



# HEAVY METAL

## EARTH'S MINERALS AND THE FUTURE OF SUSTAINABLE SOCIETIES

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# Indigenous Mining: Ancient Wisdom and Modern Practice

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*Melanie Mackay*

As the sky settles in the warm glow of the autumn twilight, a family settles down after a satisfying dinner of roasted venison and root vegetables. The lighting around them takes on the flickering glow of the fire as the children slowly get ready for bed. One family member, an artist, settles close enough to the fire to work by its soft light, gently sanding a piece of jade, smoothing the bumps and ridges. The jade will eventually be fashioned into a chisel meant for woodworking and carving. As it slowly takes form in the dancing light of the fire, the jade reflects different shades of green, from chartreuse to mint to emerald.

In another village, by a similar firelight, a mother cradles her crying daughter as she applies a healing clay ointment to a cut on the child's arm. Time and time again, the clay has proven itself useful in healing cuts and wounds. As a child, the mother applied the clay ointment to many of her own cuts and scrapes. Her mother, the child's grandmother, also used it as a medicine to help her ailing stomach. As the clay is applied to the child's cut, her cries stop, and she soon falls asleep in the loving arms of her mother.

One might imagine that the scenes above are set in the Middle Ages, somewhere in Europe perhaps, or maybe Asia. In fact, they represent people who lived many thousands of years ago on the lands that we now call British Columbia, Canada. The scenes describe First Nations using minerals for sanding and carving, and for medicinal purposes. They provide a glimpse into the deep connection of Indigenous peoples with Earth's resources.

Over the past two centuries, Indigenous knowledge of Earth's resources has been marginalized in colonial societies. Today's students in Earth sciences and mining learn their subjects through a distinctly European lens, with a focus on published scholarly works. In the Western scientific tradition, the Danish geologist Nicolas Steno (1638–86) is famous for his studies in the 1600s dating rock layers, while James Hutton (1726–97), a Scottish naturalist, is known as the 'father of geology' for his work observing rocks in the 1700s. And in the early nineteenth century, the English engineer and geologist, William Smith (1769–1839), produced the world's first modern geological map, depicting the distribution of surface and subsurface rocks (and coal) across the British Isles. Smith's efforts were the subject of Simon Winchester's 2001 book, *The Map that Changed the World*.<sup>1</sup> This book, along with many other written works and maps, have shaped Western concepts of geology and mineral resources. They do not, however, tell the whole story.

**T**raditionally, Indigenous knowledge and science were verbally passed down from generation to generation over thousands of years, leaving no written record behind for the future. This oral tradition sits alongside another form of Indigenous knowledge that is inherent within the individual, and not explicit, measurable or recordable. These Indigenous philosophies interweave the spiritual, the natural and the self into a holistic worldview where the emotional, spiritual, cognitive and physical cannot be separated.<sup>2</sup> With the arrival of European colonial powers, the production and intergenerational transmission of explicit and inherent Indigenous knowledge was gravely threatened.

In Canada, it is thought that between 225,000 and 375,000 Indigenous peoples died because of European colonization. Some estimates are as high as 1.9 million. In North, Central and South America, it is estimated that more than fifty million Indigenous people (about 90% of the existing population) died after the arrival of Europeans in 1492. This ‘Great Dying’ of Indigenous people had a significant effect on land use and forest cover. As the population plunged, lands were abandoned, and the pre-existing vegetation grew back, creating a natural carbon sink that contributed to a decrease in atmospheric carbon dioxide (CO<sub>2</sub>) associated with the so-called Little Ice Age.<sup>3</sup> Beyond its profound social and ecological impacts, the catastrophic effects of colonialism on First Nations in the Americas (and globally) also led to the loss of invaluable scientific knowledge recorded in the minds of Indigenous peoples. This lost knowledge encapsulated Earth history over thousands of years, passed on across countless generations.

Several examples serve to illustrate Indigenous knowledge in the context of Earth’s mineral resources. In the scenes depicted above, the artist sanding jade by the firelight uses a rock type known as schist, which contains the silicon-containing mineral garnet. Garnet provides an abrasive texture that is well suited to sanding and polishing. Today, garnets are used in sandpaper and industrial sandblasting. The jade being fashioned into a chisel does not break apart easily, making it well suited as a cutting surface. Evidence for the use of garnets and jade was discovered at an archaeological site of an ancient Stó:lō Nation village in the upper Fraser Valley in British Columbia, which was occupied between 2,500 and 2,000 years ago. Even earlier evidence of jade and garnet use in Indigenous cultures comes from creation stories that pre-date many archeological sites.

The mother tending to her child represents the Heiltsuk Nation on the central coast of British Columbia. The ‘healing clay’ she used was deposited during the Last Ice Age and has been known to the Heiltsuk Nation for thousands of years as a topical ointment to treat cuts, wounds and skin ulcers. It was also rolled into tiny balls and taken every day like a vitamin, helping to treat stomach ailments. The clay was a valuable commodity that was traded to other tribes outside the Heiltsuk territory. A

study at the University of British Columbia found that the clay has antibacterial and antifungal properties that are effective in treating infections by multi-drug resistant bacteria commonly found in hospitals, as well as the bacteria commonly infecting cystic fibrosis patients.<sup>4</sup> The clay contains a rich diversity of bacterial taxa which, along with various metal ions, are thought to contribute to its healing properties.

There are many more examples of First Nations in British Columbia using minerals in their everyday lives. In addition to garnets, jade and clays, Indigenous people have used quartz crystals, geodes, mica, ochre, copper, obsidian, graphite, coal and opal, to name a few. They have also used a wide variety of rocks and minerals for medicinal, ornamental and fabrication purposes, including jewelry, blades, spear points, arrowheads, houseware, paint, medicine and grinding tools. Indigenous use of native copper (pure copper in a metallic state) is a particularly interesting case in point. Today, massive quantities of copper are used around the world in the wiring of electrical devices, and the demand for this metal is expected to grow significantly over the coming decades.<sup>5</sup> Thousands of years ago in northwestern British Columbia, the metal represented wealth and status, and had both supernatural and healing roles in First Nations culture. Copper featured prominently in many myths and legends told by First Nations, including one story from the Tsimshian people, where salmon were magically transformed into this metal. According to this legend: ‘Our people call this copper “living” copper. They say that spring salmon went up this river, and when they reached the deep water at the upper part of the river, the salmon became copper’.<sup>6</sup> The legends of the Kwakiutl and the Nuxalk First Nations also connected copper to the supernatural world. The legends speak of Quomaqwa, an undersea deity, that was the supernatural source of copper, living in a copper house surrounded by a wealth of copper possessions. The Kwakiutl and other Indigenous peoples also understood that copper had curative properties and associated it with the quality of “purity”. Copper implements were handled with respect, and reserved for specific purposes, such as the use of three-pronged copper needles for ceremonial tattooing by the Haida. These uses of copper pre-dated modern understanding of the anti-microbial properties of this metal. Today, thousands of years later, the metal is commonly used

as a ‘self-sanitizing’ substance in health-care facilities and various public, commercial and residential settings.

Over thousands of years, Indigenous people developed methods to mine mineral resources from the earth. The Arrowstone Hills provide a well-known example. This quarry site exists in south-central British Columbia in the traditional, ancestral and unceded territories of the Secwépemc and Nlaka’pamux Nations. These Nations mined a silicon-rich volcanic mineral known as dacite, which was used to make toolstones. The high-quality dacite deposits at Arrowstone Hills are fine grained and black in color, with physical properties that make them hard, yet easy to shape. The dacite deposit would have been visited year-round, excavated by hand from pits measuring several meters across. Archaeological surveys of the area show that tools were often produced right at the mine site, eliminating the need to transport large rocks away from the mountain. The finished dacite tools were widely traded and have been found 200 kilometers west of the Arrowstone Hills, on a site along the Harrison River. The dacite deposit was large enough to provide First Nations with an unlimited supply of toolstones during the 11,000 years prior to European contact, and over the subsequent half millennium. Today, dacite is still collected from Arrowstone Hills for tool shaping by First Nations.

The Tahltan Nation in northwestern British Columbia have also depended on Earth’s minerals for thousands of years. Mining has always been part of Tahltan culture, and this Nation has historically prospected for and mined obsidian, a silicon-rich mineral derived from volcanic lava. Tahltan obsidian was fashioned into tools and traded with other First Nations. Studies of the chemical composition of obsidian artifacts have identified material from Tahltan territory in archaeological sites as far away as Alberta, Canada. Today, mining continues to be an important part of the Tahltan Nation. Their territory is in a region of British Columbia known as the Golden Triangle, which hosts a 500-kilometer belt of copper, gold, silver and other precious metals. The business arm of the Tahltan Nation, the Tahltan Nation Development Corporation, provides services to five different mineral projects and mines, and many

Tahltan members work on these projects. Increasingly, the Tahltan have exerted their constitutional rights over the resources situated on their territories. And through this activity, they are working to reverse more than a century of destructive colonial mining practices.

In the early years of gold-rush mining, there were few regulations. Mineral deposits were exploited in a haphazard fashion, leaving behind abandoned sites with catastrophic environmental impacts on Indigenous lands. In British Columbia alone, over 1,700 abandoned mine sites have been classified as having the potential to generate acid leaching of toxic metals into the environment,<sup>7</sup> with significant impacts on watersheds and traditional food sources, including salmon. These environmental threats come from the large-scale accumulation of waste rock piles, derived from colonial mining operations based on the principle of ‘bigger is better’. Many current surface mining activities usually include large open pits reaching kilometers in width and hundreds of meters in depth, where thousands of metric tons of rock are mined each day.<sup>8</sup> The large size of these mining operations has been driven by an ‘economy-of-scale’ approach to the provision of infrastructure (power lines, roads, buildings, tailings storage facilities) and equipment (shovels, excavators, haul trucks), where large size and scale are leveraged to spread fixed costs over a significant output.

By comparison with modern operations, traditional Indigenous mining sourced small quantities of materials from streams and riverbeds, rock formations or mineral deposits, with limited need for large excavations or hazardous waste piles. As the world’s largest, richest and most accessible deposits become increasingly rare, the mining industry will be forced to focus more attention on smaller, lower-grade and remote deposits in the future.<sup>9</sup> Perhaps First Nations could contribute to the development of a new model for mining, which incorporates the development of small mineral deposit resources. Such a model requires active participation, and indeed leadership, of Indigenous peoples in the future mining sector. At present, several significant challenges stand in the way of this goal.<sup>10</sup>



In British Columbia, a key challenge facing the mining sector is the outdated legislation regulating mineral claims and staking. The provincial Mineral Tenure Act, which dates back to the early days of the gold rush, allows any person today with less than one hundred dollars and an internet connection to stake mineral claims without regard to First Nations land sovereignty.<sup>11</sup> When claims are selected for staking, paid for and registered, the permit holder is given the right to enter and occupy an area for the exploration and development of mineral resources, even if the land holds potential cultural or spiritual importance to Indigenous landowners. The duty to consult First Nations is not triggered until an exploration application is submitted to the government, creating confusion and conflict, and leading to the false conclusion that mining rights trump Indigenous rights.

Recently, the Gitxaala and Ehattesaht First Nations of northern British Columbia initiated a legal case against the province's Chief Gold Commissioner, seeking to overturn several mineral claims made within their territory under the Mineral Tenure Act. The legal challenge cited a failure of the mineral claimants to achieve free, prior and informed consent (FPIC) of Indigenous landowners, and highlighted the potential negative impacts of mineral exploration on traditional and cultural practices. The Ehattesaht have a spiritual connection to crystals within their traditional territory, while the Gitxaala have collected ochre at a traditional gathering place called Ksgaxlam, where legends tell of supernatural dens. The Gitxaala and Ehattesaht argued that these important spiritual connections to the land would be disturbed through mineral exploration. The court agreed.

In its ruling, the British Columbia Supreme Court concluded that the Mineral Tenure Act does not include an appropriate consultation framework, and violates the government's constitutional obligations to consult Indigenous peoples with rights and title prior to the granting of mineral claims. The province has been given eighteen months to revise the mineral tenure system and will do so in consultation with First Nations and the mining industry. Many now worry that the eighteen-month period prior to the anticipated change in legislation will open a frenzy of new mineral staking claims. The next few months could significantly shape the long-term future of mineral

exploration and mining in British Columbia, with ramifications across Canada and beyond.

Despite the outdated Mineral Tenure Act, several mining companies and First Nations have collaborated proactively in the development of new mineral projects in British Columbia. As an example, the Tahltan Central Government has built a new partnership with Skeena Resources Limited, a Canadian mining and mineral exploration company that is working to re-activate a legacy mining site at Eskay Creek in Tahltan territory. The company has developed several initiatives to support this collaboration, including financial support for community-based programs, and the establishment of mentorship and entrepreneurship programs with Tahltan youth. In addition, the company relinquished several mineral tenures to help establish a nature conservancy in Tahltan territory. In turn, the Tahltan Central Government has invested five million dollars into Skeena Resources. In a news release, the president of the Tahltan Central Government said ‘Ownership provides the Tahltan Nation with a strong seat at the table as we continue our pursuit towards capacity building and economic independence for the Tahltan people’.<sup>12</sup>

Two metallurgical (steelmaking) coal exploration companies have gone even further in developing partnerships with First Nations in British Columbia. NWP Coal Canada Limited has signed an agreement with Yaq’it ?a·knuq̓i’it (Tobacco Plains Indian Band) whereby Yaq’it ?a·knuq̓i’it will act as a regulator and reviewer of the Crown Mountain Coking Coal Project. This oversight role for the Yaq’it ?a·knuq̓i’it implies that the Band can effectively shut down the project if they are not satisfied with the results of the Environmental Assessment. This represents a profound shift in the industry, as First Nations currently do not have veto rights on projects, and mine permits can be issued even in the face of community opposition. North Coal is another exploration company that is working to develop a steelmaking coal project in Yaq’it ?a·knuq̓i’it territory. The Band has developed a letter of intent to form a partnership with North Coal and its owner, Pacific Road Capital, to jointly develop the Michel Project. The partnership is based on the principles of co-ownership, co-management and co-governance. Chief Heidi Gravelle was quoted as saying ‘This partnership has

been built on mutual respect, collaboration, and integrity, while working with our community members, elders, and leadership to create a sustainable future built on strong traditions and culture. By working together with Pacific Road Capital, we will have set a precedence for other companies looking to partner in economic ventures on unceded territory.<sup>13</sup> This project, and others, are laying the foundations for new mining business models in British Columbia, providing examples of new collaborative opportunities between mining companies and First Nations.

**F**or thousands of years, First Nations have prospected for minerals and metals in lands now known as British Columbia, and in other territories around the world. Rocks and minerals were in high demand and used in many aspects of Indigenous life, from medicinal and ‘purity’ purposes to spiritual and cultural practices. Indigenous mining was driven by local supply and demand, and oral knowledge and technologies were passed down over countless generations. Although colonialism has had led to the loss of significant Indigenous knowledge, it is not too late to learn from the knowledge that still exists. At a time when innovation is needed in the mining industry, incorporating Indigenous perspectives into mining theory and practice could promote more sustainable mineral extraction, with lower environmental impacts and greater social and economic benefits for communities. New exploration companies are showing the world that deep collaboration with First Nations can exist in the development of mineral resource projects. In any path forward, the mining industry will need to embrace more holistic approaches to mineral development, incorporating Indigenous cultural, spiritual, environmental, social and economic values. Such an approach will help restore long-standing relationships between Indigenous peoples and the resources on their territories.

## Endnotes

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- 5 See also 'The Copper Supply Gap: Mining Bigger and Deeper' by Erik Eberhardt, and 'A Closer Relationship with Our Metals' by M. Scott Dunbar and Jocelyn Fraser in this volume.
- 6 Franz Boas, *Tsimshian Mythology, Thirty-First Annual Report of the Bureau of American Ethnology 1909–10* (Washington, DC: Bureau of American Ethnology, 1916), p. 301.
- 7 See also 'Mine Waste' by Roger Beckie in this volume.
- 8 See also 'The Copper Supply Gap: Mining Bigger and Deeper' by Erik Eberhardt in this volume.
- 9 See also 'Can Small Mining Be Beautiful?' by Marcello M. Veiga and J. Alejandro Delgado-Jimenez in this volume.
- 10 See also 'A Closer Relationship with Our Metals' by M. Scott Dunbar and Jocelyn Fraser in this volume.
- 11 Full text available at [https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00\\_96292\\_01](https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00_96292_01)
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