



## **The Stones of Ivittuut** Extracting Stories from Rocks

Alex J. Taylor

### Essay

The Stones of Ivittuut: Extracting Stories from Rocks

#### **About the Author**

*Alex J. Taylor is Assistant Professor and Academic Curator in the Department of History of Art and Architecture at the University of Pittsburgh. From 2014-6, he was the Terra Foundation Research Fellow in American Art at Tate, where he led a program of scholarly publications, events and displays focused on the museum's collection of post-war American art. His book Forms of Persuasion: Art and Corporate Image in the 1960s is forthcoming with the University of California Press.*

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## Extracting Stories from Rocks

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Bauxite, shown on the right in the form of a specimen from the collection of Carnegie Museum of Natural History, is the primary ore from which aluminum is made. But cryolite, the pale, lustrous rock shown to the left (fig.1), was once equally essential for aluminum production. In 1884, chemists in France and the United States both discovered that the addition of molten cryolite as a flux dramatically reduced the temperature, and therefore energy, required to extract metallic aluminum from powdered oxide. In so doing,

aluminum rapidly transformed from a luxury metal to a mass-produced commodity. As the Pittsburgh Reduction Company—eventually known as the Aluminum Company of America (Alcoa)—came to dominate the industry, it also became the world’s largest consumer of cryolite, a rock that was mined in just one place.<sup>1</sup>



**Figure 1**

Cryolite and Bauxite, Collection of the Carnegie Museum of Natural History, November 2019. (Photo: Ana Rodríguez Castillo)

That mine was in Ivittuut, on the Southwest coast of Greenland, a site that was inextricably tied to the interests of American industry. In 1864, the Pennsylvania Salt Manufacturing Company negotiated an agreement with the Danish government, which claimed colonial authority over Greenland, to control the cryolite export market, primarily for use in the manufacture of soap and fertilizer. Cryolite was also used by the glass and ceramics industries, and to produce yellow fireworks. One-third of the Ivittuut mine’s output went to the Danish government for sale in Europe, but the rest was exclusively sold to the Pennsylvania

<sup>1</sup> For a useful history of aluminum that was an important influence on *Metal from Clay*, see Sarah C. Nichols, *Aluminum by Design: Jewelry to Jets* (Pittsburgh: Carnegie Museum of Art, 2000).

Salt Manufacturing Company, which paid a 20 percent royalty to Denmark to secure total control of the mineral on this side of the Atlantic.<sup>2</sup>

The Aluminum Company of America would become the Pennsylvania Salt Manufacturing Company's best cryolite customer, two monopolies content to coexist in a state of mutual self-interest for decades. Increased demand for the mineral involved considerable logistical challenges. In the late nineteenth century, the trip to Greenland was made by a fleet of specially made wooden sailing ships. The one-thousand-mile journey was only possible in the summer, and each journey from Philadelphia to Ivittuut could take sixty to seventy days. Sometimes, boats could become stuck in the ice and fog for weeks at a time.<sup>3</sup> From Pennsylvania, cryolite was sent by rail to the Pennsylvania Salt Manufacturing Company's plant in Natrona, twenty miles northeast of Pittsburgh, not far from Alcoa's facility in New Kensington.

Like the ocean transport upon which it relied, the Ivittuut mine was seasonal. It was operated by 130 or so, mainly male, migrant workers in the summer and about half that in the winter. One account does mention an Inuit woman known as Maria, employed as a servant for the European miners.<sup>4</sup> Indeed, the very "discovery" of cryolite by German actor turned mineralogist Karl Ludwig Giesecke in the early years of the nineteenth century—and its introduction to European markets—was a product of colonialism's appetite for indigenous knowledge.<sup>5</sup> As Giesecke himself recorded in an 1822 account, "We owe the first discovery of cryolite to the Greenlanders, who, in finding it to be a soft substance, employed the water-worn rounded fragments as weights on their anglings."<sup>6</sup> It was specimens in this form that represented the first appearance of the mineral in Europe. "It was of course incorrectly stated in some periodical papers, that the cryolite was discovered by me; I only found its geological situation, and I dare say by a mere accident," Giesecke admitted, still neglecting the Inuit sailors that guided his own journey.<sup>7</sup> What was no accident, however, was that the commercial extraction of cryolite, like so many products of colonial trade, would produce little benefit for the island's indigenous population.

By the late nineteenth century and early twentieth century, the quarry at Ivittuut blasted about nine thousand tons of cryolite each year; but by the 1940s, production had reached around 46,000 tons.<sup>8</sup> The German occupation of Denmark in World War II not only left Greenland an "unoccupied territory of an occupied nation" (never mind its population of some twenty thousand people) but also threatened its cryolite—a particular concern given aluminum's use in aircraft.<sup>9</sup> As a 1940 article noted: "The problem of defending the hemisphere against attack from Greenland is not so much in the hands of the State or War Departments

<sup>2</sup> For a useful account of the industry in the late nineteenth century, see "Greenland's Queer Mine," *The Daily Republican* (Monongahela, PA), 14 April 1894, 2.

<sup>3</sup> "Their Ships are Ice Bound," *The Times* (Philadelphia, PA), 9 August 1892, 2.

<sup>4</sup> James Elverson, "A Mining Camp in Greenland," *The Philadelphia Inquirer*, 10 September 1911, 70.

<sup>5</sup> On Giesecke's career, see Alfred Whittaker, "Karl Ludwig Giesecke: His Life, Performance and Achievements," *Mitteilungen der Österreichischen Mineralogischen Gesellschaft* 146, 2001.

<sup>6</sup> Charles Giesecke, "On Cryolite; a Fragment of a Journal . . .," *Edinburgh Philosophical Journal* 6 (1821-22), 142.

<sup>7</sup> *Ibid.*, 142.

<sup>8</sup> Trevor Lloyd, "Ivigtut Cryolite and Modern Greenland," *The Canadian Geographer*, January 1953, 43-45.

<sup>9</sup> For more on this history, see Dawn Alexandra Berry, "Cryolite, the Canadian Aluminum Industry, and the American Occupation of Greenland during the Second World War," *Polar Journal* 2, no., 2 (2012): 219-235.

as in the hands of the Pennsylvania Salt Manufacturing Company.<sup>10</sup> This is something of an exaggeration and oversimplification, but the eventual dispatch of US troops to protect private interests in the mine exemplifies what would later become known as the military-industrial complex, and confirms the longstanding entanglements of American foreign policy in the commercial underpinnings of colonialism.<sup>11</sup>

By 1985, cryolite shipments to the United States spiked at 110,000 tons. And then in 1987, the deposits at Ivittuut ran out. The mine was shuttered, and the surrounding town eventually abandoned. The aluminum business would replace the mineral with a synthetic equivalent, an invention that had been in development since the 1930s, and was in fact pioneered by Germany during the war to circumvent their limited access to the mineral—although the factory was bombed before this synthetic substitute could reach its productive potential.<sup>12</sup> By the time Ivittuut had no more cryolite, Alcoa had established its own subsidiary to make its chemical substitute. Cryolite might have the dubious honor of becoming the first mineral mined to commercial extinction, but its exhaustion was invisible to consumers for whom the supply of sparkling aluminum products seemed uninterrupted and unending, disconnected from the finite natural resources it had exhausted.<sup>13</sup>

The role of the aluminum industry in causing this rock to become all but extinct was the origin of my interest in cryolite, and it was for this reason that a specimen of the material was installed—alongside other forms and stages from the production of aluminum—in a vitrine at the University Art Gallery in Fall 2019. The occasion for this display was an exhibition titled *Metal from Clay: Pittsburgh's Aluminum Stories* (fig. 2), a project that saw faculty and graduate students work with curators and collection managers from across the city's cultural institutions to reflect on aluminum's histories and legacies. For the exhibition and its catalogue, we brought together collection objects and essays from the Carnegie Museum of Art, Contemporary Craft, Hunt Institute for Botanical Documentation, Rivers of Steel National Heritage Area, Senator John Heinz History Center, the Andy Warhol Museum, the Frick Pittsburgh, University Library System, and the University Art Gallery.<sup>14</sup>

<sup>10</sup> "Greenland Defense," *The Pittsburgh Press*, 21 July 1940, 2.

<sup>11</sup> In a 1942 article, *Scientific American* already sought to deflect this connection: "Greenland, you will recall, is now occupied by American troops. It is probable that more cryolite may be found in Iceland. But there is no connection between the United States troops and cryolite. We have all the cryolite we need; we could also make synthetic cryolite, fully as good as the real thing." Henry W. Roberts, "Why are We Short of Aluminum?" *Scientific American*, May 1942, 234. For Alcoa's own similar claims, see T. D. Jolly, "The Recent Expansion of the Aluminum Industry," *Science* 96, no. 2480 (July 1942): 30–31

<sup>12</sup> This factory was at Herøya in southern Norway; see "U.S. Bombers Smash First Time at Norway," *Daily News*, 25 July 1943, C2.

<sup>13</sup> Deffreyes notes of the exhausted supply: "It wasn't a big news item because it was easy to make synthetic cryolite." Kenneth Deffreyes, *Beyond Oil: The View from Hubbert's Peak* (New York: Farrar, Straus and Giroux), 175.

<sup>14</sup> The core project team was myself, Andrew W. Mellon graduate summer fellows Emi Finkelstein and Paulina Pardo, and faculty colleagues Sylvia Rhor Samaniego, director of the University Art Gallery, and Ana Rodríguez Castillo, project coordinator of Collecting Knowledge Pittsburgh. More than a dozen other Pitt graduate and undergraduate students, faculty, and Pittsburgh curators and archivists contributed to the exhibition and work that is featured in the exhibition catalogue, *Metal from Clay: Pittsburgh's Aluminum Stories* (Pittsburgh: University Art Gallery, 2019).



**Figure 2**

Metal from Clay, installation shot, November 2019. (Photo: Ana Rodríguez Castillo)

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The idea of a rock becoming extinct was one that the exhibition's organizers and I regarded as precisely the kind of story that could help tease out the invisible histories of global mobility and exchange embedded in the sleek cylindrical skin of every aluminum can. And so, we displayed the rock beside an Alcoa branded can used by the company as a commercial sample. The sample of Greenland cryolite loaned from the Carnegie Museum of Natural History originally came from the vast mineral collection of William W. Jefferis in West Chester, Pennsylvania, but must have originated among the imports of the Pennsylvania Salt Manufacturing Company, the mineral's sole supplier. Beside the cryolite and the can it had made possible, we exhibited a sample of bauxite from Alabama that was donated to the museum by the Pittsburgh Reduction Company in 1896. The fifty-fifth specimen to be accessioned by the Carnegie Institute, this is one of many objects in Pittsburgh's museums that materializes the aluminum industry's indelible presence in the city's cultural inheritance.<sup>15</sup>

Sometimes, as our exhibition sought to reveal, aspects of these histories are deliberately hidden. By the mid-twentieth century, most of Alcoa's bauxite came not from Alabama but from Suriname. A series of botanical prints by Russian émigré Boris Artzybasheff that juxtaposed exotic plants and indigenous peoples, as an unattributed exhibition label written by Kirk Savage explained, "gave no hint of the devastation to jungle habitat in upper South America caused by bauxite mining, or of labor conditions in Trinidad where the ore was transferred to the cruise ships. Instead, they offered, as related advertisements explained, a 'paradise' where flowering trees and 'blended' races promised an escape from modern

<sup>15</sup> I acknowledge and thank the assistance of Debra Wilson, collection manager in the Section of Minerals at the Carnegie Museum of Natural History for her assistance borrowing these samples, along with Eric Dorfman, Steve Tonsor, and many other collaborators at the museum that provided their assistance to this project.

problems.”<sup>16</sup> As Savage’s didactic text emphasizes, images like these were designed to disguise the human and ecological costs involved in the business of moving rocks around the world.

*Metal from Clay* drew upon approaches to the scholarly engagement with museum and archive collections, artistic and otherwise, that have been a significant thread of my work at the University of Pittsburgh over the last four years. In 2017, a similar approach was applied in *Consuming Nature: Landscape through the Lens of the Anthropocene*, an Andrew W. Mellon-funded workshop for graduate students and faculty at the University of Pittsburgh that engaged with collections across the city. Co-led with Isabelle Chartier, then curator of the University Art Gallery, and twelve participants from across the university, our program collaborated with curators, archivists, and their collections to consider the visual and material cultures of the landscape tradition and, in particular, their contacts with the industrial histories of Western Pennsylvania, a history that so directly connects Pittsburgh to global economies of mineral extraction.

At the Carnegie Museum of Natural History, for instance, Head of Invertebrate Paleontology Albert Kollar discussed with the group his engagement with Western Pennsylvanian landscape paintings in the collection of the Carnegie Museum of Art through the prism of the geological and atmospheric processes they appear to describe (fig. 3). The group also inspected examples of slag and “anthropic” rocks, the term used to classify the kinds of human-made rocks that will, in many cases, remain part of the earth on a geological time scale. The group visited Pittsburgh’s Carrie Furnace (fig. 4), operated by Rivers of Steel, where Anna Johnson from the University of Pittsburgh’s Department of Biological Sciences led a tour of the urban garden she helped plan to remediate seventy years of toxic residue deposited at this former steel plant. At the Hunt Institute, the hand-colored plates of Humphry Repton’s *Observations on the theory and practice of landscape gardening* (1803) used moveable overlays to reveal the underlying earthworks that these picturesque scenes had required, allowing the reader to shift entire hills and rivers in the effortless flip of a flap of paper.<sup>17</sup>

Looking at diverse collections and sites to understand the legacies of extractive industries was also central to a conference that I co-organized at the Power Institute at the University of Sydney in Summer 2018. With art historians Maggie Cao and Sophie Cras, and the support of the institute’s director, Mark Ledbury, we brought together thirteen scholars for a two-day conference titled *Mining Value: Art and the Extraction of Resources*. I presented my research into the history of Cor-Ten steel, the proprietary alloy marketed by US Steel for its aesthetic value in the 1960s. But many other papers revealed art’s much longer imbrication in the histories of mining, including Amy Ogata’s research into metallurgy in Second Empire France, Anne Dunlop’s exploration of the use of African gold in Renaissance gold-ground painting, and Matthew Hunter’s account of the connections between early photographic history and the development of the combustion engine, two histories revealed to be bound together by their mutual reliance on extractive processes.

<sup>16</sup> Unattributed exhibition label, *Metal from Clay: Pittsburgh’s Aluminum Stories*, University Art Gallery, University of Pittsburgh, October 24–December 6, 2019.

<sup>17</sup> For further details of the workshop, see <https://www.haa.pitt.edu/ckp/ckp-workshops/consuming-nature>.



**Figure 3**

Consuming Nature Workshop participants at CMNH, May 2017. (Photo: Ana Rodríguez Castillo)



**Figure 4**

Consuming Nature workshop participants at Carrie Furnace, May 2017. (Photo: Ana Rodríguez Castillo)



**Figure 5**

Mining Value conference speakers at the Mitchell Library, SLNSW, August 2018. (Photo: author)



**Figure 6**

Mining Value conference speakers in mineralogy collection storage at the Australian Museum, Sydney, August 2018. (Photo: author)


Alongside these and other papers, conference speakers used their visit to Australia to meet with curators at the Australian Museum and the State Library of New South Wales (SLNSW) and to explore the visual and material histories of mining held in their collections. At the SLNSW's Mitchell Library (fig. 5), for example, the group inspected drawings from the Australian goldfields by artists like Eugene von Guerard and S. T. Gill, sources that provided a rich local context for international scholars interested in the intersections between artistic and extractive visions of the landscape. With Ross Pogson, Collection Manager of Mineralogy and Petrology at the Australian Museum (fig. 6), we explored this museum's expansive mineral collections. As Pogson's tour emphasized, these were aesthetic as well as scientific objects. But they were also indelibly commercial samples, tied to the state support for extractive industries that has long underpinned the Australian economy. Indeed, many of the specimens we inspected were once held by Sydney's former Geological and Mining Museum, an institution founded by the government's Department of Mineral Resources.<sup>18</sup>

Perhaps it was the notion of scarcity that attracted me, as an art historian, to the idea of exhibiting a lump of cryolite like a rare sculpture. And, in a way, this rock is a precious object—a specimen that escaped the material's use value to be preserved in a museum. But the limited edition to which it more profoundly points is, of course, the earth itself. Attending to collections beyond the conventional limits of art history helps underscore how often works of art are also tied to the long histories of material extraction and, often, exploitation that reached their apex under colonial expansion and industrial modernity. The material manifestations of these histories are no less important for art historians than they are for geologists, and the workshops I have described here have only reinforced my sense that there remains much to learn from each other's ways of looking. When rocks are transformed into self-consciously aesthetic objects, it is easy to lose sight of these material histories; even loose-cut gemstones seem to me to occlude, as their sparkle seduces our eye, the systems of labor and commerce within which they circulate. But rocks themselves have a brute, ponderous presence that makes it usefully difficult to avoid these fundamental questions about how humans have interacted with the earth, and about who has profited from its resources.

<sup>18</sup> For further details about this conference, see <https://www.powerpublications.com.au/conference-mining-value>. For a summary of the organizer's perspectives on the outcomes of this conference, and its contribution to a broader series of scholarly events exploring economic perspectives on art, see Maggie M. Cao, Sophie Cras, and Alex J. Taylor, "Art and Economics Beyond the Market," *American Art* 33, no. 3 (Fall 2019): 20–26.



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