assimilation of lower crustal rocks by anhydrous, hot, mantle-derived mafic magmas. This accompanied or followed accretion of the Proterozoic domain to the Archean craton, possibly in response to thermal insulation of hot mantle.

Labradorian igneous suites derived from mafic parental magmas have ε_{Nd} values significantly below postulated values for concurrent depleted mantle. This crustal component was possibly introduced directly to the mantle via subduction of continent-derived sediments, as invoked for modern arc magmas. They may therefore be a distal manifestation of northward-directed subduction within the area now represented by the Grenville Province. Some Labradorian granites, however, may have been drived by anatexis of slightly older Makkovikian materials.

It is unlikely that Makkovikian and Labradorian magmatic events are related to completely separate orogenic cycles separated by a rifting and spreading episode. An alternative model is that they represent two sequential stages in the long-term evolution of a single convergent plate boundary, perhaps analogous (in a general sense) to the Phanerozoic development of southern South America.

Evolution of the Proterozoic/Archaean boundary in northern Labrador: an example from the Saglek area

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In the Saglek Fiord area of northern Labrador, located along the eastern margin of an Early Proterozoic mobile belt adjacent to the Archean Nain Craton, two lithotectonic terranes metamorphosed to amphibolite to granulite facies have been identified. On the basis of lithological and structural linkages, Komaktorvik terrane is considered to be parautochthonous with respect to the Nain Craton, whereas Tasiuyak terrane may be allochthonous. Both terranes are characterized by subvertical foliations and subhorizontal lineations that developed in a major regional transcurrent shear zone with sinistral displacement that is exposed for a distance of approximately 1000 km in eastern Labrador and the adjacent Arctic Islands. This transcurrent shearing event, informally referred to as "Torngat orogeny" and not yet precisely dated, was associated with crustal thickening to approximately double normal thickness and was accompanied by substantial syn-metamorphic uplift during cooling.

A younger, structurally distinct event that resulted in a second episode of crustal thickening can also be recognized in the study area, where it is manifest by metamorphism and deformation of the Early Proterozoic Ramah Group and by east-directed folding and associated thrusting towards the Nain Craton, imbrication of the lithotectonic terranes and inversion of the metamorphic sequence occurred during Torngat orogeny.

The ages of the two events are not well established. An attempt to determine a minimum age for the transcurrent shearing event by $^{39}Ar/^{40}Ar$ dating of hornblende that defines the shear zone fabric in Komaktorvik terrane yielded ages of 1790-1760 Ma. These are interpreted to be the time, after the younger event, that the terrane was uplifted and cooled through the closure temperature for argon in the crystal lattice.

Rare metals (Y, Zi, Be, Nb, REE) in Labrador

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Recent studies of rare metal mineralization in the Strange Lake peralkaline granite and in the Letitia Lake area indicate that Labrador has a high potential for new rare metal deposit discoveries. Rare metal mineralization is closely associated with peralkaline granite and late-stage subvolcanic syenite stocks and the related near-vent peralkaline volcanic equivalents. Target units for new rare metal deposits include the Flowers River Igneous Suite, the Letitia Lake Group and the Red Wine Alkaline Suite. The mineralization is usually hosted by pegmatite-aplite veins or lenses, small incompatible element-rich stocks or incompatible element-rich volcanic rocks of limited extent.

Outline of the Grenville Province in Labrador

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The Grenville Province is composed of a large number of lithotectonic terranes that behave as coherent units during the Grenvillian Orogeny. These terranes can be grouped into longitudinal belts on the basis of their tectonic position in the Grenville orogen. Both terranes and belts are typically bounded by faults, most of which are gently-dipping ductile mylonite zones that can be inferred to have had a northwest-directed contractional sense of movement.

In Labrador and adjaent eastern Quebec, the tectonic foreland to the Grenville orogen is composed of units that vary in age from Archean to Middle Proterozoic. South of the Grenville Front, reworked extensions of these units comprise the Parautochthonous Belt of the Grenville orogen, which is also characterized by relatively HP-LT Grenvillian metamorphism and the absence of significant Grenvillian magmatism.

Tectonically overlying the Parautochthonous Belt along the Allochthon Boundary Thrust are terranes of the Allochthonous Polycyclic and Monocyclic belts. In Labrador the former is principally composed of high grade mignatitic gneiss terranes and plutonic complexes, including anorthosite-mangerite suites, all of which were variably affected by the Grenvillian Orogeny. In eastern Quebec, the Allochthonous Monocyclic Belt consists of the continentally-derived Wakeham Supergroup that was metamorphosed to greenschist facies during the Grenvillian Orogeny and achieved its present location as a result of southeast-directed extensional faulting. Both the Allochthonous Polycyclic and Monocyclic belts were cut by high-level Grenvillian granitoid plutons, that were emplaced through the assembled thrust stack.

The timing of Grenvillian metamorphism is not yet well known throughout the region, but may have spanned a period of more than 200 m.y. as terrane assembly took place across the orogen.

The Grenville front fold and thrust belt in western Labrador

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The Grenvillian Parautochthonous belt in southwestern Labrador forms the transition from the Superior foreland in the northwest to the high-grade polycyclic Allochthonous terranes in the southeast. It is a thin-skinned, foreland fold-and-thrust belt, with considerable basement involvement. Two terranes are distinguished in the belt. The Gagnon terrane in the west consists of metasedimentary rocks of the Lower Proterozoic Knob Lake Group and the Archean crystalline basement on which they were deposited. This terrane forms the southern extension of the Labrador Trough into the Grenville Province. It is separated from the overlying Molson Lake terrane to the east by a major ductile shear zone. The Molson Lake terrane is an igneous terrane, predominantly composed of granitoid rocks, interpreted to be the southwestern extension of the Trans-Labrador Batholith of Labradorian age, and gabbros of the Middle Proterozoic Shabogamo Intrusive suite. Northwest-directed thrusting resulted in intense telescoping of the crust during the Grenvillian Orogeny. The belt is underlain by an imbricate stack of thrust sheets that increase in size towards the southeast. Grenvillian metamorphic grade of the rocks increases both toward the structurally higher thrust sheets in the southeast, and also along the strike of the belt toward the southwest. It ranges from sub-greenschist facies in the north, at the Grenville Front, to upper amphibolite facies in the southeast, near the Molson Lake terrane.

Two phases of thrusting can be recognized in the belt. The older phase was restricted to relatively shallow crustal levels and affected mainly the metasedimentary rocks and the uppermost part of the underlying basement rocks. The second phase affected rocks at a much deeper level and resulted in the development of large basement thrust sheets. Deformation in the belt is dominated by ductile thrusting and folding, accompanied by the development of a penetrative foliation by plastic deformation mechanisms. This is in contrast to the generally brittle behavior of rocks in most well-known foreland thrust belts. The Grenvillian Parautochthonous belt may thus give insight into the mechanical processes that occur at the deep levels of younger fold and thrust belts.

The southeastern margin of Laurentia ca. 1.7 Ga: the case of the missing crust

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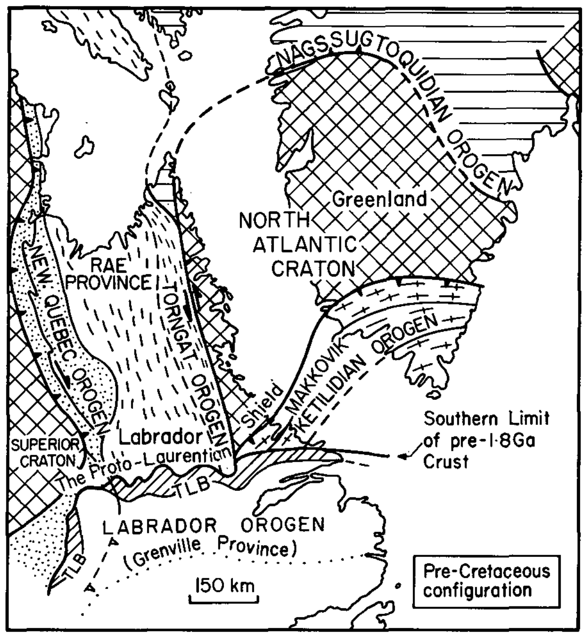
By 1.8 Ga the major part of the exposed Precambrian Shield had been assembled. The southeastern part of the shield, and its major orogenic components, are depicted at left. Subsequent crustal growth was restricted to the southeastern boundary of the shield commencing with massive accretion during the Labradorian Orogeny (1.70 - 1.63 Ga). The Labradorian suture, marked by the Trans-Labrador batholith (TLB), transects earlier orogenic trends; however, pre-1.8 Ga orogenic patterns suggest an original extent well to the south of their present limit. Structural and geophysical considerations indicate that this old crust is likely to underlie only the northern margin of the Labrador Orogen. What, therefore, happened to the remainder of the pre-1.8 Ga crust? Lack of mafic dyke swarms and related rocks of 1.8-1.7 Ga age discounts crustal rifting as a viable explanation. An alternative model may involve lateral transfer of crust by (Labradorian?) transcurrent shearing.



Metallogeny of the Labrador Central Mineral Belt

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The Labrador Central Mineral Belt consists of six Proterozoic supracrustal sequences: the Moran Lake, Lower Aillik, Upper Aillik, Bruce River, Letitia Lake and Seal Lake groups. These sequences range in age from ca. 2000 Ma to ca. 1300 Ma and occur in a 260 x 75 km area in central to coastal Labrador. Each sequence has a unique style and type of metallic mineralization. The Lower Aillik Group (>1860 Ma) hosts scattered U occurrences, including the Kitts Deposit, that have been described as syngenetic with host graphitic metasedimentary and mafic volcanic rocks. The Moran Lake Group (>1860 Ma) contains massive sulphide occurrences in basal shales, shear zone-hosted U occurrences in basalts, and epigenetic (Grenvillian) galena and sphalerite-bearing quartz-carbonate vein systems along the unconformity between this group and Archean basement granitoid rocks. Within the mainly felsic volcanic rocks of the 1860 Ma Upper Aillik Group there are two styles of U mineralization: one type was the product of synvolcanic leaching within the felsic volcanic pile, and the second resulted from post-tectonic (ca. 1650 Ma) granitic intrusions. There are also molybdenite, fluorite, and galena occurrences associated with the post-tectonic granites resembling porphyry systems. The 1650 Ma Bruce River Group contains a basal sedimentary sequence with strongly carbonatized U-bearing shear systems and an upper, mainly felsic, volcanic sequence also with U in shear zones. Both sequences contain Cu occurrences in late fault and fracture systems. The peralkaline felsic volcanic rocks of the 1327 Ma Letitia Lake Group contain syngenetic massive sulphide and epigenetic shear zone sulphide occurrences. Associated syenitic intrusions host Nb-Be and REE mineralized zones. The youngest supracrustal sequence (ca. 1300 Ma), the Seal Lake Group, hosts over 250 copper (with variable silver and molybdenum) epigenetic vein occurrences ranging from native copper in slates through chalcocite and bornite in diabase sills and basalt flows.

An overview of Labrador geology and metallogeny

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Labrador geology spans the geological time scale from earliest Archean (ca. 3.6 Ga) to the Tertiary; however, most of the terrestrial landmass is Precambrian (Archean to late Proterozoic). In the most fundamental tectonic subdivision, Labrador consists of the Archean Nain and Superior Structural provinces, the 2.1-1.8 Ga Churchill Province (Trans-Hudson Orogen) that separates the two Archean provinces in central Labrador, the Makkovik Province (ca. 2.0-1.8 Ga) that borders the southern edge of the Nain Province, and the northeast trending Grenville Province which truncates all of the earlier structural provinces. The Grenville Province experienced terminal deformation between 1.1 and 0.95 Ga. The Nain, Churchill and Grenville provinces were intruded by large bimodal anorthosite-granite massifs between 1.45 and 1.15 Ga. Granitoid rocks of the Trans-Labrador batholith (ca. 1.65 Ga) were intruded in the northeast-trending belt within what was to become the Grenville Province. Much of the crust to the south of the batholith was formed during the recently recognized Labradorian Orogeny between 1.7 and 1.63 Ga. This crust was subsequently reworked during the Grenvillian Orogeny. Following the Grenvillian Orogeny, southern Labrador was affected by crustal rifting (Lake Melville rift system) and basaltic dike intrusion (Long Range dykes), representing the distal effects of the opening of the Iapetus Ocean ca. 0.6 Ga. Cambro-Ordovician rocks along the Straits of Belle Isle form part of the western platform of this orogen. Mesozoic rocks are represented by Cretaceous talus deposits preserved within small grabens in western Labrador and scattered basaltic to lamprophryic (and Kimberlitic?) dikes and diatremes of Jurassic-Tertiary age found along the Labrador coast.

Archean mineralization is represented by Ni, minor PGE, and asbestos showings within the Florence Lake greenstone belt located in the southern part of the Nain Province. Aside from these occurrences, the mineral potential of other greenstone belts is basically unknown. The northermost exposures of the Nain Province contain a series of metamorphosed, layered, Archean anorthosite complexes that may be equivalent to the chromitiferous Fiskenaesset Complex of West Greenland. Gold mineralization has been reported from high-grade gneisses in the Superior Province in western Labrador-Quebec.

Proterozoic mineralization is represented by the iron deposits of western Labrador that occur within the Schefferville area of the Labrador Trough (Churchill Province). The Labrador Trough also contains Cu-Ni mineralization in interlayered mafic volcanic and turbiditic rocks. Ultramafic sills, intruded into this sequence in adjacent parts of Quebec, host Ni-PGE mineralization. The Lower Proterozoic Ramah Group of northern Labrador contains a stratiform pyrite horizon that may have potential for sedex deposits. The Makkovik Province contains the Proterozoic Kitts and Michelin uranium deposits along with occurrences, ranging from indications to prospects, of massive sulphides, base-precious metal veins, uranium, molybdenite and REE. The Trans-Labrador batholith is associated with the molybdenite occurrences and some of the uranium occurrences. Minor showings of base metals occur within the anorthosite massifs and associated layered gabbroic intrusions. These mafic plutonic rocks also have a relatively uninvestigated potential for PGE and Ti mineralization. In the Nain area, anorthosite is quarried as a source of labradorite. Proterozoic peralkaline intrusive suites contain rare-metal (including REE, Y, Zr, Be and Nb) deposits. The Grenville Province contains the world-class metamorphosed iron deposits of the Labrador City-Wabush area. In the same area there are also dolomite, graphite and silica deposits. Except for local pyritiferous horizons in pelitic gneiss, the remainder of the Grenville Province is not well endowed with mineralization. The diamond potential of the Mesozoic-Tertiary lamprophyres is unknown.