

SPECIAL ISSUE FOR **MINERAL RESOURCES REVIEW 2005**



Ramp Development, Aur Resources Inc., Duck Pond



Construction of Concentrator Building,
Aur Resources Inc., Duck Pond

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Department of Natural Resources, Mines Branch

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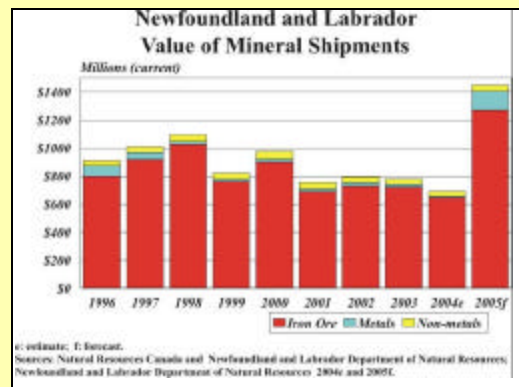
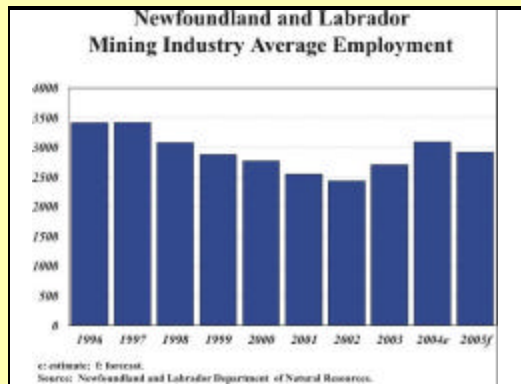
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MINERAL INDUSTRY UPDATE

The mineral industry in Newfoundland and Labrador contributes significantly to our economy and is one of the key activities that leads to economic growth and development in the province. In 2004, mining and exploration activity combined to provide \$350 million in GDP while generating an estimated 3,095 person years of employment. Employment increased from 2,704 person years in 2003 due to an increase in the number of people employed on the Voisey's Bay project. Employment in 2005 is forecast to be approximately 3,000.

The mining sector produces over a dozen mineral commodities that are sold in national and international markets while others are critical elements in the local construction industry. The total value of Newfoundland and Labrador's mineral shipments decreased from \$776 million in 2003 to approximately \$693 million in 2004, due mainly to labour disputes in the iron ore industry. The total value of mineral shipments in 2005 is forecast to almost double to \$1.4 billion as a result of an increase of over 70% in the price of iron ore.

Shipments of industrial minerals, or non-metals, increased from approximately \$36 million in 2003 to \$38 million in 2004. The forecast for industrial minerals in 2005 will see an increase to \$43 million due mainly to an increase in shipments of pyrophyllite, dimension stone, and dolomite.



During 2005, provincial mining companies plan to make capital investments in excess of \$500 million. These investments will contribute significantly to the economy of Newfoundland and Labrador in sustaining capital and new development through expenditures in business services, equipment and employment.

The exploration sector is the key to new mineral development in the province and benefits from exploration activities are realized throughout all of Newfoundland and Labrador. In 2005, mineral exploration expenditures are forecast to be \$40 million with \$27 million being invested in Labrador and \$13 million in Newfoundland. Of this \$40 million, 78.5% will be directed toward grassroots projects and 21.5% will be directed toward more advanced projects.

MINING SECTOR UPDATE

29TH ANNUAL REVIEW OF ACTIVITIES

DEPT. OF NATURAL RESOURCES, MINES BRANCH

Over the past 28 years, the Mines Branch of the Department of Natural Resources has presented its Review of Activities during the CIM Newfoundland and Labrador Branch's annual conference and trade show. With the theme of this year's conference being "Newfoundland and Labrador - Providing Rock Solid Opportunities," the department looks forward to updating the industry and general public on both the development of existing opportunities and exploration activities which are leading to potential new opportunities.

Frank Blackwood, Director Geological Survey

Mr. Blackwood will provide a review of the field and office-based projects of the provincial Geological Survey and the activities of the Geological Survey of Canada in the province during 2005. This will include an overview of some of the mineral-deposit research, bedrock mapping and geochemical studies conducted throughout this year.

Ken Andrews, Director Mineral Lands

Mr. Andrews' presentation will review the main statistical indicators and the more significant highlights in mineral exploration over the past year. The programs and accomplishments of the Mineral Lands Division will be briefly reviewed.

Permitting for mineral exploration is an important issue for the exploration sector. The presentation will review efforts to streamline and reduce the regulatory burden through the government wide red tape reduction initiative and developments with other government departments.

Charles Bown, Director Mineral Development

Mr. Bown will provide an overview of the Mineral Development Division's activities and highlight industry developments that have occurred over the past year.

As the Division responsible for implementation of the Mining Act, this presentation will review the activities which have been directed toward its implementation and identify the reporting requirements for existing and developing operations. In addition, this presentation will review some of the rehabilitated properties and conclude the talk with some of the proposed activities for the upcoming year.

DUCK POND PROJECT

Our Resources' Duck Pond project, located in central Newfoundland, contains a massive sulphide deposit containing proven and probable reserves of 4.1 million tonnes at an average grade of 3.3% copper, 5.7% zinc, with gold and silver credits.

The company is currently constructing mine facilities with the intention to operate at a capacity of 1,800 tonnes per day, producing an average of 41 million pounds of copper, 76 million pounds of zinc, 536,000 ounces of silver and 4,100 ounces of gold annually over an approximate seven-year mine life. In addition to the

reserves, there are 1.1 million tonnes of inferred resources that may be upgraded to reserves and mined, potentially adding an additional two years to the minelife.

The \$92 million capital development program commenced in January 2005 with a budget for 2005 of \$51.7 million. These expenditures include detailed engineering, site clearing and power line construction. To-date the portal and over 500 m of ramp has been completed and equipment procurement has advanced as scheduled.

The Duck Pond mine is scheduled to commence production in the fourth quarter of 2006, and once operational, employ approximately 190 people annually.



VOISEY'S BAY PROJECT

Throughout 2005 the Voisey's Bay project has continued to progress well and has attained several key milestones. Open pit mining from the ovoid has commenced and on September 15, 2005, Inco announced that it had produced first concentrate from the mill. Work at the Hydromet Demonstration Facility at Argentia remained on schedule, and handover of the facility to Voisey Bay Nickel Company's operating team took place on October 11, 2005.



Inco has reported that exploration activity is ongoing at Voisey's Bay and is producing results with "good potential." During August, Inco acquired mineral claims

covering approximately 172,000 hectares just south of the Voisey's Bay deposit and has stated its continued confidence in the exploration potential at Voisey's Bay. The company plans to continue drilling and exploring its Labrador properties.

The Inco Innovation Centre officially opened at Memorial University on September 20, 2005. The Centre houses research, business support and education facilities, as well as, the offices of the Canadian Research Chair in Aboriginal Studies and the Centre for Aboriginal Research.

MINERAL EXPLORATION HIGHLIGHTS

The number of claims staked in the province is forecast to be up by about 30% over 2004 and by year-end, 25,000 claims are expected to be recorded. This increase can be largely attributed to a renewed interest in nickel exploration and the continued search for uranium/iron ore in Labrador and to a lesser extent-base metals/gold on the Island.

In Labrador, the search for uranium in the Central Mineral Belt of Labrador is heating up. Aurora Energy Inc. has recently demonstrated that mineralization at the Michelin uranium deposit extends to greater depths than previously indicated. Future exploration by Aurora will attempt to increase the mineral resource at the Michelin deposit as well as test targets in other areas. Crosshair Mining and Exploration Corp. have just completed their airborne geophysical surveys and have discovered four new areas of bedrock mineralization. The Santoy Resources/Monster Copper Corp. joint venture has completed a prospect-

ing/mapping program in the Mustang lake area and have awarded a drill contract which is expected to commence shortly. Santoy will also drill its 100% owned Anomaly 7 property.

The recent staking of 6,884 claims by Inco Limited in the Garland Lake area has rekindled interest in nickel exploration in Labrador. Other companies active in the vicinity include; Celtic Minerals Ltd., Freeport Resources Corp. and Cornerstone Resources Inc. Other companies with active exploration programs for nickel in Labrador include: Altius Resources Inc./Teck Cominco, Nortec Ventures Corp. and Gallery Resources/ BHP Billiton.

New Millennium Capital Corp. continues to evaluate its LabMag iron-ore project in the Schefferville area of western Labrador. Diamond drilling and bulk sampling programs are in progress.

In Newfoundland, base metal exploration is once again on the upswing.

This is due in large part to the continued development of the Duck Pond copper-zinc mine and the encouraging results reported by Messina Minerals at the nearby Boomerang prospect. Recent encouraging copper-zinc results reported by Mountain Lake Resources Inc. from the Bobby's Pond prospect may add further momentum to exploration in the region.

Gold remains an active exploration target in central Newfoundland with significant diamond drilling campaigns launched by companies such as; Richmond Mines Inc., Kermod Resources Ltd., Crosshair Mining and Exploration Corp. and Rubicon Minerals Corporation.

Other commodities of interest on the Island include; uranium in the Rocky Brook and Burgeo areas, tungsten in the Grey River area and limestone/dolomite on the Port-au Port Peninsula.

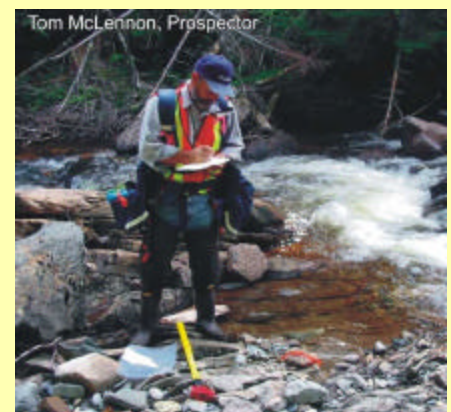
MINES BRANCH ACTIVITIES

THE MATTY MITCHELL PROSPECTORS RESOURCE ROOM

The Matty Mitchell Prospectors Resource Room (the Room) project, a private/public partnership, currently in its eighth year of operation, continues to supply mentoring, technical support and property promotional assistance to prospectors across the province. In 2005, the Room provided clients with on-site information and consultation services, including rock and mineral identification, help with data interpretation and presentation, and technical advice. Other clients were assisted via telephone or e-mail consults and through other efforts and initiatives. The current strength of the mineral exploration sector led to ever increasing demands on the Room's resources in 2005.

A major new public-outreach initiative was launched in 2005 to promote prospecting throughout the province. The Room partnered with the Newfoundland and Labrador Chamber of Mineral Resources to deliver a series of free prospecting workshops in regional centres across Newfoundland and Labrador. The initial round of seminars, delivered by geologists Nathaniel Noel and Larry Hicks, were well-attended. Preliminary discussions are ongoing to develop a second series of seminars and workshops that will target other rural areas.

The website was redeveloped this year and additions were made to the in-house document collections. Please drop by the Matty Mitchell Prospectors Resource Room to check out some of the newest additions to the rock and mineral collection in the newly housed Matty Mitchell Sample Library.



THE MINERAL INCENTIVE PROGRAM UPDATE 2005

The Mineral Incentive Program was approved again this year with a total budget of \$1,628,000 and consists of two components: Prospectors Assistance and Junior Exploration Assistance.

HIGHLIGHTS

The Prospectors Assistance budget is nearly fully-subscribed this year with a total of sixty-eight (68) grants being issued to local prospectors since April of this year.

A total of fifteen (15) grants have been awarded under the Junior Exploration Assistance. The program is fully subscribed and as was the case last year, there were more applications submitted than there were available funds.

PRORAM DESCRIPTION

The Prospectors Assistance supports resident prospectors through non-refundable grants of up to \$4,000 for a traditional, grass-roots prospecting on crown lands or lands staked in the prospectors name.



Altius Resources, Drilling on Rambler Property

The Junior Exploration Assistance supports independent junior exploration companies or individuals with non-refundable grants of up to \$100,000 for eligible exploration work on the Island and up to \$150,000 for eligible exploration work in Labrador on new and existing mineral targets. The funding is provided through a 50/50 cost sharing measure for exploration work.

As well, the Department of Natural Resources, jointly with the Bay St. George Campus of the College of the North Atlantic in Stephenville, held the annual 14-day Prospectors Training Course between May 30th and June 12th. A total of twenty-six (26) students were enrolled in the course this year with nearly half the students from Labrador. After completing this field-oriented training course, the local prospectors are eligible to apply for status as Genuine Prospectors which enable

them to stake up to thirty (30) claims per year without having to pay the \$50 deposit per claim.

TARGETED GEOSCIENCE INITIATIVE UPDATE

The Geological Survey of Canada (GSC), in partnership with the Geological Survey of Newfoundland and Labrador (GSNL), is endeavoring to stimulate sustainable mineral development in the province through the federal Targeted Geoscience Initiative program. The program's goal is to turn resource potential into new social and economic benefits by increasing private sector mineral exploration. The program began in 2000, and due to its success, participation will be continued in 2005. The federal government has approved funding at \$5-million per year for a new 5-year Targeted Geoscience Initiative in its 2005 budget. This new Initiative, as instructed in the federal budget document, will focus on geological mapping to promote the discovery of the new base metal reserves in established mining communities.

The GSC is undertaking a study by Dr. Neil Rogers on the volcanic rocks of the Buchans mining district, including the Buchans and Roberts Arm groups. GSNL is collaborating with a bedrock mapping project, carried out by Dr. Brian O'Brien, in the same belt of rocks. The province added an extra \$150,000 to the Geological Survey's budget in 2005-06 to facilitate this collaboration. In this province the Buchans - Roberts Arm belt is highly prospective for base metals and gold.

MINERAL RIGHTS ADMINISTRATION SYSTEM - MIRIAD

The province introduced its new Mineral Rights Administration System (MIRIAD) on February 28, 2005. To date, over 19,000 claims have been staked from many locations throughout the province, as well as, from locations across Canada; including British Columbia, Ontario, New Brunswick, and Nunavut.

Clients using of the system have made a number of suggestions for improvements to the online staking part of MIRIAD. These include: a) the option to increase the size of the staking screen, b) the option to input UTM coordinates and zoom directly to the area, c) the option to turn on the names of the claims holders d) and upon completion of a staking transaction, the option to return to either, 1) the last staked area, 2) the last map sheet 3) or to a new UTM coordinate location. It is anticipated that some of these suggestions will be implemented by the end of the calendar year. For further information please visit our website at: www.claimstaking.gov.nl.ca/

FEATURED ARTICLES

WHAT IS HYDROMET?

Since the signing of the Voisey's Bay Development Agreement, there has been a lot of discussion about hydrometallurgical processing technology, commonly referred to as hydromet. Not only has there been a lot of talk, but there has also been a lot of work completed toward proving this technology as a technically and economically feasible method of processing nickel concentrate from Voisey's Bay in Labrador. What you may not know is that the hydromet process is not a totally new technology and has been used for many years in processing metals such as zinc, copper and even nickel. However, what makes Voisey's Bay Nickel Company's (VBNC) hydromet process new is its ability to process concentrate directly into finished nickel without requiring the integration of any smelting process.



The most common question posed is, how does hydromet work? Finely ground concentrate is mixed with a water based solution within a pressurized vessel known as an autoclave. The chemical reaction will produce an impure solution of nickel, cobalt and copper which will pass through a number of purification steps to separate these valuable metals from the impurities. The nickel itself is recovered through electrolysis which will produce a high quality nickel product suitable for market.

Hydromet processing has the potential to generate significant advantages relative to traditional processing technologies. First, by processing concentrate into marketable nickel and eliminating the smelting process, a hydromet facility requires much less energy to operate due to the elimination of the huge furnaces required to roast ores. Second, waste products

produced by hydromet are in solid form which can be neutralized with lime and stored in an environmentally acceptable manner. Traditional smelting techniques produce harmful air emissions such as sulphur dioxide that are difficult to contain and a slag material which requires treatment and storage. Finally, hydromet generally recovers a higher percentage of metals from concentrate; in fact, VBNC is projecting a recovery rate of 95% for nickel and cobalt at the proposed hydromet commercial plant. Nickel recovered through traditional smelting can range from 90 - 95%, however, only about 50% of cobalt is recovered. By reducing energy demands and air emissions, while achieving higher recovery rates, hydromet processing technology has the potential to be both economically viable and more environmentally friendly.

As with any new technology, much research and development is required to fine tune an idea so that its practical application is achieved. In order to accomplish this, VBNC has utilized several development steps designed to contribute toward the successful application of the hydromet technology. The initial step was to prove that each chemical reaction generated the desired outcome; this was successfully completed on a laboratory scale. The second step was to construct a mini-pilot plant to integrate and test each of the individual chemical reactions as a continuous and interconnected

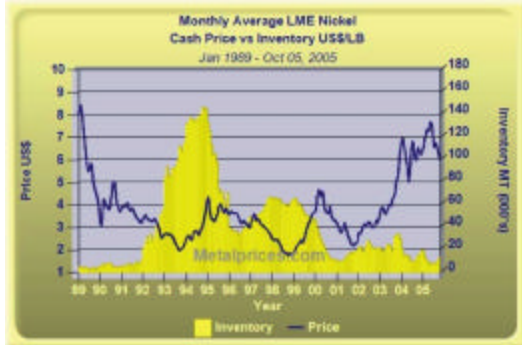


process. These tests were successfully completed in October 2004. The final phase of this research and development effort involves the construction and operation of a 1/100th scale demonstration facility at Argentia. The purpose of this facility is to prove out and fine tune all processing steps to confirm commercial viability and to assist with the selection of construction materials and equipment for the commercial plant. The demonstration facility will be ready to process concentrate by October, 2005, the same time as the first shipment of concentrate is scheduled to leave Voisey's Bay. If successful, VBNC will construct a commercial hydrometallurgical processing plant capable of processing 50,000 tonnes of finished nickel annually and employing approximately 400 people during operations.



REPORT ON NICKEL

The price of nickel has increased by approximately 200% since late 2001 climbing from a low of \$2US per pound to its current price of over \$6 per pound. During 2005, nickel remained above of \$7 for approximately four months and even closed just above \$8 for 2 days along the way. This is quite impressive for a metal that traded between \$2 - \$5 for the thirteen year period from 1990 to 2003.



Nickel's appreciation in price is the result of an interesting mix of both supply and demand factors transpiring to push nickel well beyond its long term analysis price of \$3 - \$4 per pound. Increasing global economic activity, especially from China, has resulted in increasing demand for nickel which is used in the production of stainless steel and products used in industries such as aerospace, oil and gas exploration, transportation and chemicals. Increasing demand has outpaced the actual additional supply of nickel available. This was facilitated by technical challenges that delayed several large scale projects expected to provide new low cost nickel during the late 1990's. The anticipated ore supply forecasted to result from the development of several Australian projects resulted in a number of mining companies not making the exploration investments required to maintain the development of new projects

required. As with many minerals, the lead time from discovery to actual mining can be 10 years, so it is only now that the implication of this period of low investment is felt in terms of the industry's lack of additional supply.

Nickel's outlook is bright with analysts projecting the metal to trade between \$5 - \$7 per pound for 2006 and \$4 - \$6 for 2007. This is despite decreasing stainless steel demand and new supply from projects such as Voisey's Bay, beginning this year, and Goro and Ravensthorpe, scheduled to start in 2007. The projected world nickel supply/demand balance is such that nickel is still projected to trade above prices used for long term analysis.

REPORT ON ZINC

The greatest use for zinc, (47%), is as a coating for iron and steel products to make them rust and corrosion resistant, while other important uses are in the manufacture of die-cast products and brass. Zinc is also used in the manufacture of batteries, rubber and as a pigment in white paint.



The production of zinc in Canada can be dated back to the early 1900's in British Columbia. Today, Canada's smelting capacity comes from four smelters located across the country, supplying 10% of the world's total supply. The majority of world's zinc comes from China which produce about 23% of worldwide production.

As seen in this chart, world zinc prices hit a 15 year low in 2002 due to oversupply. Reaction to the decline in prices has been small, high cost producers have been forced to either suspend production or close their operations, while larger diversified companies were able to withstand the problem.

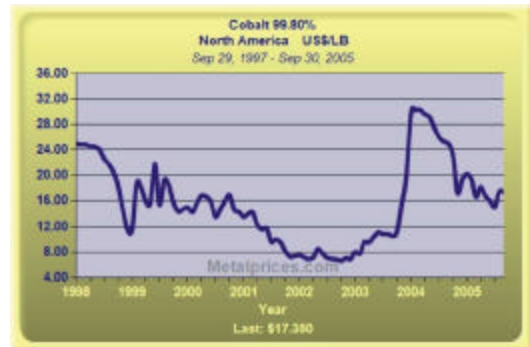
Recent high stock levels have left the zinc market exposed to uncertainty. With New Orleans warehouses holding about 44% of the total LME zinc stocks, the impact of Hurricane Katrina has impacted the availability of this inventory, and has pushed short term prices to a five month high.

Continued growth in the usage of refined zinc can be attributed to the increased use of galvanized steel in China where the demand for new infrastructure is growing. While China, the world's largest producer and consumer of refined zinc, continues to report increased demand commodity prices will remain strong.

Commodity prices are forecast to decline in 2005 to range from 50¢ to 61¢ per pound and in 2006 range from 61¢ to 64¢ per pound.

REPORT ON COBALT

Cobalt is a naturally occurring element found in rocks, soil, water, plants, and animals. There are non-radioactive and radioactive forms of cobalt. Non-radioactive cobalt, referred to as stable cobalt, is used to produce metal alloys. Cobalt compounds are also used to color glass, ceramics and paints, and used as a drier for porcelain enamel and paints.



Cobalt has been used to colour pottery and glass from at least 2600 BC and cobalt-containing glazes have been found in Egyptian tombs of that period. Chinese pottery from the Tang (600-900 AD) and Ming dynasties (1350-1650 AD) also contained blue colours made from cobalt-containing minerals. Today, cobalt has many uses including:

- superalloys for use in jet and rocket turbine engines.
- as an important ingredient in both Nickel-Metal-Hydride and Lithium Ion batteries used in cell phones and laptop computers.
- as a catalyst in plastic manufacturing and as a refinery catalyst to desulphur crude oil.
- as a magnetic alloy.
- additive in paints, varnishes and inks to control drying time.
- in cutting and wear-resistant alloys and coatings.
- in the adhesives that bind steel-belted radial tires.
- as a ground coat for porcelain enameling used on steel bathroom fixtures and large appliances.
- as a glass decolorizer and as an ingredient of colored pigments.
- cobalt salts are added to animal feeds to increase Vitamin B-12 production.
- cobalt alloys are also used extensively to make artificial body parts, such as hip and knee joints.

Cobalt has been historically produced as a byproduct of nickel or copper mining/refining with only about 5% of the world's supply sources from cobalt-only mines. This can contribute to large price fluctuations as evidenced by the included price graph. The United States is the world's largest consumer of cobalt but, currently, has no domestic mine or refinery production. To ensure an adequate supply for military, industrial, and essential civilian needs during a national emergency, cobalt metal is included in the U.S. National Defense Stockpile.

WHAT ARE INDUSTRIAL MINERALS?

Industrial minerals are usually defined as "any rock, mineral or other naturally occurring substance of economic value, exclusive of metallic ores and mineral fuels".

In this group, there are over 200 mineral commodities, which include bulk mineable products such as aggregates; and speciality minerals and materials such as decorative granite, silica and talc. This diverse range of mineral commodities are used for their inherent physical or chemical properties in a wide range of industrial and domestic applications. Some industrial minerals may have one or a few applications. Others, such as lime, have over 50 uses. Salt has more than 14,000 known uses.

Some of the common industrial minerals and their uses are provided in the table to the right.

Current industrial mineral producers in



Newfoundland and Labrador include: Atlantic Barite Limited, Atlantic Minerals Limited (dolomite, limestone); Galen Gypsum Mines Limited; Hi-Point Industries (1991) Limited (peat); Hurley Slate Works Company Inc.; Central Holdings Inc. dimension stone); Newfoundland Pyrophyllite; Shabogamo Mining & Exploration Limited (silica); and Torngait Ujaganniavingit Corporation (anorthosite - dimension stone). In addition, there are several hundred sand and gravel pits and dozens of crushed stone quarries in the province. The Department forecasts that in 2005, these operations will generate approximately 460 direct person years of employment, and mineral shipments valued at about \$43 million.

Industrial Mineral	Main Uses
Aggregates	Concrete, asphalt, ice control, road base, common fill
Barite	Heavy additive in oil-well mud, filler in rubber and paint, radiography
Dimension Stone	Building and decorative material, monuments
Dolomite	Metallurgical flux, water treatment, chemical manufacture, ceramics, fertilizer
Limestone	Cement, metallurgical flux, fillers in plastics and paints, agriculture uses
Gypsum	Wallboard, plaster, cement, agricultural uses
Peat	Soil improvement, absorb oil spills
Pyrophyllite	Ceramics, refractories, paint
Silica	Glass, metallurgical flux, refractories, silicon metal, fused silica, ferrosilicon

GEOLOGY AND BOTANY: THE ALPINE FLORA OF THE NAIN AREA

"Plant life exists by geological consent, subject to change without notice."

The above quote, a modification of a famous comment by American historian Will Durant (1885-1981) on the precarious tenure of civilization, is taken from a recently published (2002) book entitled "Geology and Plant Life: The Effects of Landforms and Rock Types on Plants" by Arthur Kruckeberg, emeritus professor of botany at the University of Washington. Botanists such as Dr. Kruckeberg, as well as avid home gardeners, are keenly aware of how soil composition and conditions govern the growth and proliferation of plants. It is my experience that many field geologists, who work with rocks and soils as part of their daily routine, are less so.

My interest in the Alpine flowers of northern Labrador was piqued some thirty years ago when I was working in the Torngat Mountains. Ever since, I have been photographically documenting many of these hardy little plants elsewhere, especially in the Nain area. At the outset I noticed that the chemical composition of the underlying rocks and the quality (porous, impermeable) of local gravel influenced plant habitats. The following few examples illustrate how plant life reflects its geological setting.



Photo 1. The livelong saxifrage (*Saxifraga paniculata*).

Rock-type control: From my first sighting, I have been particularly impressed by the tenacity of a beautiful little livelong saxifrage (*Saxifraga paniculata*). It preferably inhabits calcareous, or lime-rich, rocks such as limestones and marbles, doggedly clinging to small cracks and the overlying shallow soils. It somewhat resembles the common home garden plant referred to as hens-and-chicks. From small (2 to 5 cm) rosettes of pale green to gray-green, succulent-like, leaves rises a 10 to 15-cm stem having tiny flowers which have many red dots on their white petals. The serrated fringes of the leaves have white, sugar-like, encrustations from exuded calcium. Because this saxifrage is so characteristic of calcareous rocks on the plateau west of Nain (Photo 1), I used to refer to it colloquially as "the marble plant".

Bedrock control on plant habitat is also obvious on some of the islands east of Nain. At a few locations I have observed a tiny flowering plant called the birds-eye primrose (*Primula mistassinica*), growing in 1 to 2 m-wide fractures that mark the traces of fine-grained, granular, basaltic dykes within metamorphosed and deformed granitic rocks. The primrose is strikingly noticeable against the dark rock and soil in the fracture, displaying several pale purple-pink, flowers, having notched petals surrounding a yellow centre, atop 10 to 20-cm-tall stems rising from low rosettes of bright green leaves. The plant is completely absent from the abut-

ting granitic rocks. By contrast with the primrose, the common black crowberry (*Empetrum nigrum*) - the "blackberry" to many of us - has colonized both the granitic and the basaltic rocks.

Soil-type control: Barren hillsides having water seeps that promote localized soil saturation are home to the common butterwort (*Pinguicula vulgaris*) throughout the Nain region. The bright-purple flowers of this tiny insectivorous plant can be seen nodding atop 5 to 10-cm stems rising from a yellow-green, star-like array of ground-hugging sticky leaves that have curled edges. The cone- to tube-shaped flowers are generally inclined from the stem, and have a protruding lower lip. Close inspection of the leaves will usually show that the plant is doing its part to decrease the local population of tiny flying insects!

Regions where moisture retention is not the norm are home to some plants that flourish only under such porous soil conditions. The well-drained, sandy and cobbly, glacially derived soils of the wind-swept uplands proximal and west of Nain are, for example, hosts to a profuse growth of the pin-cushion-shaped Lapland diapensia (*Diapensia lapponica*). The dark green, leathery-leaf mounds and irregular low carpets of this hardy plant are generally less than 8 cm high and 50 cm in maximum spread, and support tiny, white, cup-shaped flowers on 2 - 5-cm stems. The diapensia's tap-root extends far below ground level to retrieve the moisture necessary to maintain its growth.



Photo 2. Moss campion (*Silene acaulis*).

Another mound- and cushion-forming species that prospers on well-drained soils, especially on sandy benches above the high-water mark on the archipelago east of Nain, is the moss campion (*Silene acaulis*). The tiny, somewhat fragrant, intense pink, flowers

covering the surface of these 2 - 5-cm-high plants (Photo 2) can be spotted along the terraces well before one gets close enough to positively identify the plant itself. Like diapensia, the moss campion depends on a deep tap root for anchoring and for seeking moisture.

These few examples described here help to illustrate, as portrayed by Arthur Kruckeberg, the intertwining of geology and plant life. As elsewhere, the flora of the Nain area serve to remind us that even though many living things can adjust to new surroundings, others are specifically adapted to thrive only in restricted habitats where their life-sustaining necessities are in the correct proportions to nourish them in these relatively "harsh" environments.

Bruce Ryan

"PROSPECTING IN THE BIG LAND"



A Labradorian, who has had an interest in prospecting in 'The Big Land', is Donald F. Blake Sr. who lives in North West River. Donald has been quite active prospecting for gold and base metal deposits in several areas of Labrador for the past 6 years.

He was born in North West River and completed high school at Lake Melville High School. Donald's work experience includes being a miner at several operations across Canada, along with being a driller/blaster, environmental, health and safety monitor and a project employment administrator on the Voisey's Bay Project. Donald has had an interest in rocks since childhood, and that interest has been with him ever since. His father, who was a prospector for sixteen years in

HISTORIC MINE SPOTLIGHT:

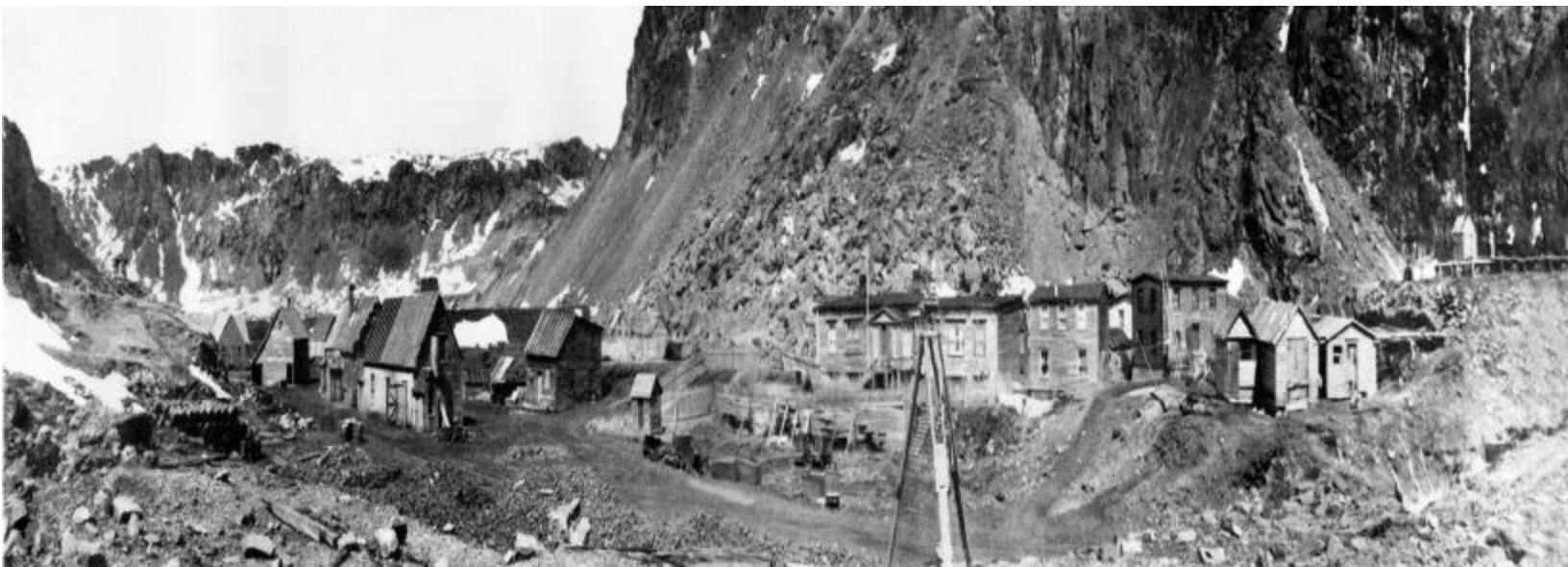
Twice in the last 120 years - from 1864 to 1917 and from 1957 to 1967 - the bustle of mining has disturbed the repose of Tilt Cove. This article will explore the story prior to confederation with Canada.

The traditional story tells that as Smith McKay explored the district in 1857, he met a fisherman from Tilt Cove, Isaac Winsor, and noticed that the man used a heavy metallic rock as boat ballast. Upon inquiry, Winsor showed him outcrops of copper-bearing rock in the steep cliffs surrounding Tilt Cove. Another story relates that McKay spotted samples of the copper-bearing rock on the mantelpiece of Winsor's home and was told that the cove was 'full of the stuff'. McKay left and, some years passed before he returned again. On his return he saw that the Tilt Cove copper deposits did indeed warrant development, and formed the Union Mining Company with Charles Bennett. On July 27th, 1864 the first blasts shook the west cliffs of Tilt Cove to herald the birth of the Union (West) mine. As with other early Newfoundland mines, the first Tilt Cove miners came from Cornwall. Mining techniques used in Tilt Cove closely resembled those of the Cornish mines and vessels waited at the pier to take the ore to the Swansea copper smelters in Wales. In 1870, Tilt Cove had the brief glory of providing 5% of the world's then minimal nickel production.

Once mining began, Tilt Cove turned into Newfoundland's first mining town with scores of neat white cottages blanketing the bowl-shaped cliffs around Winsor Lake. In 1869, the town's 300 miners supported its 768 inhabitants with salaries ranging from £10 to £21 per month. However, a grimmer side existed to the bleak and isolated aspect of Tilt Cove. On December 6th, 1867, the Queen of Swansea left St. John's for Tilt Cove with fifteen people aboard. Twelve miles from Tilt Cove, the ship ran aground off Gull Island. The survivors lit a fire and waited in vain for help to arrive. In desperation, they resorted to systematic cannibalism, the unlucky victims being chosen by drawn straws. These measures only postponed the death of all hands, and when fishermen visited Gull Island a year later they found little but bones and Felix Downsley's diary. Today, a monument to the Queen of Swansea sits atop the east cliffs of Tilt Cove.

During its first 16 years, the Tilt Cove mine owed much of its success to the energies of Smith McKay. He spent most of his time in Tilt Cove, which contributed to his being elected as the district's Member of the House of Assembly in 1869, 1873, 1882 and 1885. Charles Bennett, however, did not share the general enthusiasm of his partner, and early in 1877, differences arose between the two men and the partnership dissolved acrimoniously. McKay was banished and lost an ensuing legal battle and problems started to infect the mining operation.

The first hint of impending trouble came in 1882, when miners began to have problems excavating high-grade ore as demanded by the Swansea smelters. By 1886, Tilt Cove miners were hard put to remove additional high-grade ore without jeopardizing the soundness of the mine. This situation finally compelled the mine captain to open up a large orebody in the east side of Tilt Cove. The East mine ore averaged only 3 to 4% copper and was highly pyritic. Otherwise, it was plentiful and accessible enough to be quarried more cheaply and safely than the West mine ore. After Bennett's death, the Tilt



Labrador, worked for a number of exploration companies over the years, including Brinco. “I would guess that, in part, that has influenced my decision to take up prospecting more or less full time”, Donald says. “I’ve been beating on rocks for 5-6 years now”, he goes on to say.

“Mineral potential in Labrador is limitless. As you know, the vast majority of Labrador hasn’t even been explored for its mineral wealth. Having said that, Labrador is also a large and remote territory. Travel to the interior is pretty much limited to fixed wing or helicopter. That is expensive, thereby limiting access for the most part to exploration companies with substantial backing. This mode of travel is out of reach to independent prospectors such as myself and my prospecting partner, Richard Michelin”, says Donald.

Realizing that much of Labrador has only had limited mineral exploration and mineral prospecting activity, ‘The Big Land’ still has many mineral treasures just waiting to be discovered. Donald hopes that one day his prospecting activities will lead to the next Voisey’s Bay discovery.

TILT COVE MINE 1864 -1917

Cove Copper Company Limited (London, England) issued Bennett’s trustees a trust deed of 800 mortgage debentures worth £100 each in 1888, and in exchange leased the Tilt Cove mine property.

If the McKay years were the best ones of early Tilt Cove, the Tilt Cove Copper Company years were the worst. Upon assuming control of the property, the directors decided to smelt the pyritic ore on site rather than ship it to Swansea. This decision very nearly destroyed the entire Tilt Cove operation.

It was John Taylor, a principal director, who finally saved the company from complete ruin. In 1890, he arranged that the company sublease the mine to the Cape Copper Company Limited, a firm that he had formed in 1862. It is debatable that the Cape Copper Company could have saved the Tilt Cove Copper Company, had not dramatic changes happened simultaneously in the Swansea smelting industry and the United States abolished all tariffs on ores in 1894. This latter event opened the American market to the Tilt Cove copper, tariff free. With the beginning of the twentieth century, however, the era of prosperity ended. In 1902, the West Mine shut down, and by 1907 the East mine’s visible ore reserves were nearly depleted. The Tilt Cove Copper Company went into liquidation and in March 1914 returned the Tilt Cove mining lease to Bennett’s trustees.

It is a fact of the mining industry that what at one time may be an uneconomic deposit may later become economic, should the metal’s price increase sufficiently. At a shareholders meeting of the Cape Copper Company in 1913, the chairman announced that the Tilt Cove mine approached exhaustion. However, within two years of the company’s withdrawal from Tilt Cove, two Newfoundlanders Robert G. Rendell and James M. Jackman took over the mining operation and made \$150,000. The profit arose because the outbreak of World War I caused copper prices to more than double between 1914 and 1916.

Eventually the war proved their downfall, as freight rates escalated so much that they could not afford to ship the ore to market. They tried to overcome the freight-rate problem by treating the ore onsite by erecting an expensive concentrator, but two days after the plant’s installation in 1916, it broke down. Not wishing to continue the struggle, they sold the concentrator to a company in Bay Roberts and returned the mine to its trustees.

So ended the first active era of the Tilt Cove mines. The economic value was enormous to Newfoundland, roughly 61,000 tons of copper, 416 tons of nickel ore, 50,000 ounces of gold and 50,000 ounces of silver were produced by the mines during those 53 years. The Tilt Cove mines’ real significance lay in that their inception sparked the Notre Dame Bay copper boom - the very backbone of Newfoundland’s mining history

Story extracted from: Once Upon A Mine by Wendy Martin.



UPCOMING EVENTS

Mineral Exploration Roundup 2006
January 23 - 26, 2006
Vancouver, British Columbia
Contact: British Columbia &
Yukon Chamber of Mines
(604) 689-4800

PDAC 2006 International Convention,
Trade Show & Investors Exchange -
Mining Investment Show
March 5 - 8, 2006
Toronto, Ontario
Contact: PDAC (416) 362-1969

2006 CIM Mining Conference & Exhibition
Creating Value with Values
May 14 - 17, 2006
Vancouver, British Columbia
Contact: CIM 1-800-667-1246

GAC/MAC Annual Meeting
May 14 - 17, 2006
Montreal, Quebec
Contact: gacmac2006@uqam.ca

2006 Conference of Metallurgists
October 1 - 4, 2006
Montreal, Quebec
Contact: Gillian Jazar
(514) 939-2710, ext. 1329

MINES BRANCH KEY CONTACTS

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Deputy Minister.....(709) 729-2766
Assistant Deputy Minister.....(709) 729-2768

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Director, Mineral Development.... (709) 729-5851
Wabush Office..... (709) 282-3949

Director, Geological Survey..... (709) 729-2301
Goose Bay Office..... (709) 896-5162
Geoscience Publications and
Information.....(709) 729-3159

Home Page
<http://www.gov.nl.ca/mines&en/>

Information and statistics quoted are from data provided by government and /or industry publications:
for details, the reader should direct their enquiries to the Mineral Development Division of the Department of Natural Resources