

Ontario: an Overview

Mergers, discoveries and a new mine signal the dawn of a golden era

This report was researched and prepared by Global Business Reports (www.gbreports.com) for Engineering & Mining Journal. Editorial researched and written by Ben Cherrington, Elisa L. Iannacone and Sofia Messina. For more details, please contact info@gbreports.com.

On September 24th 2018, Barrick Gold and Randgold Resources announced agreement on a share-for-share merger valued at US\$6 billion, creating an industry-leading gold mammoth that will focus on assets in tier-one jurisdictions. This new incarnation of Barrick will own half of the world's top ten tier-one gold assets, and over 77 million ounces of proven and probable gold reserves.

One month before the Barrick-Randgold announcement, the Ontario junior community received news of Great Bear Resources' high-grade gold discovery at the Red Lake camp, which spurred its share price from C\$0.50 in August 2018 to over C\$3.30 a mere two months later. Michael White, president and CEO of IBK Capital, the investment banking firm that brokered a C\$10 million private placement for the Vancouver-based junior, cited the discovery and financial transaction as an example of market revival, reflecting: "The public markets for mining and metals have gone through a period of contraction, but we see that coming to end and heading into a bull market."



Hon. Greg Rickford, Minister of Energy, Northern Development and Mines, and Indigenous Affairs, Government of Ontario.

If the mergers and discoveries in Q3 2018 were early indicators of a new upturn in the gold sector, tangible evidence came in the form of Ontario's first new high-grade gold mine in ten years, as Harte Gold opened its Sugar Zone gold mine in Northern Ontario on October 24th. Stephen Roman, president and CEO of Harte Gold, suggested the opening of the Sugar Zone demonstrates that Northern Ontario is open for business: "We will revitalize the region and town of White River and employ hundreds of people," he stated.

A new provincial government focuses on collaboration

Kenora-Rainy River MPP, Greg Rickford, was sworn in on June 29th 2018 as the new Minister of Energy, Northern Development and Mines, and Indigenous Affairs in Premier Doug Ford's Progressive Conservative cabinet of the Ontario government. Under the previous Liberal government these three responsibilities had been divided between individual ministers, and this perceived downgrading ruffled some feathers. However, Chief RoseAnne Archibald, leader of the Chiefs of Ontario, voiced her support for the incumbent minister, declaring him to be, due to his experience working with northern communities, by far the best choice to work with the Indigenous Peoples of Ontario.

In his interview with Global Business Reports, Minister Rickford underlined his commitment to move forward with a resource revenue sharing program intended to help northern towns and Indigenous communities share in resource development. Sandra Gogal, partner at Miller Thomson LLP and expert in Aboriginal and environmental law, explained how the program can benefit communities and mining companies alike: "This pilot project would see governments sharing their mining tax revenues with affected First Nations, with the aim of encouraging mining development and alleviating the financial pressure on mining companies."

The theme of collaboration is also evident beyond the traditional dynamic of mining companies, governments and local communities, exemplified by the Pan-Canadian SMR (small modular reactor) roadmap being developed between the Ontario government, nuclear energy giants Bruce Power and Ontario Power Generation, along with other provinces, territories and power utilities from across Canada. "The realization of an SMR industry in Ontario will provide sustainable and reliable power to Ontario's remote communities and support vital industry that will create jobs and opportunities in the north," noted Minister Rickford.

A palpable sense of positivity has returned to Ontario, one of the preeminent global mining jurisdictions, as players from across the value chain prepare themselves for the next upswing. GBR has been on the ground talking to protagonists from across the breadth of Ontario's mining sector and the following pages examine and relate its hopes and concerns.

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The investment engine of global mining

Toronto is the financial heart of the mining industry, spearheaded by the Toronto Stock Exchange (TSX) and TSX Venture, which together accounted for 59% of all global mining financings in 2017. Almost 56 billion mining shares were traded in 2017, with a total value of C\$206 billion, and there was tangible evidence of renewed investor confidence, illustrated by one of the largest mining IPOs in TSX's 165 year-history, as Nexa Resources raised over C\$730 million in Q4.

There are currently four ways companies can list on the Toronto stock exchanges: Capital Pool Company programs (CPCs), IPOs, dual listings and reverse takeovers (RTOs). Since the introduction and success of the CPCs, the Special Purpose Acquisition Companies (SPACs) was introduced – the TSX version of the CPC shell concept.

The Capital Pool Company (CPC) program introduces experienced investors to entrepreneurs whose growth and development-stage companies require capital and public company management expertise. Different to a traditional IPO, the CPC program enables seasoned directors and officers to form a Capital Pool Company with no commercial operations and no assets other than cash, list it on TSX Venture Exchange, and raise capital. The CPC then uses these funds to seek out an investment opportunity in a growing business. Dean McPherson, head of business development and global mining at the TMX Group, expanded on the benefits of the CPCs: "The CPC program has been a huge success for TSX, with 2,464 created since the start of the program, 87% of which have completed qualifying transactions. Currently, we have 78 CPCs trading on TSXV."

Dean pointed to the qualifying transaction made by Brazilian based company Sigma Lithium in May 2018 as a recent example of this alternative way to list.

The return to dual listings was another indicator of the global upswing: "Companies listed on the LSE or the ASX are looking to our exchanges to access over US\$20 trillion in investor capital," continued McPherson. "The last time we saw any significant IPO activity was 2012, so there is a general enthusiasm returning to the marketplace."

The TSX and TSXV have been complemented by the rise of the Canadian Securities Exchange (CSE), which announced that the first half of 2018 was the strongest six-month

period in its history, with significant increases in number of listings, trading volume and value traded compared to the same period in 2017. By the end of August 2018, the CSE had reached just under C\$2 billion in issuer financing, with the mining sector accounting for the second largest number of new issuers, behind the booming cannabis space, according to Richard Carleton, CEO of the CSE.


In 2019, the CSE plans to introduce a blockchain clearing and settlement system that will provide listed companies a venue to list and trade tokenized securities. As transactions occur on the exchange, they will be cleared and settled instantaneously, solving one of the challenges for junior and mid-size companies in terms of the non-dilutive effect it will have for existing shareholders. Carleton explained: "This will mean dealers will not have to fund open-position during the settlement period that we currently have, which will reduce the friction that currently exists for companies paying dividends, royalty streams, splits or consolidation distributions to shareholders."

Canada's FTS (Flow-Through Share) program, introduced by the federal government in 1972, is a tax driven structure that allows an individual or corporation to invest in a Canadian exploration company and receive the tax benefit from those expenses being spent on the ground for exploration.

Financial services in the city

If the Toronto stock exchanges provide the platform for junior mining companies to raise capital, it is the financial service institutions in the city that orchestrate the transactions. Companies such as IBK Capital, Sprott Asset Management, Franco-Nevada, Dundee Corporation, and Mackie Research Capital, all headquartered in Toronto, provide the backbone of the financial district that anchors both the Canadian economy and the global mining industry.

Dundee Corporation is one of the heavyweights of international mining finance. Founded by Ned Goodman, one of Canada's most successful investment leaders, Dundee



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Mining 2.0: Sustainable Cash Flows Has New Meaning

By: **Dean McPherson**
Head, Business
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It is no secret that the end of the most recent mining cycle left the sector with a bruised reputation. Lower investment returns, combined with environmental concerns and substandard gender diversity practices, all served to feed negative public perception. On the heels of the commodities boom of the early 2000s, it could also be said that the sector was plagued by the irrational exuberance and hubris of the previous period.

As a result, the general sentiment was that many investors, millennials, in particular, were reluctant to invest in the sector.

Heading into 2018, stakeholders were in agreement: the mining industry needed to embrace progress and effect positive change to restore the image of the sector in the eyes of investors and the public. This year, we've made great progress on the road to recovery. In fact, I would say we're entering "Mining 2.0"; a new age of responsible and innovation-based mining, fueled by new sources of demand.

The Momentum Builds for "Mining 2.0" - Mining in 2018 and beyond

With the modern investor in mind, mining companies have taken necessary steps to evolve and align the mining sector with global trends; placing an increased focus on corporate social responsibility (CSR), gender diversity and innovation.

Organizations like Women Who Rock and Women in Mining are relentlessly advocating to increase and diversify the talent pool. Their grass-roots efforts are gaining widespread support from stakeholders and companies as women are encouraged to pursue leadership careers in the mining industry.

Innovation is a constant pursuit in any industry and mining is no exception. Companies are continuously seeking ways to optimize existing processes in order to deliver value to their bottom-line. Recent innovations include using drone technology to make aspects of exploration more efficient and utilizing new water-saving methods to process ore, as well as automation efforts in extraction and transportation.

Mining is the foundation of the future; infrastructure and technology advancements are possible because of mining. Like many aspects of modern society, the mining sector has undergone a reckoning and realised it can do better. There is potential for all stakeholders to benefit as the mining industry advances. It took a supercycle and a prolonged downcycle to create our own type of revolution; however, I think we can all agree the future is looking brighter with "Mining 2.0."

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has invested billions of dollars into the mining industry since being established in 1957. Jonathan Goodman, Dundee's current chairman and CEO, noted that as only around 25% of mines make money during a mining cycle, investors need to be selective and analyze a variety of factors and data to determine whether or not an investment opportunity is solid: "Many things go into a successful investment in the mining industry. It goes beyond just strong geology. Success in the mining industry requires synergies between engineering, design, development, construction and community relations."

In 2016, Shaun Usmar decided to leave his role as senior executive VP and chief financial officer at Barrick Gold and establish Triple Flag Mining Finance. Triple Flag's first deal was a C\$250 million silver streaming deal with Nexa Resources on its Cerro Lindo mine, followed by bilateral deals with Steppe Gold and Nevada Copper, and more recently a C\$200 million deal to acquire an extensive royalty portfolio from Centerra. When asked how Triple Flag has managed to compete with established players in the financial services sector, Shaun responded: "We have experience and knowledge within the mining industry, with a large and sophisticated financial backer (Elliot Management Corporation) that enables us to offer beneficial services at a competitive cost of funding to prospective partners."

Another new player making waves in the market is Cobalt 27, a company established with the aim of creating a platform that gives investors exposure to the electric vehicle (EV) space. After going public in June 2017, Cobalt 27 exercised 16 contracts and bought the world's largest physical position of cobalt outside of the Chinese government, worth over C\$300 million today. Since then, the business has evolved from a physical starting point into a royalty and streaming entity, highlighted by the C\$300 million deal which saw Cobalt 27 buy a percentage of the cobalt production from Vale's Voisey's Bay mine in Labrador.

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Jonathan Goodman, chairman and CEO, Dundee Corporation.

Justin Cochrane, president and COO of Cobalt 27, is bullish about the fundamentals of cobalt and nickel: "For the rapidly increasing EV market, three times the amount of cobalt will be needed to service demand. For nickel, the market will have to double in size. I believe that analysts tend to underestimate how quickly people move from one technology to another, and the industry is most definitely moving towards sustainable EVs," he stated.

As CEO of Victoria Gold, Chad Williams, founder and current CEO of Red Cloud Klondike Strike, felt that there was a distinct lack of strategic advisory services dedicated to mining from a financial standpoint. Since

its establishment in 2012, Red Cloud has helped over 400 mining companies raise funds, complete M&A transactions, and market assets, among a variety of other services dedicated solely to the mining industry. Despite entering the market at the start of a downturn, Red Cloud has increased its revenues by an average of 50% per year since its inception. Williams divulged one of the tactics that has been successful for Red Cloud: "We often take shares in the companies we provide services for as a form of compensation. This has been extremely lucrative, even in a challenging market," he explained.

Up in smoke: the legalization of cannabis

Despite the renewed sense of optimism surrounding the investment climate for mining, competition for funding has become fiercer than ever with the seismic impact of three new industries – cannabis, cryptocurrencies, and blockchain. Since cryptocurrencies peaked in January 2018, digital assets have crashed, losing around US\$600 billion in less than nine months. Cannabis, however, has gone from strength to strength, exemplified by the US\$3.8 billion investment made by Fortune 500 alcoholic beverage company Constellation Brands in Canadian cannabis company Canopy Growth in August 2018.

Canopy Growth, founded in 2014, already boasts a market cap comparable to Barrick, highlighting the scale of the impact the cannabis industry has made.

Executive vice president of IBK Capital, Adam Schatzker, while recognizing that these new industries have taken some of the risk capital out of the marketplace, sees the capital created by cannabis, cryptocurrencies and blockchain companies as an opportunity rather than a distraction: "Mining is notoriously cyclical and can actually benefit from the great wealth being created from these new industries... Years ago, the dot-com boom took investment away from the mining sector, which was later reinvested into juniors when equity metal market conditions improved."

Denis Frawley, founding partner of Toronto law firm Ormston List Frawley LLP, likened the cannabis boom to a magnet, pulling in capital, focus and talent. He suggested that rather than trying to compete with the momentum of this new industry, junior mining companies should present themselves as attractive options for the investment of the vast amount of new wealth being created, explaining: "Investors will want to diversify their holdings, and many of them here in Toronto have deep knowledge and expertise in the mining industry, so will be open to interesting opportunities."

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Mining players across the province extend mine-life through brownfield expansions



Harte Gold opens Ontario's first gold mine in ten years with premier Doug Ford. Photo courtesy of Stan Sudol (RepublicOfMining.com).

As the largest producer in Canada of gold, platinum group metals and nickel, as well as the second largest producer of copper, Ontario led all Canadian jurisdictions in mineral production in 2017. Political stability, mining tradition, infrastructure, proximity to the financial markets and the relative ease of finding skilled labor, all contribute to a favorable mining environment that ensures continuous production, regardless of the commodity cycle.

Nevertheless, high labor costs, social sensitivities and bureaucratic hurdles from a federal and provincial level make it challenging

to move projects forward and transition from exploration to production. Stephen Roman, chairman, president and CEO of Harte Gold, lamented the ever-increasing permitting requirements: "The new Ontario Mining Act of 2013 was a major blow to exploration and development due to punitive new rules. For instance, to permit our bulk sample took three years."


A dearth of new greenfield deposits in Canada, combined with the impact of the downcycle and mineral prices that have still yet to fully recover, has forced mining companies to focus on the development of brownfield projects. Glencore's Kidd operation in Timmins, the deepest base metal mine in the world with a maximum depth of almost 10,000 feet, celebrated its 50th year of production in 2016, and recently extended its life-of-mine (LOM) expectancy to early 2022. Glencore also announced it will move ahead with the C\$700-million Onaping Depth project in Sudbury, and expects to reach full production at the deposit, located 2,500 metres beneath the Craig mine in Onaping, by 2025.

In March 2018, Vale announced it will spend C\$760 million over the next four years to expand its historic Copper Cliff operation in Sudbury. With six mines, a mill, a smelter, a refinery and nearly 4,000 employees, Copper Cliff is one of the largest integrated mining complexes in the world. Vale says it is doubling its exploration budget in the Greater Sudbury Area to C\$42 million.

The changing footprint of Canadian diamonds

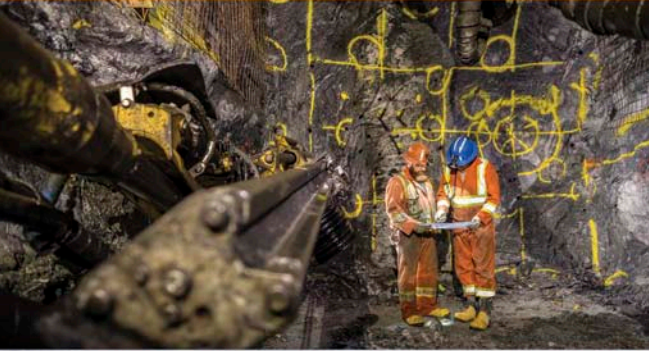
De Beers, the world's leading diamond company, 85%-owned by Anglo American, announced it will not extend the life of Ontario's first diamond mine, the Victor mine located in the James Bay Lowlands of northern Ontario. Mining and processing activities are due to be completed in Q1 2019, before moving into the formal closure phase. De Beers will have contributed C\$6.7 billion cumulative GDP impact for Ontario during the life of the Victor mine, according to Kim Truter, CEO of De Beers Canada. Reflecting on the legacy of the Victor mine, Truter noted: "The Victor mine has been a wonderful success story for De Beers, exceeding all expectations in terms of the life of the asset, the quality of the diamonds and revenue generated for all stakeholders."

To enhance its Canadian portfolio, De Beers acquired the Peregrine Diamond business in September 2018, which includes the Chidliak resource on Baffin Island and other assets in the North-



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west Territories. Initial engagement with the government and locals has begun, with the permitting and environmental baseline study phase to follow, which is expected to take two to three years to develop.

Mid-tiers add Ontario assets to their international portfolios

Over the past century, the Timmins area has produced more gold than any mining camp in Canada. McEwen Mining acquired the Black Fox project in Timmins in October 2017. Rob McEwen, chairman and CEO of McEwen Mining, expanded on the potential of the project, which sits on what is known as the 'Golden Highway': "Our 2018 Exploration budget at Black Fox is C\$15 million. To date, the drill results have been most encouraging. Not only have we identified numerous new zones of mineralization on the property, we are also seeing a continuation of the mineralization to depth in the mine. Our exploration program has increased our resource ounces and the grade."

One of the major success stories of recent years in the Ontario mining community is Alamos Gold, ranked in a recent BMO study as the second fastest growing gold producer in the world between 2014 and 2018. Formerly a single-asset producer from its Mulatos mine in Mexico, Alamos merged with AuRico Gold in April 2015, and acquired Richmond Mines for US\$630 million in November 2017, adding the Ontario mines Young-Davidson and Island Gold to its portfolio. John McCluskey, president and CEO of Alamos Gold, reflected on the enviable position the company has established: "We have a debt free balance sheet, a great pipeline of growth projects, and strong long-term production from our North American assets that has set us up to prosper when the cycle turns."

2018: the boom year for Palladium

Palladium is a precious metal with industrial qualities, so that 80% of its consumption is from the automotive industry. With demand being driven up by the move from diesel to petrol and hybrid vehicles, and producers in South Africa scaling down operations and announcing cutbacks due to the decreasing price of platinum, of which palladium is often a by-product, the price of palladium has more than doubled from its low of US\$473/oz in January 2016, to over US\$1,140/oz in October 2018.

North American Palladium (NAP) advertises itself as the only pure play palladium producer, after Stillwater Mining was bought out by Sibayne Gold. Re-capitalized in 2015 when Brookfield Asset Management (BAM)



Rob McEwen, chairman and CEO, McEwen Mining.

acquired 92% of the business, NAP is now focusing on its single producing asset, the Lac des Iles mine north of Thunder Bay, Ontario. The site is currently processing over 6,000 mt/d, with the intention to double capacity to 12,000 mt/d in 2019, and NAP has managed to reduce its underground mining costs to less than C\$40/mt delivered to surface. Jim Gallagher, president and CEO of NAP, revealed that the move to a variation of sub-level cave mining called sublevel shrinkage mining ('SLS') has been a catalyst for NAP's change in fortune: "Due to this change in method, we are now able to go back to the upper part of the mine which was historically



John McCluskey, president and CEO, Alamos Gold.

mined out, but now provides an economically viable resource."

Canada's newest gold mine

One of the companies to have made the transition from explorer to producer is Harte Gold, whose Sugar Zone property in White River Ontario was officially opened on October 24th 2018. Located between a number of other producing gold mines, including Barrick's Hemlo operation, the Sugar Zone asset is Ontario's first new high-grade gold mine in over ten years. Stephen Roman, chairman, president and CEO of Harte Gold, is in a confident mood: "When I took over, we had

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Stephen Roman, chairman, president and CEO of Harte Gold.

a market cap of C\$1 million. Now we have a C\$250 million market capitalization with strong growth potential."

The Harte Gold leadership team was joined by Ontario premier Doug Ford and the Minister of Energy, Northern Development and Mines, and Indigenous Affairs, Greg Rickford to cut the golden tape and officially open the mine that has been years in the making. Roman thanked the town of White River and the Netmizaaggamig Nishnaabeg and Biigtigong Nishnaabeg First Nations for their continued support, and spoke of how the Sugar Zone mine will revitalize the community in northwestern Ontario.

Exploration in Ontario: The hunt for the next world class deposit

As impending mine closures for the major players approach, the eyes of the junior community are widening with an acute sense that new greenfield projects of substantial proportions and quality will have to be found, or acquired, in the near future. In a tier one jurisdiction with little threat of political instability halting production, the prospect of a high-grade discovery in Ontario is tantalizing for all involved in the industry.

The Ring of Fire has yet to catch light, as the two proposed 300-km all-season roads necessary to access the remote Eagle's Nest project became caught up in lengthy First Nations consultation. However, a turning point came in 2017, as Noront Resources changed its approach, deciding to make the Indigenous peoples proponents of the access roads, enhancing their participation in the EA process. Regarding the construction timeline, Alan Coutts, CEO of Noront Resources, expects EA work on the roads to be completed by the beginning of 2020, with construction due to start immediately afterwards: "Construction will start on the Eagles Nest mine once the permitting process is finished and physical construction of the roads has begun," he said.



Michael White, President and CEO, IBK Capital.

A high-grade discovery at Red Lake

The Red Lake Gold Camp, northern Ontario, is home to Goldcorp's Red Lake mine, one of the largest gold camps in Canada and the world. It is also the location of a hive of exploration activity, as a variety of juniors jostle for a share of the spoils in a district that has produced over 29 million oz of gold since 1949.

Vancouver-based junior Great Bear Resources (GBR) caused a stir in the Canadian mining community in August 2018, when results of its high grade gold discovery at the Red Lake Camp announced intercepts of 26 g/mt over 16m, and 68 g/mt over 7m. Since the announcement of the drill results at the Dixie project hinge zone, GBR's share price rose from C\$0.50 to C\$1.80 in less than a month, reaching over C\$3.30 by mid-October 2018. Chris Taylor, GBR's director, president and CEO, commented on GBR's remarkable results: "Not one drill hole has failed to hit gold at the Dixie limb."

Toronto-based investment banking firm, IBK Capital, orchestrated a C\$10 million private placement for GBR on August 24th 2018, which included a C\$4.8 million investment from Rob McEwen. Michael White, president and CEO of IBK Capital, is bullish about the potential of the discovery: "A high-grade deposit of this size, concentrated in a near vertical shoot or hinge, is straightforward to mine, and such a discovery could easily trade through C\$1 billion dollars in value," he proclaimed.

The best place to find a new mine is in the shadow of an old one

Continuing the theme of juniors focusing exploration on gold-rich, past producing areas, Manitou Gold is also following the adage that 'the best place to find a new mine is in the shadow of an old mine'. Its acquisition of 25% of the Goudreau-Lochalsh deformation zone (GLDZ belt) came in two separate

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transactions: the purchase of four mining patents in 2017, consisting of over 160 acres of unexplored land adjacent to the past producing Edwards and Cline mines, followed by the purchase of Argo Gold's RockStar property, totalling in excess of 7,000 acres, in April 2018.

Pat Dubreuil, president of Manitou Gold, sees Alamos Gold's success in the GLDZ belt as an indication of the potential for world-class deposits there: "Alamos Gold's exploration activity is quickly proving up 2 million ounces of defined reserves in the area. They have been consistently producing 100,000 oz of gold per year and have become one of the lowest cost producers in Ontario."

Creating value through the project generator model

With mineral prices stuttering and a lack of capital flowing into the junior space, the traditional junior business model of raising money for drilling activities is increasingly spurned in preference of a project generator model. One such company is Noble Mineral Exploration (NME), holding the Project 81 property, consisting of over 79,000 hectares of mineral rights in the Timmins/Cochrane area of Northern Ontario, located only 3 km north of Glencore's famous Kidd Creek mine, which has produced over 150 million



Vance White, president and CEO, Noble Mineral Exploration.

tonnes since 1963. Due to the size of the land package NME owns, it has been able to develop its assets with strategic partners such as Spruce Ridge, MacDonald Mines, Orix Geoscience, CGG Geoscience and BECI Exploration Consulting. Vance White, president and CEO of NME, expanded on the type of mineralization in the vicinity of Project 81, and its potential: "These very large VMS (volcanogenic massive sulfide) deposits occur in clusters which lend themselves to the opportunity for satellite deposits, and these satellite deposits could host between 30 million and 50 million tonnes, with an institutional value of well over C\$1 billion."

Canadian exploration beyond Ontario

Toronto is renowned for the global reach of its mining industry, but is also home to a number of junior companies with operations in other Canadian provinces. Some of the provinces outside of Ontario, while serving up logistical challenges, offer the benefit of under-explored land that often comes at a cheaper premium.

In late 2016, Black Widow Resources rebranded to BWR Exploration, shifting its attention away from Ring of Fire targets in Ontario and towards the Little Stull Lake gold project in Manitoba, which was acquired from Puma Exploration. Neil Novak, president and CEO of BWR Exploration, expanded on the reasoning behind the change of direction: "We targeted projects that have historical resources on them and that needed further exploration to bring them along the exploration cycle from historical resource to a maiden compliant resource."

Novak, whose previous company Spider Resources was dubbed the spark that lit the Ring of Fire, intends to prove this area of NE Manitoba, adjacent to the Ontario border, is an emerging gold camp of high potential: "The aim is to work over a few years with definition and delineation drilling to approach the 1 million-ounce range," he said.

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Ontario mining's international footprint

Canada is home to 75% of the world's mining companies, many of which will never have an operation in the country. The TSX and TSXV, financial cornerstones of the mining industry, support a network of junior and mid-tier mining companies plying their trade in over 100 jurisdictions worldwide. Attracted by underexplored regions with high-grade mineralization and lower wage costs, Toronto is home to a plethora of companies attempting to reap the benefits and navigate the challenges that mining in foreign jurisdictions present.

Dundee Precious Metals (DPM), with current operations in Namibia and Bulgaria, and exploration in Armenia, Bulgaria and Serbia, epitomizes the global reach of mining companies based in Toronto. Rick Howes, president and CEO of DPM, adheres to a philosophy that respects cultural nuances when operating in foreign jurisdictions: "Whenever you operate abroad, it is important to remember you are a guest in that country. We must be respectful of culture and traditions, without imposing foreign ways of doing business."

Praising the transparency of the Namibian government and the support it has given its mining industry by creating a regulatory framework that works for the sector, Howes suggested that modern mining practices can sometimes be applied with more ease in less developed jurisdictions: "The countries DPM operates in are sometimes more open to adopting Industry 4.0 mechanisms than some of the more established Western countries. Governments are open to new technolo-



Rick Howes, president and CEO, Dundee Precious Metals.

gies and want to increase social responsibility," he affirmed.

Also headquartered in Toronto with assets in Africa is Teranga Gold, the largest commercial producer of gold in Senegal. Two years ago, Teranga Gold was operating in a single jurisdiction with a single asset, but through the acquisition of Gryphon Minerals it brought in three projects in Burkina Faso, and three joint ventures: one in Burkina Faso and two in Côte d'Ivoire, which enhanced Teranga Gold's West-African pipeline. Richard Young, Teranga's president and CEO, detailed how an organic growth pipeline will significantly increase its production: "Teranga Gold aims to expand its production capability from 200,000 oz of gold per year, to 350,000 oz by 2020, and to more than 500,000 oz within the next five years."



Richard Young, president and CEO, Teranga Gold.

The Sabodala region in Senegal where Teranga Gold operates was one of the poorest areas in the country a decade ago, but recent government surveys show that today the area is one of the healthiest. Young attributes this success to an approach that has seen Teranga invest in youth education and training, local economic development, infrastructure, food safety and nutrition issues within the communities since 2010: "Most CSR programs in the industry are top down, but Teranga Gold implemented a bottom up approach. The local communities establish the priorities and develop the programs," he said.

The rise of mining in Mongolia

Mining in Mongolia accounts for over 10% of its GDP, half of its industrial production, and 40% of export earnings. The Oyu Tolgoi

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mining project, a JV between Turquoise Hill Resources (a majority-owned subsidiary of Rio Tinto) and the Mongolian Government, is the largest financial undertaking in Mongolia's history. A Foreign Investment Promotion and Protection Agreement (FIPA) was signed between Canada and Mongolia in September 2016, and in 2017, Mongolian private company Steppe Gold, with head offices in Toronto and Ulaanbaatar, was the first company to sign an MOU with the government for their Gold-2 program.

Founded in 2016, Steppe Gold acquired the ATO project from Centerra Gold, with the intention to grow the company through other acquisitions. In May 2018, Steppe Gold went public and raised C\$25 million with an IPO on the main board of the TSX. Aneel Waraich, director and executive president of Steppe Gold, expanded on its immediate priorities: "The aim is to have the mine fully built and start production by H1 2019. The ATO project will provide an estimated 37,000 oz AuEq/year, at US\$333/oz cash costs from oxides."

When asked about Steppe Gold's longer-term ambitions, Aneel declared: "To become Mongolia's largest mid-tier gold and mineral producer."

Canada's influence in Latin America

In Latin America, Canadian miners are the most influential foreign group within the region's mining sector. Supported by bilateral trade agreements, institutions such as chambers of commerce, and a shared deep-rooted mining tradition, many of the mining producers and junior explorers active in Latin America are headquartered in Canada's two major mining hubs – Toronto and Vancouver.

One of the Toronto-based companies enjoying success in Latin America is Torex Gold Resources (TGR), which came into production in 2016 with an US\$800 million investment. TGR is the 100% owner of the More-



Fred Stanford, president and CEO, Torex Gold Resources.



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los gold property, an area of 29,000 hectares in the Guerrero Gold Belt, located 180 km southwest of Mexico City. In April 2018, TGR overcame an illegal blockade at their El Limón Guajes (ELG) mining complex that had lasted six months. Crediting the resistance of the local community that rallied against the blockaders, Fred Stanford, president and CEO of TGR, elaborated on one of the biggest challenges faced by Mexican miners: “Blockades such as this shut down Mexican mines for up to ten years. However, we were up and running again in 10 weeks, and still continued partial operations despite the blockade.”

TGR is developing its own innovative solutions to drive down costs and increase efficiency at its ELG operation. These include a 1.3 km long conveyor belt which generates its own energy, the Calix Filtration Plant – the biggest filtration plant in the world which uses dry stack calix, and Muckahi mining technology, which Fred Stanford has been developing for years, and Torex Gold will be testing in Q1 2019. The Muckahi monorail conveyor system utilizes a slusher and transports the ore body continuously, requiring a drift half the size of the large trucks currently in use. Stanford believes the Muckahi technology is a game-changing innovation that can dramatically improve productivity: “The aim is to reduce the time necessary for the mining and transportation of the ore body to one third of the current time,” he stated.

Of all the Latin American countries, Chile perhaps is the most mature mining jurisdiction, accounting for around 40% of the world’s total copper mine capacity. Toronto-based junior Chilean Metals has a dual focus, with assets in Chile and Nova Scotia. While appearing to be a curious combination at first, Terry Lynch, chairman and CEO of Chilean Metals, compared the geology of the two locations at either end of the Americas, as they both sit on continental shelf plates. Chilean Metals sold its Copaquire project to Teck for C\$3 million in 2015, keeping a 3% royalty, which Lynch believes, considering the scale of Teck’s nearby Quebrada Blanca operation, has the potential to finance his company moving forward: “Cash-flow from that will be useful to fund future exploration for Chilean Metals and provide dividends to its shareholders.”

Ecuador: the new hotspot of world mining

For many years, Ecuador remained relatively underexplored, particularly in comparison to its Andean neighbour, Peru. However, the Ecuadorian government has started to support its burgeoning mining sector with gradual improvements to the fiscal policy to attract direct investment, culminating in the complete removal of the windfall tax in August 2018. The government has also decreased royalties on mining projects and granted automatic approval of up to 40 exploration drill pads for any new mineral concessions issued. Glenn Mullan, president of PDAC, noted how Ecuador has garnered the attention of the global mining community: “At PDAC 2018, a day was dedicated to presentations on Ecuadorian geological case studies, showcasing the potential of the region to significant foreign investors.”

Christian Kargl-Simard, president, director and CEO of Adventus Zinc Corporation (AZC), was given a global mandate to find the next world-class base metal deposit, with a particular focus on zinc. Backed by two major royalty companies and two private equity groups, AZC spent one year looking extensively at over 220 zinc related opportunities globally, which was whittled down to a shortlist of six opportunities. Of these six projects, AZC executed on its Ecuadorian target, the high-grade copper-gold-zinc Curipamba project, in partnership with Salazar Resources, providing AZC with first-mover advantage in Ecuador for making new discoveries. “We strongly believe that the best bang-for-your-buck in exploration right now is in Ecuador,” declared Kargl-Simard, before expanding on the reasoning behind investing in the Curipamba project: “The Curipamba project

fits all of our M&A objectives. We were looking for an existing 10 million tonne resource that was already economic and with the potential to at least double in size. In addition, the transaction structure supports a rate of return (ROR) much greater than 15% with long-term prices, including the cost to acquire the asset," he said.

Few junior companies can claim to have a background as intriguing as Aurania Resources. While researching the historical archives of the Ecuadorian gold mining industry in the late 1990s, Keith Barron, Aurania's founder and CEO, found documentation that proved the existence of the gold producing mines, Logroño de los Caballeros and Sevilla del Oro, that are now lost somewhere in the Cordillera de Cutucu. Years later, in the Vatican library, he found descriptions from 1627 of how to get to the lost city of Sevilla del Oro.

Barron has a history of success in Ecuador, having co-founded Aurelian Resources in 2001, which made the Fruta del Norte gold discovery in 2006 that was sold to Kinross Gold in 2008 for C\$1.2 billion. He insists that Aurania's Lost Cities project is not a treasure hunt, but the story of a respected management team with world class discoveries already under their belts: "We are conducting a methodical and logical exploration project and we use modern

geological, geochemical and geophysical exploration techniques in a geographical area of high discovery potential," affirmed Barron.

Toachi Mining was founded by industry heavyweights Laurie Curtis and Jonathan Goodman, who created the company from the restructuring of Ferrum Americas Mining when the opportunity to invest in the La Plata project in Ecuador was identified. Alain Bureau, president and CEO of Toachi Mining, likened La Plata, a polymetallic VMS (volcanogenic massive sulphide) project to Agnico Eagle's flagship LaRonde mine in northwestern Quebec.

Praising the Ecuadorian governments' introduction of fast-forward permits for Scout drilling, Bureau continued: "A streamlined permitting process is particularly vital for junior companies, who cannot afford to lose momentum."

Mine the mines abroad, mine the markets in Canada

When Superior Gold purchased the Plutonic Gold operation in Western Australia for US\$30 million from Northern Star in 2016, its leadership team and investors were delighted with the transaction, considering the infrastructure there today would have a replacement value of approximately US\$2.5 billion, according to Superior Gold's CEO,

Chris Bradbrook. Having produced more than 5.5 million oz of gold since 1990, the Plutonic Gold mine is the sixth largest historical producer of gold in Western Australia, and has provided Superior Gold with an impressive cash flow since being acquired in 2016: "Up until the end of Q2 2018, Plutonic has generated over US\$34 million for Superior Gold in terms of cash flow from operations," said Bradbrook.

Asked to elaborate on the reasoning behind a mining company with assets in Australia being headquartered in Toronto, Bradbrook responded: "Superior Gold's immediate strategy is simple: mine the mine in Australia, and mine the market in North America."

Closer to home, Peloton Minerals is focused on three Carlin-style exploration targets in Elko County, Nevada. The targets are located on the same trend as the Long Canyon project, acquired by Newmont for US\$2.3 billion, and Ted Ellwood, president & CEO of Peloton Minerals, believes the area has the district-scale potential: "We strongly believe there is a gold trend of significance there, and the Nevada Geological Society supported this idea at their symposium in 2015."

Kinross Gold has entered into a joint venture agreement with Peloton Minerals to explore its Independence Valley project, and the drilling program is expected to start in 2019.

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Disrupting the Industry

The innovations changing the way we mine

On September 12th 2018, Barrick Gold announced it will eliminate the executive role of Chief Innovation Officer as part of a broad decentralization push. Whilst adding that it will continue to work on innovation, this news is in line with the trend of major mining companies opting to rely on the service industry for the development and provision of new technology.

In the face of stiff competition for funding from the cannabis industry, and with commodity prices suffering, mining companies have had to look for innovative new methods to drive down costs and increase productivity. The epicenter of this wave of innovation can be found in the small mining town of Sudbury, Northern Ontario. World-renowned as the service and supply hub of Ontario mining, Sudbury is also home to a plethora of SMEs and organizations spearheading a technological revolution that is changing the way we mine.

A trip to the NORCAT Underground Centre at the Fecunis mine in Onaping, Ontario,

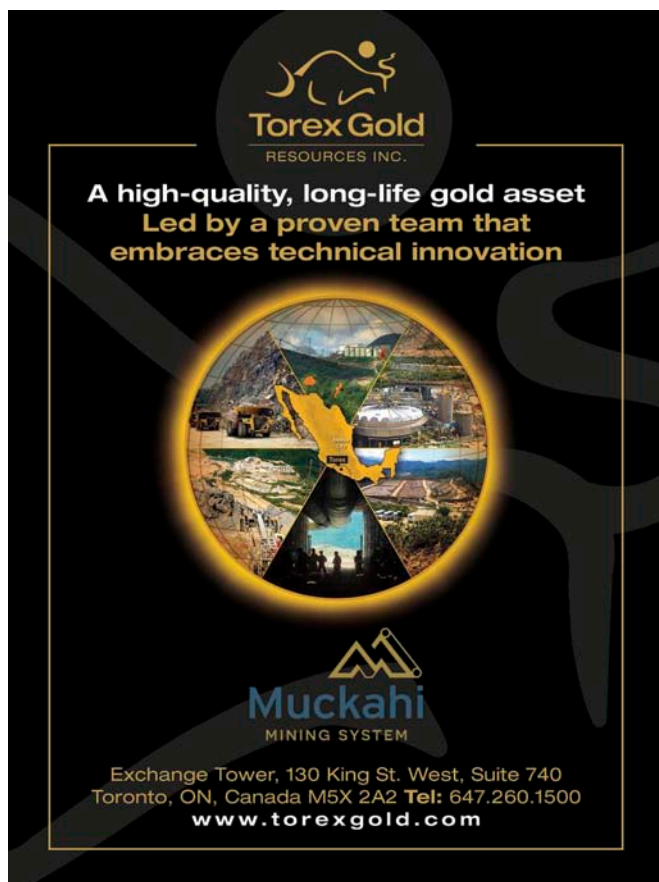
allows visitors a snapshot of the future, nurturing a robust innovation ecosystem that supports approximately 60 mining technology projects per year. "NORCAT is the only non-profit regional innovation center in the world that has an operating mine designed to enable start-ups, SMEs, and international companies to develop, test, and showcase new and innovative technologies in an operating mine environment," commented Don Duval, CEO of NORCAT.

One of the mining tech companies to have tested its products at the NORCAT Underground Centre is Maestro Digital Mine, who provide a complete automation network backbone and rugged IoT devices for underground mines. "Recognizing the industry's growing demand for data, and the challenges that many of our customers encountered with connecting ventilation solutions to their networks, we identified a gap in the market," said Michael Gribbons, co-founder of Maestro.

Creators of the Plexus PowerNet, the world's first powered coaxial Gigabit network,

Maestro Digital Mine have installed products in over 100 mines globally. Acknowledging that it has taken time to educate the mining community, Gribbons has noticed an acceleration in the uptake of digital connectivity solutions in the last twelve months: "Five or six years ago, companies did not put gas sensors in the mines, whereas today it is commonplace," he stated, continuing: "This momentum will continue to gain traction with the growing need for mining companies to reduce costs and become more productive."

Centric Mining Systems provides enterprise solutions software to mining companies worldwide, with offices in Sudbury and Perth, Australia. Recognizing that automated systems and technologies need to work in unison, Centric's technology unifies data streams into a single view and uses analytics and predictive analytics to interpret data. Utilizing WipWare fragmentation data, integrated with power consumption and recovery data from the mill, Centric has created an AI system then generates workable scenarios



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Wray Carvelas, CEO and executive director, DRA Global.



Justin Taylor, president, Halyard.

of information. Chris Novak, CEO of Centric, explained: “We discovered that we could tune the drill and blast processes to optimize power usage in the mill and recovery, all based on fragmentation. By taking those four verticals: drill and blast, fragmentation, milling and grinding, and recovery at the processing plant, we could generate entirely new answers.”

Another company investing in innovation to drive down costs is global consulting firm SRK, which recently acquired Sudbury-based mine simulation company, Labrecque Technologies. Gary Poxleitner, SRK’s principal mining engineer, explained how this partnership can help customers visualize mining operations and plan accordingly: “Once a mine has been designed, Labrecque Technologies’ software simulates processes that help clients accurately predict mine production and work out how best to equip their operations to maximize profitability.”

Fortifying the foundations: The EPCM companies building the mines of the future

The lack of new projects during the downturn forced engineering firms to reevaluate their approach, downsize, merge and innovate to enhance their capabilities and become leaner, more agile entities. However, the challenging conditions did not mean doom and gloom for all companies, as a broad spectrum of EPCM players from blue chip multi-nationals to new players in the market proved that adversity can create its own set of opportunities.

Multi-disciplinary EPCM group DRA Global has established itself as a credible and more agile alternative to the blue-chip engineering and project delivery companies, according to Wray Carvelas, DRA’s CEO and executive director. Since 2016, acquisitions such as the Met-Chem business in Montreal and more recently Perth-based engineering company, Minnovo,

have strengthened DRA Global’s platform in francophone Canada, francophone Africa and Australia, enhancing its open-pit mining capabilities. It has also allowed DRA to re-domicile its corporate holding company to Perth, in a strategic move to extend client-facing capabilities to ASX clients, complementing the Toronto and Montreal offices, which cater to TSX clients.

DRA offers the full life-cycle of services to its clients – from concept study through to commercial operation. Against this backdrop, it is advancing towards the digital mine: “DRA Global is investing in the transition towards predictive maintenance and prescriptive optimization of mine facilities, the backbone of which is MOMS (Mine Operations Management System), which is being used successfully across a number our operations,” explained Carvelas.

Another South African to have made a positive impact on the Ontario mining industry is Justin Taylor, president of engineering firm Halyard, who established the Toronto-based company in 2012 to focus on smaller, fast-tracked projects. Halyard has grown from one employee to a workforce of 22 people in its six years since creation, having worked for mining companies such as Harte Gold, Alamos Gold, Hudson Bay Minerals, Canada Fluorspar, LNS Greenland, Coeur Silver Tip, Dominion Diamond, Stornoway Diamonds and Agnico Eagle. Halyard won the EPCM contract for Harte Gold’s Sugar Zone property, Ontario’s newest gold mine, a fast-tracked project that took 15 months from beginning to completion. Since then, based on the delivery success of the initial project, Halyard has been asked to be involved in the expansion of the Sugar Zone mine. Taylor elaborated on the agility that Halyard can offer its clients: “We believe the large EPCM firms struggle to deliver smaller capital projects (below C\$60m) in a fast-track and efficient manner and this is the space we operate in.”

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Cementation, recipients of the gold award in the Mining and Natural Resources category as one of Canada's Safest Employers for 2017, has developed a culture that permeates through the organization, assured Roy Slack, president of Cementation Canada. Slack recognizes that innovation is more than just a cost saving measure: "When you talk about innovation, it is not necessarily automation, but different processes that take people away from the face or away from the hazards is the next step from a safety standpoint, through remote operation and the development of processes."

Engineering giant Jacobs acquired CH2M Hill for US\$3.27 billion in December 2017, and has seen double-digit pro forma revenue and profit growth since the merger came into effect. In September 2018, it was announced that Sirius Potash will continue to move forward with their Wilton project, and Jacobs was awarded the material handling facility (MHF) construction contract, with construction due to start by Spring 2019. Jeremy Okolisian, VP of business development for the Americas for Jacobs MM&T (Mining Minerals & Technology) division, intends to leverage the experience of Jacobs Connected Enterprise (JCE) in sectors such as aerospace, to provide innovative solutions to the mining industry: "We want to adapt and bring these technologies into the mining sector, particularly in the areas of automation, control systems, monitoring and cyber security," he said.

OEMs making the transition from diesel power to battery electric vehicles

In a similar vein to the automotive industry, mining equipment is rapidly making the transition from diesel-powered machinery to battery electric vehicles (BEVs). Increasing global emissions standards, the heightened awareness of the threat Nano diesel particulate matter (nDPM) poses to mine worker's health, in addition to the economic and safety benefits electrical equipment provides, are all factors contributing to an industry-wide push to electrify mining.

In February 2018, Sudbury-based RDH Mining Equipment was acquired by SMT Scharf AG from Hamm, Germany, subsequently creating RDH-Scharf. Gustavo Portalier, CEO and MD of RDH-Scharf, accredits the Canadian-German alliance for enlarging the company's global footprint and potential to take on more projects, as well as increasing its product line. RDH-Scharf is extending its regional targets by introducing battery technology with CODELCO in Chile, and Gustavo insists that the adoption of BEVs must

be a wholesale change: "There is no point in having one battery-operated machine when there are another ten working with diesel in the same project. This is a change that must happen from the start," he reflected.

Another OEM to undergo significant structural changes recently is global giant Epiroc, which listed on the Stockholm Stock Exchange as a separate entity to Atlas Copco on June 18th 2018. Epiroc collaborates with customers in more than 150 countries, had revenues of US\$3.7 billion in 2017, and employs more than 13,000 professionals globally. Epiroc has already achieved over 50,000 hours of automation and interoperability – the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged – in Canada to date. Jason Smith, general manager of Epiroc Canada, hopes to see the introduction of Epiroc's second generation of BEVs in Canada in 2019. Regarding their development timeline, Smith commented: "The first prototypes of the generation 2.0 BEVs are expected to be coming off our production lines in Q4 2018, with trials beginning in Europe together with our development mining partner."

The services that support the industry

Since winning a five-year contract with Vale in 2015, Sudbury-based NATT Safety Services has focused on providing the full safety package as a turnkey operation – supplying rescue teams, developing rescue plans, performing hazard assessments and providing training. Mark Arnold, general manager of NATT Safety Service, divulged on the philosophy driving business growth: "We take care of our client's health and safety, so they can focus on their core business," he declared.

The mining industry contributes to over 30% of all business for Golder Associates, which provides consulting, design, and construction services in earth, environment, and related areas of energy. As mining companies become more aware of water management issues across the entire mine site, and energy reduction becomes an increasing priority, David Brown, principal of Golder's mine environment division, commented on Golder's intention to expand its presence in Ontario and across Canada: "We are starting to see upticks in the market and thus we are also in the process of attaining more staff to meet the industry demands," he said, continuing: "We would like to expand our integrated mine water management and treatment, and climate change and carbon emission reduction services."

Conclusion: navigating the impending upturn

The preeminent tier-one jurisdiction positions itself for success

Mineral exploration expenditures in Ontario are forecast to be C\$593 million in 2018 – a projected increase of 13% from 2017, and an indication that Ontario's mining industry is at the beginning of an upward curve. However, the necessity to fully embrace new technologies instead of passively awaiting them, and the challenge of attracting and retaining the requisite talent to support an industry on the rise, will have to be addressed.

Recruitment: the scramble for talent and push for diversity

Even during the downturn, from the end of the 'super cycle' in 2012 until early 2017, there were over 1,000 unfilled jobs in Canadian mining operations as the sector struggled to attract quality talent regardless of the commodity cycle, according to Chris Stafford, president of executive search company C.J. Stafford & Associates. Stafford has been recruiting for the mining industry since 1981, and warned that the mining sector recovery, in the wake of retiring baby boomers, will pose a new set of challenges: "Mining Industry Human Resources Council (MiHR) predicts that over the next 10 years, 88,000 new workers will be needed to make up for 50,000 retirement exits, alongside other shortages."

Stafford went on to note that the MiHR prediction was merely the baseline estimate, and considering current industry trends and forecasts, in an expansionary economic sce-

nario, that figure could rise to 130,000: "The shortage is real and will continue to plague the industry unless it broadens its scope for hiring," he said, suggesting that mining companies should embrace diversity, and spend more time with schools garnering the interest of students early in their education, as Cominco had previously practiced to great effect.

The Canadian Institute of Mining's (CIM) initiative, Mining 4 Society (M4S), was put in place to enhance awareness of mining and increase mineral literacy. CIM president elect, Roy Slack, emphasized the importance of nurturing a better public understanding of the sector: "Mining is essential for the quality of life we have today and our industry has made advances in terms of safety, environmental stewardship and working with Indigenous peoples."

Cambrian College's Mining Engineering Technology (MNTY) program is grooming the next generation of miners. INCO and Falconbridge were founding partners of Cambrian College 50 years ago, and the institution continues to work closely with mining industry partners, particularly through its applied research division, Cambrian Innovates. Shawn Poland, vice president of Cambrian College, explained how SMEs can benefit from Cambrian's R&D resources: "The companies working with us will still hold their IP, and look to us for real-world, real-time solutions for the challenges they are facing."

Innovation in a traditional industry: how Ontario can lead the way

Doug Morrison, CEO of CEMI, Centre for Excellence in Mining Innovation and UDMN, Ultra-Deep Mining Network, believes that, for the industry to fulfill its potential, it must first change its approach: "The most valuable asset that we have is time and the mining industry squanders a great deal of it," he stated. "It is essential that we adopt a systems approach to innovation if we are to make the transition from batch processes to continuous processes."

Vic Pakalnis, the CEO of MIRARCO playing an integral role in the cross-sector pollination between the nuclear energy and mining industries, expressed a mood of renewed optimism: "The last five years in the industry were the worst I have ever witnessed in my 40-year career, but the times are finally turning. The sector is adopting sophisticated new technologies from alternate verticals to increase safety, productivity, and sustainability."

Ontario has nurtured a vibrant ecosystem of innovation spearheading change. The wheels are in motion as the industry moves towards a more efficient, modern mining culture that breeds greater safety and productivity. As the march towards digitalized and autonomous mining gathers pace, Ontario has positioned itself at the forefront of mining innovation.



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