

## FROM ROCK TO INGOT Processing Copper

Two conceptualized scenes document the multi-faceted, labor-intensive process of producing copper for export in the late 1800s and early 1900s. In the block diagram at far right are the underground operations. At left, top to bottom, are the surface operations. The accompanying photographs were taken at Keweenaw mining companies.



**1 DRILLING AND BLASTING**  
Following the copper vein, miners drilled holes into the lode and filled them with explosive charges (above). Blasts freed copper rock for removal.



**2 HAULING**  
After hand-loading the copper rock into tram cars, workers hauled the trams through the drift to the shaft. There the rock was transferred to skips (above) and hoisted to the surface.



**3 HOISTING**  
A huge steam-powered drum (above) with a cable attached pulled loaded skips from the mine. At the same time, another skip or man-car descended on a parallel track, balancing the load.



**4 CRUSHING AND SEPARATING ROCK**  
Skips entered the shaft-rockhouse (above) where copper rock was separated and crushed. Poor rock was discarded while copper rock (two- to four-percent copper) was sent to the stamp mill.



**5 TRANSPORTING**  
Railroads served the peninsula's mining industry, linking mines, mills, smelters, and support facilities. Spurs and sidings off the main line carried rail cars into buildings for loading (above).



**6 STAMPING / CONCENTRATING**  
Massive steam-powered stamps (above) pounded the copper rock repeatedly, breaking it down into smaller pieces. Efficient stamps processed 600-800 tons of rock per day.



**7 SORTING**  
Stamped rock was sorted by water. Heavier pieces, about 60 percent copper, fell to the bottom of the sorters (above) and were collected for smelting. Waste rock or tailings was washed into the lake.



**8 SMELTING**  
Smelter furnaces (above) heated copper concentrate to a liquid. Slag—rock debris—was skimmed off the surface. Air stirred into the molten copper oxidized (burned off) the remaining impurities.



**9 CASTING**  
Workers ladled pure molten copper into molds (above). As it cooled, the copper hardened into blocks called ingots. Ingots were cast in different shapes and sizes for different markets.



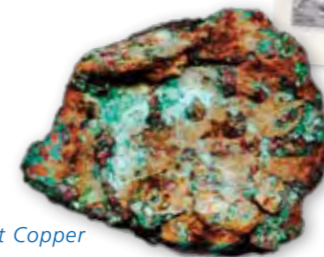
**10 SHIPPING**  
In summer, ships loaded with ingots traveled to ports like Detroit and Chicago. Ingots were stockpiled for months at a time in harsh winter weather.

*There can scarcely be a shadow of a doubt [that the Keweenaw Peninsula] will eventually prove of great value to our citizens and to the nation.*

—Douglass Houghton, leader of the 1840 expedition that surveyed the mineral resources of Lake Superior's southern shores.



Pieces of mass copper exposed and transported by Ice Age glaciers are known as float copper (left). Word of the Ontonagon Boulder (above), a 3,700-pound chunk of float copper, sparked the copper rush to the Keweenaw Peninsula in the 1840s. The Ontonagon Boulder now resides in the Smithsonian's National Museum of Natural History.



Float Copper

## LURE OF THE COPPER COUNTRY

From the top of Michigan's Upper Peninsula, a lonely arc of land points northeast into Lake Superior's expanse. This is a world of trees and water, of a fiery north woods autumn against a backdrop of cool blues. Roads trace the shoreline, trails wind through forests. Around the corner or over a hill, structures emerge—survivors of the Keweenaw's industrial age. Back then the forests were fuel, the waters were commercial routes, and the shaft-rockhouses, stamp mills, and smelters churned out copper day and night. The structures, their setting, and stories of the mining life are preserved and protected at Keweenaw National Historical Park.

The Keweenaw Peninsula had the largest deposit of pure elemental copper in the world. The land was formed by the Portage Lake Volcanics, a series of hundreds of lava flows. The flows hardened into rock layers, some extraordinarily rich in native copper. Over time these layers tilted to form the peninsula's ridged spine, exposing the copper deposits.

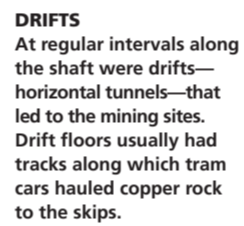
Early Native Americans were the groundbreakers—literally. Some 7,000 years ago Lake Superior peoples developed sophisticated mining techniques. The copper was so pure it could be used straight from the ground to make beads, tools, and ornaments. Extensive trade routes carried Keweenaw copper to

places like Effigy Mounds National Monument in Iowa, Hopewell Culture National Historical Park in Ohio, and Alberta, Canada.

More recently, copper captivated French, British, and American explorers. When the United States gained title to the Keweenaw in 1842, it opened the door to commercial mining ventures. By the 1870s the mines had caught the world's attention and held a place in the international copper market until the last mine closed in 1996. The architecture, landscapes, and heritage that remain tell us that the fortunes of the mining companies and the communities they fostered were inseparable. The Keweenaw's story is more than lakeside sunsets, picturesque towns, and winter sports. It is also one of natural wealth and human ingenuity.

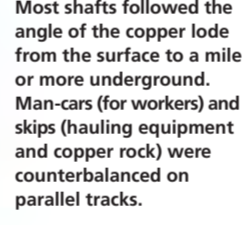


Mining Hat



DRIFTS  
At regular intervals along the shaft were drifts—horizontal tunnels—that led to the mining sites. Drift floors usually had tracks along which tram cars hauled copper rock to the skips.

Drill Bits



SHAFT  
Most shafts followed the angle of the copper lode from the surface to a mile or more underground. Man-cars (for workers) and skips (hauling equipment and copper rock) were counterbalanced on parallel tracks.

## THE BUSINESS OF MINING

In 1843 reports of mass copper on the Keweenaw Peninsula spurred one of the first mineral rushes in the United States. Copper was valued for its use in everything from guns to cookware to telegraph wire. Prospectors looked for prehistoric mines in the Keweenaw and often built shafts right over them. In 1855 new shipping locks at Sault Ste. Marie linked Lake Superior and Lake Huron, opening eastern and European markets to Keweenaw copper. The Civil War and the increasing growth and industrialization of America's cities encouraged many companies to establish mines in the region. Eastern stockholders financed and directed most of these operations. Earnings not reinvested in mining properties went to Boston, New York, and other distant cities.

By the 1870s the Copper Country was earning its name and producing over three-quarters of the nation's copper. At that time, the amygdaloid and conglomerate deposits in the central part of the peninsula were the most profitable. Two of the most successful companies that tapped these deposits were the Quincy and Calumet & Hecla mining companies. Mining copper required a large workforce. Companies recruited men and provided them and their families with houses, schools, hospitals, and libraries. They donated land for churches and parks, and encouraged the development of banks, shops, and other businesses. By 1910 the region's population reached 100,000 and over 30 nationalities called the Keweenaw Peninsula home. Towns turned from pioneer settlements into bustling industrial communities as mining operations expanded.

Mines operated year-round, day and night. Even with several feet of snow on the ground, the mines were warm or even hot. Underground workers carried equipment, lights, meals, and anything else needed for their shift. Besides miners, there were timbermen reinforcing the drifts with wooden posts, trammers operating the rock-hauling cars, and general laborers. Surface workers operated hoists, monitored rock crushers, stoked the smelter, repaired equipment, and tracked payroll at business offices. Some unskilled workers were young boys. Women did not work in the mines.

Falls, fires, explosions, rock falls, and mechanical mishaps took their toll: about one man a week died. Others suffered from blindness, hearing loss, lost limbs, and head injuries. A local newspaper report from 1900 documents one accident: "Richard Trevarrow, aged 21 years, employed at No. 5 Shaft, Calumet branch... as timberman, went to work this morning just as cheerful as usual. Before 9 o'clock he was injured so seriously that he died within an hour."

Despite their success, by around 1900 new mines out west challenged the Keweenaw's dominance. Managers looked for ways to increase production while cutting costs. They introduced new technologies like the one-man drill, which meant that men worked

Processed Copper Ingot



**COPPER FORMATIONS**  
Eons ago, a rich solution rose from deep within the Earth, permeated the existing rock layers, and created three types of copper rock. Amygdaloid copper formed within the vesicles and holes of ancient lava flows. Conglomerate copper developed within the sedimentary rock layers. Mass copper formed in large fissures and fractures.

Hand Lantern



alone instead of in pairs. In 1913, frustrated by low wages and long work days, miners walked off the job. The strike polarized the region and brought hardship and tragedy before ending in 1914. Concessions were made by both miners and managers, but the bitter dispute left lingering resentment.

The Great Depression and World War II added to the precarious state. Mining became more expensive as shafts went deeper. Labor disputes simmered, another stress that companies could ill afford. The Keweenaw faced increasing competition and copper's market value fell. By 1968 all but one mine on the peninsula had closed their doors, ending one of North America's longest and most profitable mining eras.



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One-Man Drill Advertisement

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# Keweenaw Past and Present

NATIONALITY	American	Argentinian	Austrian	Canadian	English	Finnish	French	German	Hungarian	Irish	Italian	Polish	Rumanian	Russian	Scand.	Scotch	Other	Total	
First of Month	45	3																54	5375
During Month																		2	238
For Month																		7	318
Last of Month																			55
Same Date Last Year																			

**From top:** People outside Cliff Mine, whose early success helped spark immigration to the Copper Country in the mid-1800s; identification cards; Calumet & Hecla identification badge.

**Above:** Early churches in Calumet. Mining companies sometimes donated land for church construction.

**Left:** Railroad locomotive and workers in snow. Railroads transported supplies and materials to mining operations.

**Background:** Tamarack mine workers. From 1882 until it was bought by C&H in 1917, Tamarack was the second largest producer of copper from the Calumet conglomerate lode. **Above background:** Mine workers recorded by nationality, December 1928.

**From top:** Winter in the Copper Country; Italian immigrant in Calumet; English class for immigrants; mining company employee records, identification badge, C&H.

**Above, scattered:** Copper pennies, one of the end products of Keweenaw copper. Copper was also used in sheathing for ship hulls, plumbing, roofing, electrical components, and was alloyed with other metals.

**Right:** Employee identification badge. While women did not work in the mines, they did work in offices and other support operations.

**From top:** Holman and Williams grocery, Calumet, ca. 1900; identification badge; union card; broom factory established for blinded employees; community pool in bathroom built by C&H; employment record for deceased miner-worker. **Right:** Loading mineral onto steamer.

## Old World Keweenaw

"Here is a large community peopled by foreigners," wrote a visitor to Calumet in 1907. Jobs in the mines—and hardships overseas—brought thousands of immigrants to the Keweenaw between 1843 and 1914. Early on, experienced miners came from Cornwall, England, and also from Ireland and Germany. Later immigrants arrived from northern and eastern Europe as well as from China and Lebanon. In 1908 Calumet public schools taught children from over 30 countries.

People brought the old ways with them: Finnish saunas, polka music, and povitica, an Eastern European sweet bread. They came with faith, too. A community's ethnic diversity was reflected in the number and denomination of churches. Many groups formed mutual aid organizations like Calumet's Slovenian Catholic St. Joseph Benevolent Society, established in 1883. While many people were initially drawn here to work in the mines, they found ways to return to more traditional occupations. Some generalizations rang true: Italian grocers imported linguini and olive oil and French Canadians ran sawmills and lumber camps. With the mines' decline, economic depression and hardship compelled many to move to cities like Detroit and Chicago. Yet the thousands of immigrants who came here left a legacy that is reflected in street signs, restaurant names, and community reunions and festivals. For many Americans, this was their ancestors' first home in a new world.

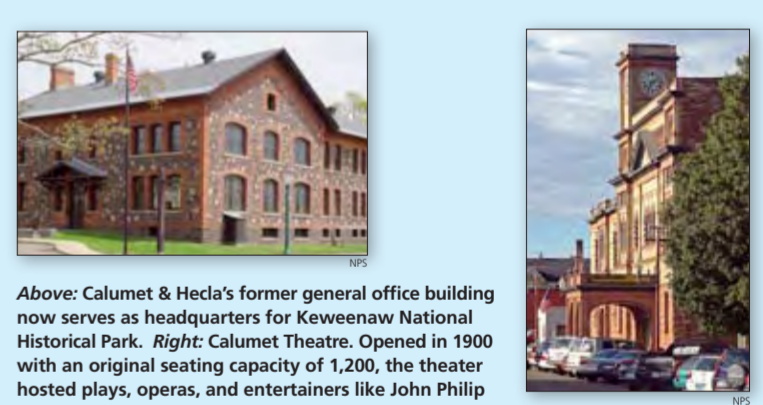


The Cornish pasty (below), meat and vegetables baked in a crust, was popular in the Copper Country. Miners (above) heated pasties inside lunch pails over a flame. Eastern Europeans made their traditional povitica (below right), a sweet nut bread.

## Preserving Keweenaw's Heritage

Local residents feared the loss of their heritage as they witnessed the demolition of mining, milling, and smelting structures in the 1970s and 80s. Many looked toward preservation as the answer. The establishment of national historic landmark districts at Quincy and Calumet in 1989 recognized the region's significance. Believing that more was needed, they persuaded Congress to create Keweenaw National Historical Park in 1992. The park preserves and interprets sites, structures, and stories related to copper mining on the peninsula. The National Park Service works closely with local governments, educational institutions, and public and private entities. A permanent advisory commission helps with operations and the coordination of partner activities.

You may have been drawn to the Keweenaw for relaxation and recreation. Once you're here you discover that the Copper Country's history is intertwined with its natural beauty. Past and present meet in unexpected ways and in unexpected places.

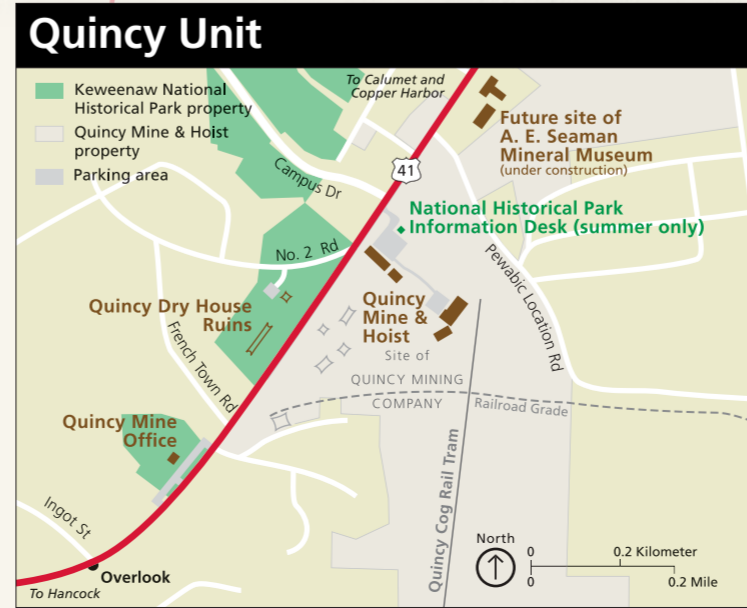
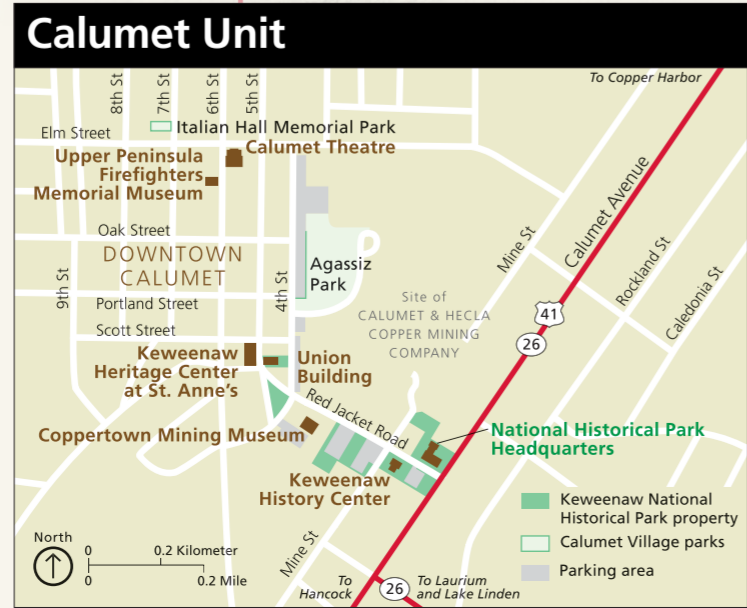


Above: Calumet & Hecla's former general office building now serves as headquarters for Keweenaw National Historical Park. Right: Calumet Theatre. Opened in 1900 with an original seating capacity of 1,200, the theater hosted plays, operas, and entertainers like John Philip Sousa and his band.

## Planning Your Visit

**Getting to the Park**  
Keweenaw National Historical Park is in Michigan's Upper Peninsula about 100 miles northwest of Marquette, Mich., via U.S. Hwy. 41, and about 200 miles north of Green Bay, Wis., via U.S. Hwy. 141 and 41. Daily scheduled air service is provided to the Houghton County Memorial Airport (CMX). Charter bus service is also available.

**The Park Units and Keweenaw Heritage Sites**  
The national historical park preserves two large-scale mining complexes. The Quincy Unit near Hancock focuses on the above- and below-ground technologies of copper mining. Twelve miles north is the Calumet Unit, which incorporates the social, ethnic, commercial, and company-planned aspects of the Calumet & Hecla mining community.



Most property in the two park units is privately owned. Please respect private property. As the park continues to develop, more National Park Service facilities and services will become available. Contact the park for updated information.

In and around the two park units are over a dozen independently operated Keweenaw Heritage Sites that work in partnership with the National Park Service. Each site tells a different story about the Copper Country. Services vary with each site and may include interpretive programs, self-guiding tours, museum exhibits, theatrical performances, and recreational opportunities. Hours and days of operation vary with the season, and each Keweenaw Heritage Site has its own admission fee or donation request. Most sites are closed for winter.

**More Information**  
Visitor information is available year-round Monday through Friday at park headquarters in Calumet. There is a seasonal information desk in the Quincy Unit. For more information contact:

Keweenaw National Historical Park  
25970 Red Jacket Rd.  
Calumet, MI 49913  
906-337-3168  
www.nps.gov/kewe

Additional area information is available at the Keweenaw Convention and Visitors Bureau, 888-646-6784.

Keweenaw National Historical Park is one of over 390 parks in the National Park System. To learn more visit [www.nps.gov](http://www.nps.gov).