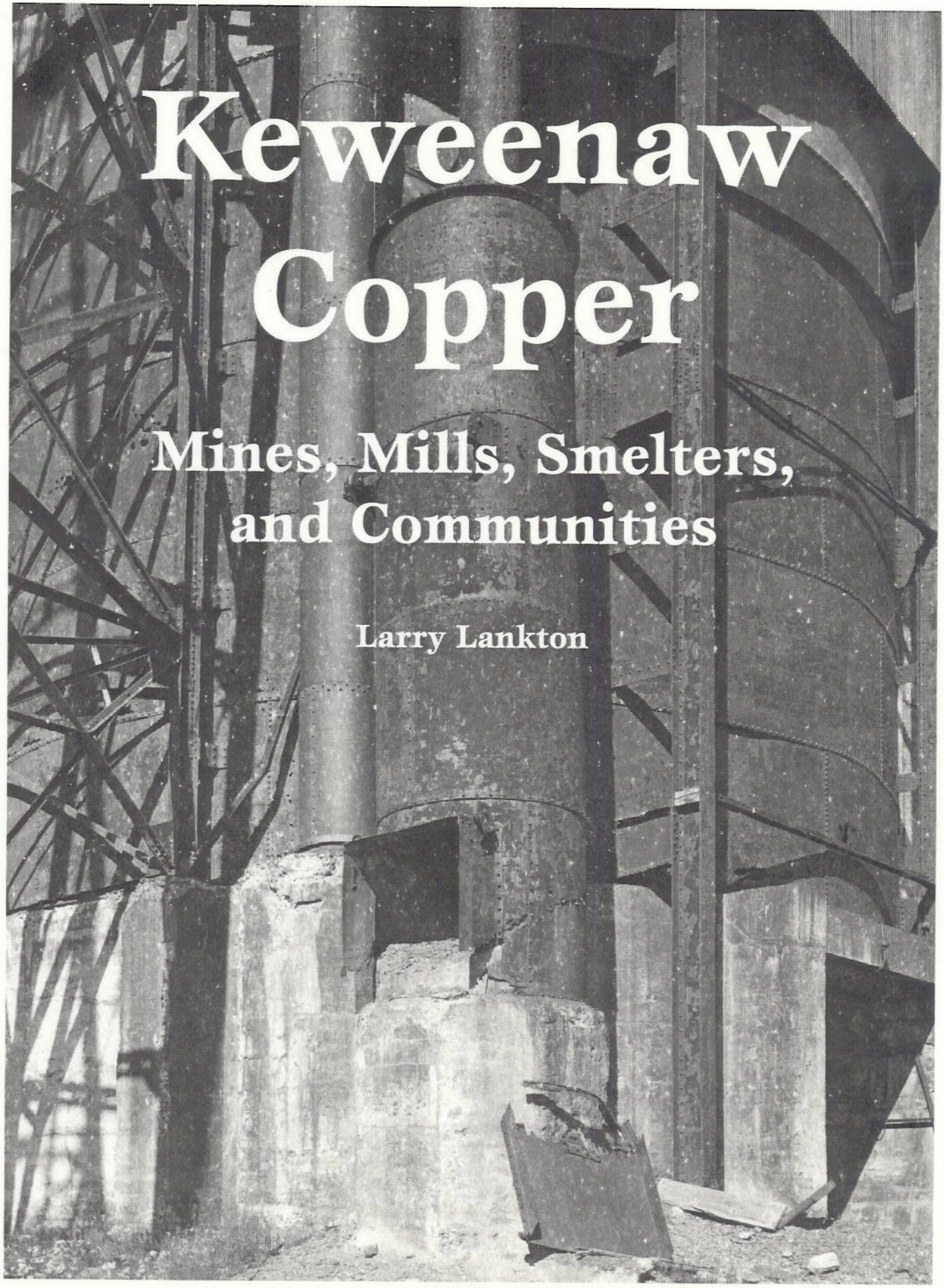

Keweenaw Copper

Mines, Mills, Smelters, and Communities

Larry Lankton

Keweenaw Copper:

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This introduction to the history of the Lake Superior copper industry, and brief guide to historic sites associated with that industry, was written to be presented to attendees of the 26th Annual Conference of the Society for Industrial Archeology (SIA). This conference, hosted by Michigan Technological University's Graduate Program in Industrial History and Archaeology, was held at Houghton, Michigan, from May 29 to June 1, 1997. For further information regarding the SIA or MTU's IA Program, write to the Department of Social Sciences, Michigan Technological University, 1400 Townsend Drive, Houghton, Michigan, 49931-1295.

Cover photo
Quincy Mine No. 2
Shaft Rockhouse
Jet Lowe Photo, HAER

Acknowledgements

Several persons helped with the preparation of this work, and their contributions need to be acknowledged. Undergraduates at MTU, either as an independent study project or as part of their requirements for a course in the history of the Copper Country, collected data on many of the sites discussed here. My thanks go out to Chad Lehner, Amanda Neuenschwander, Corey Oscarson, Eric Marshall, Steven Cross, and Brian Arneson (Brian also produced some of the maps used in the volume). Dorothy Quirk, a graduate student in Michigan Tech's Graduate Program in Industrial History and Archaeology, also provided research assistance. Ed Yarbrough, of the National Park Service, shared some of his material on historic Calumet, while Kim Hoagland of Michigan Tech did the same for the Central mine. Erik Nordberg and Kay Masters of the Michigan Technological University and Copper Country Archives also provided invaluable assistance. Terry Reynolds, Pat Martin, and Kim Hoagland read the manuscript and suggested improvements; Bill Tembreull scanned the photos, and Arlene Johnson (both of MTU Publications/Photo Services), was the designer.

—L. L.

Preface

This publication is not intended to be a comprehensive history of the Keweenaw Peninsula or of its copper mining industry, yet it does attempt to outline those histories. It is not intended as a comprehensive guide to industrial archeology sites, one that mentions every last mine and mill, or might give very detailed descriptions of a shafthouse here, a steam stamp there, or a reverberatory furnace building somewhere else. Yet it does describe mining, milling, and smelting on the Keweenaw, and tells how, when, and where they operated. It also indicates where some of the best physical remains of historic technologies and industries can be found along the peninsula today.

What this volume really hopes to do best, in addition to the aspirations mentioned above, is to give visitors to the Keweenaw an appreciation for how the land was settled, and an understanding of why various centers of business, industry, and community ended up where they did, doing what they did. The "artifact" or "historic site" we want to study here is the Keweenaw as a whole, from Copper Harbor down to Ontonagon. We want to see, in general, how this land was transformed after the mine rush of the 1840s to meet the needs of commerce, transportation, mining, milling, smelting, and community.

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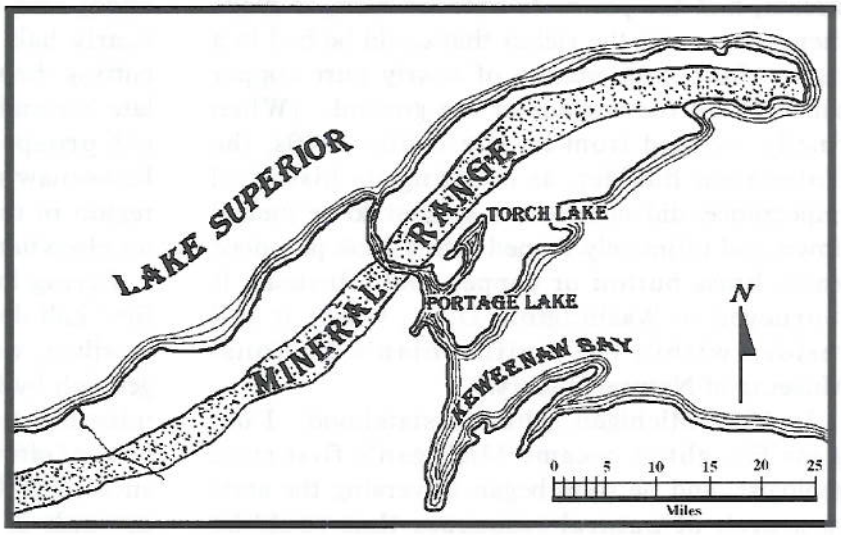
1 Keweenaw Copper: An Introduction

In the early 1840s, Upper Michigan's Keweenaw Peninsula became a remote outpost on the American frontier. American settlers came here from the likes of New England, New York, and Lower Michigan. Immigrants from Canada, Ireland, Germany, and England's Cornwall joined them. The settlers came as prospectors, speculators, investors, geologists, and miners. Others arrived in the dress of shop, hotel or house-keepers, as mechanics or skilled tradesmen, as U. S. soldiers, or as wives, mothers or children. They came to play a host of different social roles on Lake Superior, but they all came for one reason: copper. If the copper hadn't been here, the Americans and Europeans wouldn't have come, and the peninsula would have remained home only to a small band of Ojibwe peoples.

Keweenaw copper represented an enticing geological novelty. About 880 to 1,000 million years ago—surely no short span of time—the Keweenaw land mass was formed. Volcanic activity laid down several hundred layers of basaltic rock, which interbedded with sedimentary materials—sand, stones, and boulders—put down by erosion. These many rock strata did not remain horizontal. As the earth's crust changed and shifted, they were bent into a bowl shape. One upturned edge formed the Keweenaw Peninsula, while another surfaced as Isle Royale. Copper entered this picture dissolved in a hot solution that was expelled upwards into these rock strata from deeper in the earth. In some places, very dense, impermeable rock kept the solution out. But in more permeable rock, the solution flowed into large and small cavities alike. Then an unusual geological event occurred. The copper precipitated out of solution not as a compound, but as native, metallic copper.

Billions of pounds of the red metal underlay the Keweenaw, bound up in a matrix of ancient basaltic or sedimentary rock. Much of the copper existed as small flecks; other deposits, which had been formed in large fissures, weighed hundreds of tons. While the underground copper was of course invisible to early human visitors to the area, other copper specimens were not, because



The copper-bearing mineral range ran along the central spine of the Keweenaw Peninsula. The mining companies searched here for mass, amygdaloid, and conglomerate deposits.
(Brian Arneson)

they sat right on the surface. Glaciers had scoured and "mined" the upturned edges of copper-charged lodes. They had snagged pieces of mass copper, carried them along, and then dropped them off, leaving them to repose on hillsides or along riverbanks.

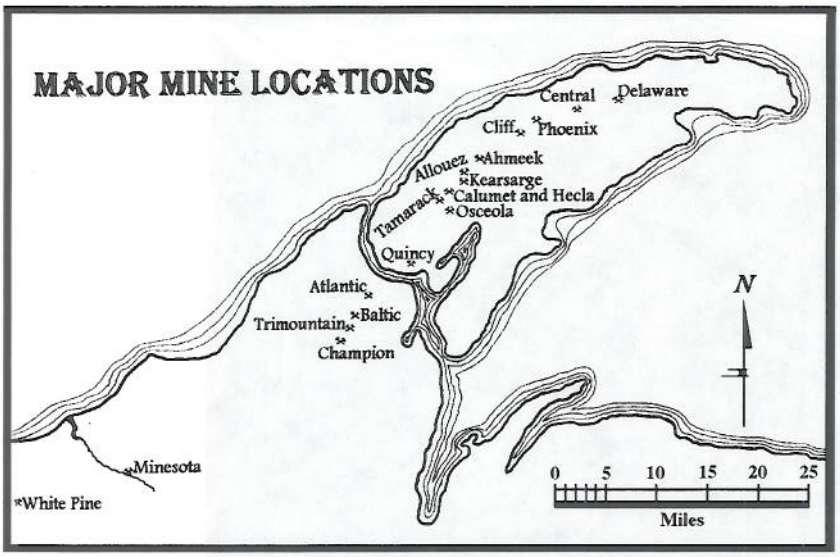
At least 5,000 years ago, Native Americans discovered and started using Keweenaw copper. They collected it from the surface. They also followed the copper into the ground, using hammerstones and other tools to excavate pits and even shallow shafts. After liberating the copper—which needed no smelting—they worked it into ornaments and tools and traded it widely across the North American continent.

During America's colonial era, both the British and the French learned of the copper from Indians and sent expeditions to the Keweenaw to explore its metallic wealth. At that early date, any and all attempts to start mining the copper were futile, but they helped spread word of the curious, metallic copper to be found on Lake Superior's south shore. In the 1820s and '30s, explorations to the region continued, sometimes with the sponsorship of the United States government. Nearly all these early visitors made a difficult wilderness pilgrimage up the Ontonagon River valley to see the Keweenaw's most famous copper specimen: the legendary Ontonagon Boulder. This "nugget" of copper, weighing nearly 4,000 pounds and sitting right alongside the stream, had the power to enthuse men, to make them conjure up the riches that could be had in a place where large masses of nearly pure copper sat right on the surface of the ground. (When finally wrested from its site in the 1840s, the Ontonagon Boulder, as befitting its historical importance, did not go to a smelter to be melted down and ultimately turned into a cook pot, door knob, brass button or copper roof. Instead, it journeyed to Washington, D. C., where it still resides within the Smithsonian's National Museum of Natural History.)

In 1837 Michigan achieved statehood. Douglass Houghton became Michigan's first state geologist, and he soon began traversing the state in search of natural resources that could be tapped to create jobs, economic growth, and wealth within the new state's boundaries. Houghton had been to the Keweenaw before. He went there again to assess the nature, breadth, and value of its copper deposits. In 1840, in reporting on the copper lands to the Michigan legislature, Houghton sounded a note of caution. It would be hard to launch a mining industry in such a remote wilderness. Nowhere in the world had a successful industry been dedicated to mining native, metallic copper. Mining the Keweenaw in the near future would be a very risky venture, and surely much money would be lost.

Despite Houghton's personal and professional misgivings and cautions, his work—coupled with the newsworthy removal of the Ontonagon Boulder from Lake Superior to the East—helped trigger a mine rush to the Keweenaw in the early 1840s. Thousands travelled out to the copper, mostly by water, and many on small boats guided and rowed across Lake Superior by colorful voyageurs. In accordance with Douglass Houghton's predictions, trying to settle this region and build up a profitable copper industry proved no easy task. Houghton himself drowned while coasting off the Keweenaw in a small vessel in 1845. Settlers coped with beautiful yet dangerous Lake Superior; with thick, tangled woods and swamps that thwarted overland transportation; with black flies and mosquitoes that made any early summer in the woods a miserable experience; and with snow, ice and winter lasting nearly half the year and freezing them out and cutting them off from "the world below" between late November and early May. Many of the earliest prospectors and speculators found the Keweenaw so inhospitable that they explored the region in the summer only and then fled to winter elsewhere in greater comfort and security.

Paying lodes of copper proved elusive in the first half-decade of mining. Copper, unlike gold or silver, was no precious metal. Nobody could get rich by finding just a little of it. A profitable mine had to extract ton after ton after ton. That level of effort precluded small scale operations. A successful Keweenaw copper mine had to employ upwards of a hundred men and erect a physical



Mass mines to the north, like the Cliff, and to the south, like the Minesota, sustained the early copper industry—but after 1860 the amygdaloid and conglomerate mines in Houghton County, both north and south of Portage Lake, produced the great majority of the copper. (Brian Arneson)

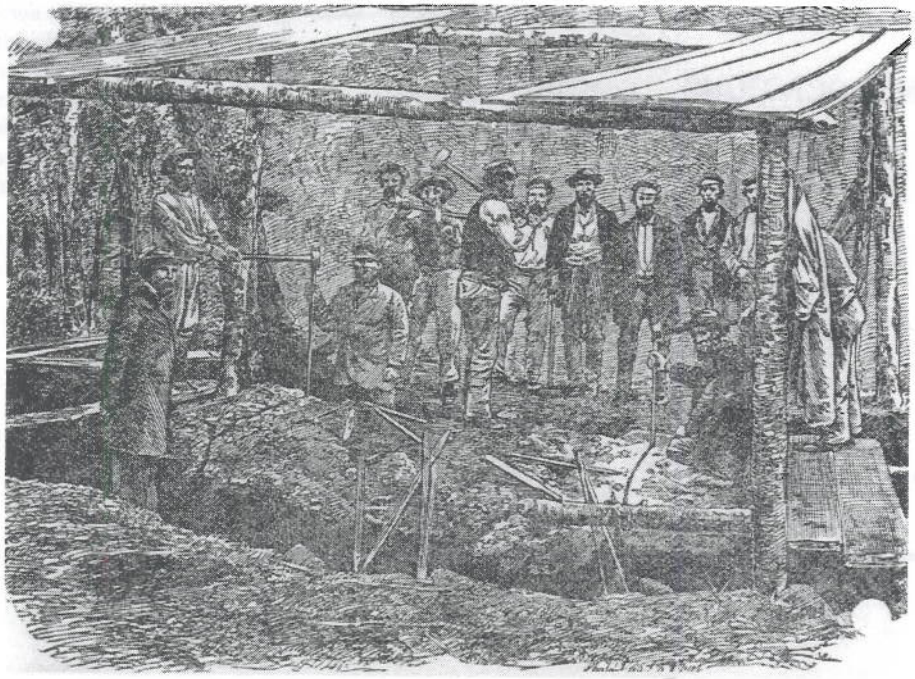
plant of considerable size. Because this new industry's capital requirements were high, while the chances of success were low, the incorporated mining company became the preferred means of opening new mines. The companies garnered needed capital by tapping a host of investors, instead of just a few, and each investor had a limited stake in this risky business.

The numerous copper-bearing lodes that outcropped along the central spine of the Keweenaw followed a northeast to southwest strike. Most of these lodes were charged with "amygdaloid" copper, which had been deposited in almond-shaped cavities in basaltic rock. Other lodes held "conglomerate" copper, so-called because it was bound up in a conglomeration of sedimentary materials: sand, stones, and boulders. At intervals, fissure veins cut across the long, linear amydgdaloid and conglomerate lodes at nearly right angles. These fissures were sometimes charged with large masses of copper weighing up to several hundred tons.

The earliest companies searched—often futilely—for large deposits of mass copper found in fissure veins. The first few years of mining failed to produce any mass copper bonanzas; the mine rush to Lake Superior slowed; and wealthy investors and rugged pioneers alike became discouraged. But then the Pittsburgh and Boston Mining Company —quite literally—turned the fortunes of the district around. On the northern end of the Keweenaw, the company struck it rich at the Cliff mine and started paying out millions of dollars of dividends to its investors, starting in 1849.

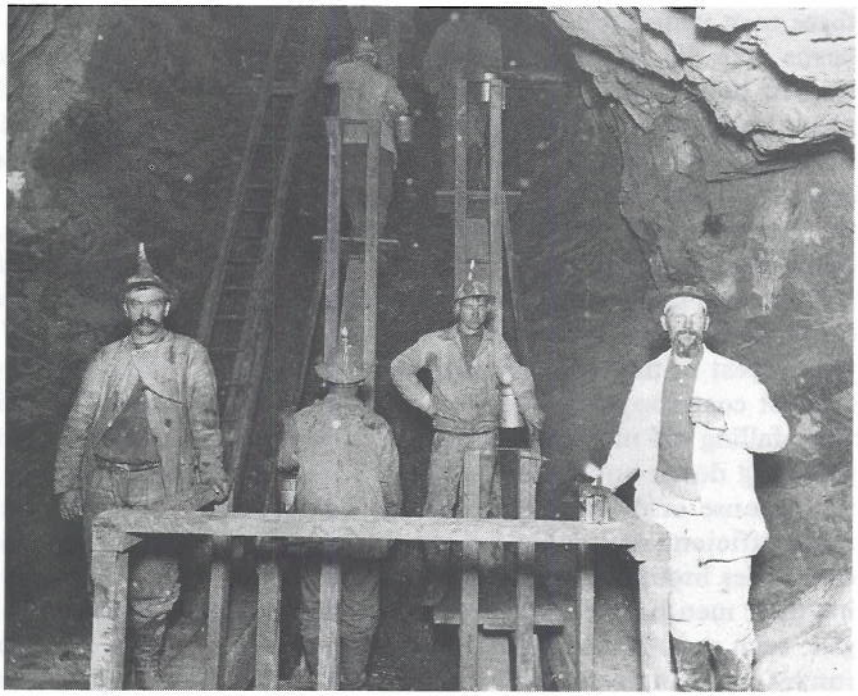
The Cliff mine's success revitalized the nascent industry. Companies pressed ahead, and although most would fail, enough succeeded in handsome fashion to make Keweenaw copper a profit-making enterprise. In the 1850s, the Minesota [sic] mine uncovered a second mass copper bonanza, this time at the Keweenaw's southern base. In the late 1850s and early 1860s, a clutch of new, important mines—including the Quincy—opened not on fissure veins, but on amygdaloid lodes uncovered in the peninsula's middle, at Portage Lake. A bit later, about a dozen miles north of Portage Lake, Edwin Hulbert discovered the richest of all Keweenaw lodes: the Calumet Conglomerate. By the early 1870s, the Calumet and Hecla Mining Company, working that lode, became one of the world's largest and richest mines.

Altogether, it took nearly thirty years, from the 1840s till the early 1870s, to transform a remote wilderness into a rigorous mining district—thirty years of frontier existence, during which time set-



Miners parted large finds of mass copper using sledge hammers and special chisels.
(MTU Archives and Copper Country Historical Collections)

Sixty-seven levels underground at the No. 6 Hecla shaft, one miner prepares to drill while three others tend to the important task of barring down loose rock from the hanging wall.
(MTU Archives and Copper Country Historical Collections)



Underground workers at Quincy rode a man-engine into the mine from the 1860s till the 1890s. Note the mining garb, lunch pails, and candles. (MTU Archives and Copper Country Historical Collections)

tlers sorted out the region's geology, came up with effective mining, milling and smelting technologies, and all the while erected a social infrastructure replete with houses, roads, merchants, professionals, schools, churches, and other trappings of "civilization." An industry that had once been called a chancy, "subterranean lottery" became a dominant feature of the landscape and settled in for nearly 125 years of mining native copper.

Almost as soon as the Lake mines opened, they dominated American copper production. From 1850 through the late 1880s, Michigan accounted for at least half the nation's output, sometimes accounting for as much as ninety percent. Calumet and Hecla, taken alone, sometimes produced nearly two-thirds of Michigan's production, and the central portion of the Keweenaw (Houghton County) became the hard-working core of the industry, because it included the region's biggest mines, mills, and smelters.

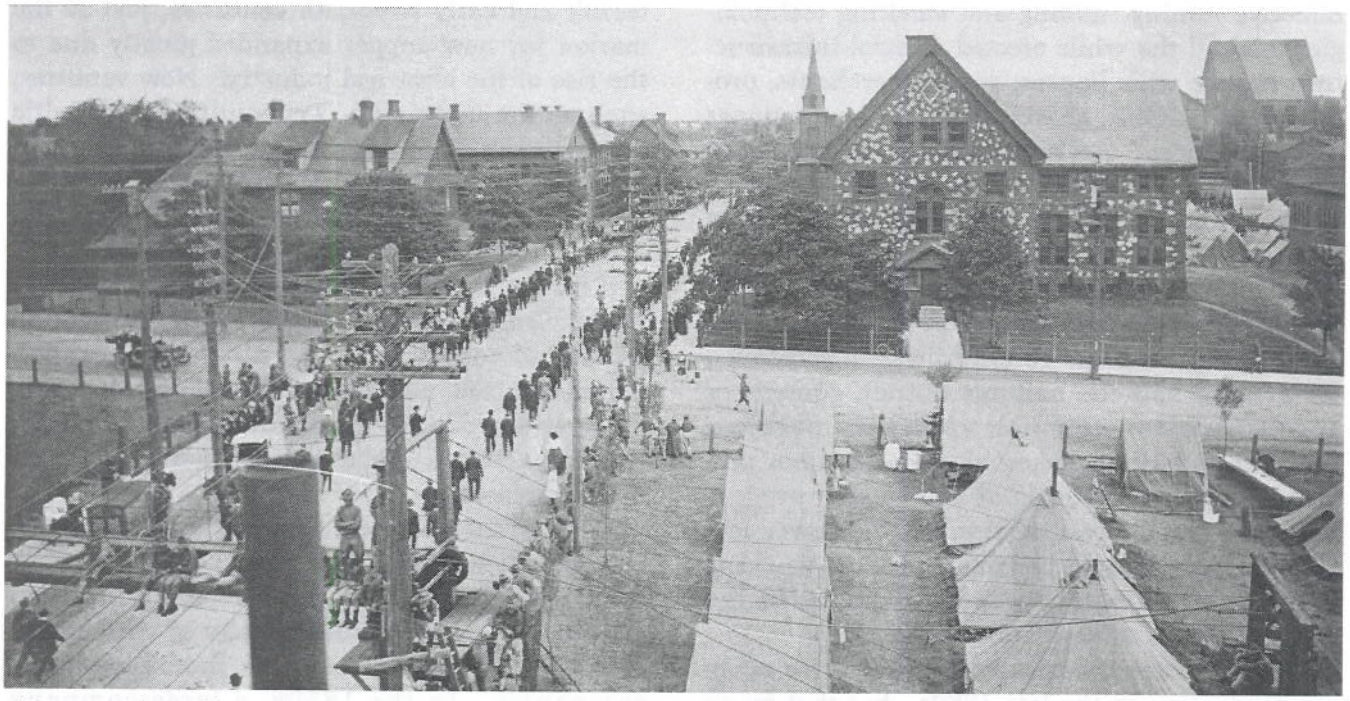
Butte, Montana, surpassed Lake Superior's copper production in the late 1880s—but that by no means indicated that the Keweenaw mines had gone into decline. On the contrary, they underwent considerable expansion in the late nineteenth and early twentieth centuries, just as the market for new copper expanded greatly due to the rise of the electrical industry. New ventures, such as the Champion, Trimountain and Baltic mines, opened up in the late-to-be-discovered South Range mining district in Houghton County. Mining experienced a revival on both the northern end of the Keweenaw (Keweenaw County) and on the southern base (Ontonagon Country). By 1900, the mines produced about 150 million pounds of copper annually, up from 50 million pounds in 1880 and 100 million pounds in 1890. They still produced about one-fourth of America's new copper, while the bulk now came from western mines.

Early in the twentieth century, however, not all was well at the Lake mines or in their attendant communities. Social and labor relations had been strained by a growing multiplicity of rival ethnic groups and by the rise of larger, more impersonal companies. In the 1850s, a large company employed maybe 200 workers; by 1910, Calumet and Hecla alone employed nearly 5,000. Many of

these men were Finns, Italians, or eastern Europeans who did not come from mining traditions in their homeland, and who found mine work on Lake Superior to be hard, disagreeable, and unsafe. At the time, more than a man a week on average, or about 60 men a year, were dying in the local mines, most often in rock falls coming down from the hanging wall.

The men had their set of problems and concerns; so did the companies. Their mines were the deepest in the United States and the nation's highest cost copper producers. Copper values were falling off in many key lodes. Lodes were pinching down and become harder—adding to the expense of drilling and blasting. To become more efficient and achieve productivity gains, companies brought in new experts, started pushing their men harder, and adopted new technologies, such as rock drilling machines that could be run by one man, instead of two.

In 1913, lingering labor-management problems in the industry became more contentious and immediate, resulting in a district-wide strike being called on July 23 by locals of the Western Federation of Miners. This bitter, divisive and sometimes deadly labor conflict lasted into early April, 1914, when the soundly beaten union finally caved in to the well-financed, powerful companies. Over the strike's span of eight and a half months, the Keweenaw lost its reputation as a harmonious labor district. Both the strikers and the companies perpetrated acts of violence, and in the midst of all this social tumult, a great tragedy occurred in Calumet. In the afternoon of Christmas Eve, strikers' families held a party upstairs at the Italian Hall. Santa Claus had come and gone, distributing small gifts to the children. Then, for whatever reason—perhaps the yelling of "Fire!"—hundreds raced to the exit and down the stairs. At the bottom of the steps, a human log-jam formed. As more and more people piled on, persons at the bottom began to be crushed under the weight of their friends and die of asphyxiation. All told, the Italian Hall disaster claimed 74 victims. Fifty of them were children aged sixteen and under.



The worst labor strike in Copper Country history occurred in 1913-14. This strike photo, taken at the intersection of Red Jacket Road and Mine Street at Calumet, shows the National Guard encampment there. The three C&H structures (from left to right) are the Agassiz house, the main office building, and library. (MTU Archives and Copper Country Historical Collections)

Most major mines on the Keweenaw operated their own railroads to run stamp rock from mine to mill and, for some, to run concentrated mineral from mill to smelter. Keeping the rail lines open in winter was no easy task, as attested to by this 1893 photo of a C&H locomotive. (MTU Archives and Copper Country Historical Collections)

The hopeless strike, attended by the Christmas Eve tragedy at Calumet, represented a social nadir in the history of the Copper Country. Ironically, this low point occurred within a short stretch of time, about 1910 to 1917, when the district reached several important all-time peaks: a total population of about 100,000 persons; copper-industry employment of 15,000 to 18,000 workers; annual production hitting up to 270 million pounds of ingot copper; and $24 million in dividends paid out in a single year.

The First World War era—due to its high prices and high demand for copper—provided this faltering mining district with a final hurrah, in terms of production and profitability. Shortly after the war, in 1920-21, the onset of permanent decline arrived. Nations and industries dumped surplus war-time copper on the market, prices plummeted, and the entire American copper industry suffered, but especially so the Lake Superior mines. Mines closed, some permanently. In 1921—for the first time since 1849—the district paid no dividends to stockholders.

The Lake copper mines did not succumb easily to their economic problems, but instead fought back in order to get the most out of their properties, even in hard times. Companies, especially Calumet and Hecla, conducted large scale geological explorations, trying to find new sources of copper. Mines consolidated, with bigger firms taking control over the operations of smaller ones. They assessed their operations, shaft by shaft, mill by mill, keeping efficient ones open and closing down others that only promised to run in the red. They continued to adopt new technologies: drills and explosives, power shovels and electric haulage locomotives underground, and on the surface, larger smelters with semi-

automatic casting machines for producing ingots. With Calumet and Hecla leading the way, several companies opened new shallow "mines": the lake bottoms on the margins of their stamp mills. Using improved recovery techniques, they dredged up discarded stamp sands, reground them, and salvaged copper that had been discarded and lost in early decades. And finally, companies began to diversify. Instead of just producing copper ingots and cakes, they entered into manufacturing by acquiring or creating companies that produced brass and copper articles, such as pipes or tubing. They dealt in copper-based chemicals, foundry products, land sales, bus lines, and even water companies.

All these efforts and strategies added nearly a half-century to the working lives of companies such as Calumet and Hecla, Quincy, and Copper Range. Permanent decline started in 1920, but the last of the native copper mining firms did not shut down until the late 1960s. Over the intervening decades, production, employment, and profitability never approached past performance benchmarks. The region's importance as a copper producer kept dwindling. The Lake mines produced 20 percent of the nation's copper in 1910; 15 percent in 1920; 10 percent in 1930; and only about 5 percent by 1940. Over that same span, total employment in the industry declined from 18,000 in 1910 to 3,500 in 1940.

As the industry downsized, the Keweenaw correspondingly lost much of its population. Houghton County lost more than half its residents between 1910 and 1945, as its population dropped precipitously from 88,000 to only 40,000. Local economic decline forced people out. They had to move to find jobs and secure futures. As people left, housing became vacant, entire neighborhoods disappeared, and surplus schools, churches, shops and stores closed. On the one hand, outmigration and the dwindling of the region's human institutions was a sad thing. But on the other hand, it was good that so many people moved out. Good that they could go to Detroit and work in the auto plants, or go west to work in other mines. That fate was far better than staying put and being trapped in unemployment and poverty.

The Second World War, unlike the First, brought no great boom to the region. The same was largely true of the Korean War—with one notable exception. In the early 1950s, the United States was a net importer of copper, and as the Korean conflict was starting the government acted to boost domestic production of the metal. The Copper Range company, still operating its now marginal native copper mines in the vicinity of Painesdale, received a $57 million construction loan from the government, as well as a contract to purchase 243,750 pounds of copper. With these inducements in hand, Copper Range worked to open its new White Pine mine in 1955.

White Pine, however, was not really a part of the historic native copper district. Located nearly 75 miles southwest of the heart of the traditional mineral range, White Pine was an entirely different type of Michigan copper producer. Its rock was a shale, not basaltic or conglomerate rock—a buried, 300-million-ton ore body that contained relatively little native copper and was mostly chalcocite, or copper sulphide, in grains so small as to be practically invisible. To work this deposit (which it did until closing in the mid-1990s), White Pine employed mining, milling and smelting technologies unlike those of any native copper mine.

While White Pine became Michigan's largest copper producer, back up on the Keweenaw Peninsula, only the Copper Range and Calumet and Hecla companies continued to mine native copper through the 1950s and into the 1960s. At regular intervals, the copper companies confronted labor problems and strikes. Like two old boxers, laborers and managers went at each other, round after round. Workers legitimately wanted more, while the managers of old and marginal producers claimed they had nothing more to give. Finally, Copper Range closed its Champion mine in 1967, and the final curtain came down on Calumet and Hecla's mining division two years later.

Save for some small scale and exploring operations to be conducted a bit later, the Lake Superior native copper mining industry, born in the early 1840s, was finally out of business in 1969. It had been a long and interesting run, and a historically significant one. These had been some of

the earliest, large-scale, incorporated mining operations. They had pioneered in hard-rock, deep-shaft mining techniques. And few other mineral ranges in America had supported such long-term production.

The Keweenaw's mines had produced 10.5 billion pounds of copper. They had made fortunes for some, such as Alexander Agassiz, the Harvard professor and president of Calumet and Hecla from 1871 till 1910, and William Paine, the New Englander who grew rich off Michigan copper and lent his name not only to the village of Painesdale on the Keweenaw, but also to the investment firm of Paine, Webber, and Company. The mines also produced jobs for tens of thousands of blue collar workers, most of whom had migrated to America from the British Isles, Europe, and Canada. Some of these men took pride in mine work and liked it; others (especially many of the Finns and southern and eastern Europeans who arrived near the turn of the century and later) hated it and protested that the mining companies treated them like beasts of burden. And no small number of men—about 2,000—had died in pursuit of the red metal, in mines that followed their inclined lodes as far as 9,200 feet into the ground.

Today, traces of the dead mine workers can be found in numerous local cemeteries, while traces of the dead mining industry can be found in the cities and villages that look like time has stood still since about 1910; in the company houses that still line so many streets; in the industrial ruins of mines, mills and smelters; and in the stamp sand beaches of local lakes that mark where ponderous steam-powered stamps had once pounded wealth out of rock.

One of many unneeded, abandoned workers' houses in Quincy's Lower Pewabic neighborhood, photographed in 1941. Today, cellar holes mark where three dozen houses like this had once stood.
(Library of Congress)

Certificate of Heroism

The Citizens of Hancock, Michigan and vicinity

Present to Baden Sincock

this testimonial in ritation for heroic service performed in behalf of fellow workmen entombed by a fall of ground in the Quincy Mine on Saturday, October 29, 1927, resulting in the death of seven men employed as timbermen in No. 2 shaft.

The prompt manner in which you and your co-workers responded, and the heroism exhibited by the entire crew engaged in the work of recovering the bodies of those who lost their lives have inspired the citizenry of this community to publicly recognize your valor and intrepidity. Your conduct in this instance emphasized the fact that the age-old traditions of mining were again exemplified in the highest degree.

It is well understood that no monetary emolument can compensate you for the risk involved and the bravery shown, and, for that reason, the citizens of Hancock and vicinity present to you this testimonial in recognition of your heroic conduct.

The Citizens of Hancock and Vicinity

Dated at Hancock, Michigan,
this the fifteenth
Nineteen hundred twenty-eight.

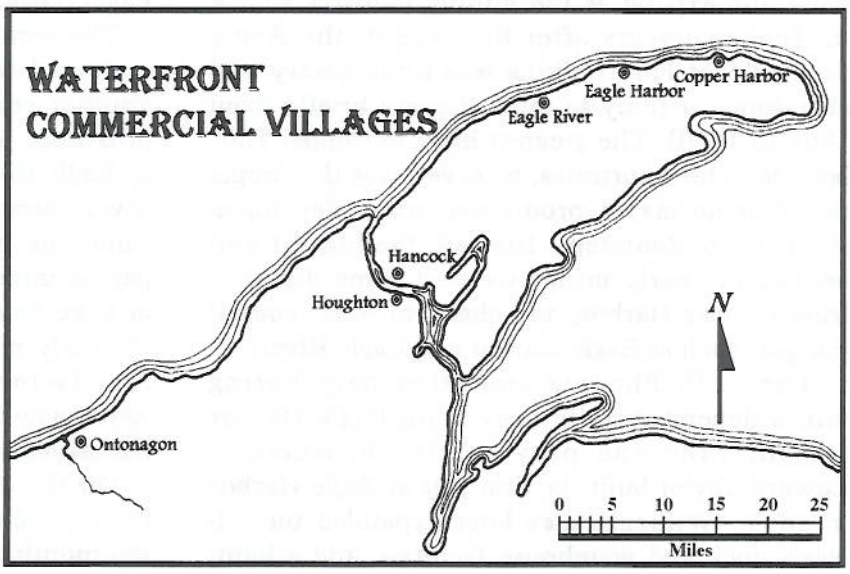
Quincy's No. 2 shaft suffered a major fire in July, 1927. In October, seven men working to retimber the shaft died when a fall of rock came down on them. The citizens of Hancock gave a "Certificate of Heroism" to Baden Sincock and 69 other men who went down No. 2 to try to save their co-workers.
(Sincock family)

2 On Water's Edge: Commercial Villages

Starting in the 1840s, mining companies and settlers began dotting the Keweenaw Peninsula with many new communities. Companies put their mine villages—called "locations"—in the hinterland along the mineral range, where the copper was. But not all new villages were dedicated to mining. Some, instead, arose on this frontier to fulfill trade, commerce and transportation needs. In the 1840s and 1850s, important commercial villages sprang up on the shores of Lake Superior and astride Portage Lake. They went to where the water met the land, because water-borne transportation linked the Keweenaw frontier with the "world below." People came in and the copper went out on boats.

At these commercial villages, shipping lanes ended at harbors, at wharves and docks, where new and primitive roads began. These roads ran away from the water, through the woods, toward isolated mine locations, perhaps two to fifteen miles distant. At the locations, companies erected houses and maybe made provisions for a store or two to operate, but they usually did little to develop a well-rounded or complete commercial district, and they also kept bars from opening on their property. Consequently, settlers at mine locations in the interior travelled back and forth to the nearest shoreline village to take advantage of the shops, services, and entertainments to be found there, be they barbers or druggists, or barrels of flour or whiskey.

When the mine rush first began in the early 1840s, prospectors, geologists, and speculators flocked to Copper Harbor, on the northern tip of the Keweenaw. Copper Harbor was the region's first village of note. The federal government set up its land office here to handle mining claims and property transactions. In 1844 it erected Fort Wilkins at Copper Harbor as a protective measure and symbol of authority, intended to discourage hostile and uncivil activities. Recognizing the importance of Copper Harbor as a port of call, the U. S. Lighthouse Establishment put up its first lighthouse in the region at Copper Harbor in 1849.



Located on the water, the region's early commercial villages serviced hinterland mines. Here, the early supplies came in and the copper went out. (Brian Arneson)

The U. S. Army garrisoned Copper Harbor's Fort Wilkins only briefly during the mid-1840s and again during the late 1860s. Today, it is a Michigan State Park.
(MTU Archives and Copper Country Historical Collections)

At first, Copper Harbor was a picturesque tent city. Highly transient explorers pitched their tents alongside the harbor as they came and went—and many of these tent dwellers at Copper Harbor boarded a boat in the fall to avoid having to winter on the Keweenaw. But soon log cabins, small shops, and even a hotel or two came along to bring a greater appearance of comfort and permanence to this outpost.

Copper Harbor, however, did not continue to grow and expand as the mining industry rooted in. Just two years after building it, the Army decided that Fort Wilkins was unnecessary and abandoned it (only to open it again briefly from 1867 to 1870). The greatest blow to Copper Harbor's long-term fortunes, however, was the simple fact that no major, productive mines developed right on its doorstep. Instead, the biggest and best of the early mines were at some distance from Copper Harbor, and closer to other coastal villages, such as Eagle Harbor and Eagle River.

The Cliff, Phoenix and other neighboring mines depended quite heavily on Eagle Harbor for shipping and provisioning businesses. Edward Taylor built the first pier at Eagle Harbor in 1844. William Raley later expanded the village's dock and warehouse facilities, and a lighthouse went up in 1851. Eagle Harbor, by the 1850s, boasted more hotels, stores, churches, and drinking establishments than any of the hinterland mine locations. One early general store, which Foley & Smith established in the 1850s, still survives and is open for business. Henry Hobart, the schoolteacher at the Cliff mine during the Civil War, recorded in his diary trips made to Eagle Harbor for the purpose of shopping, or to have his students compete in spelling bees against Eagle Harbor's young scholars.

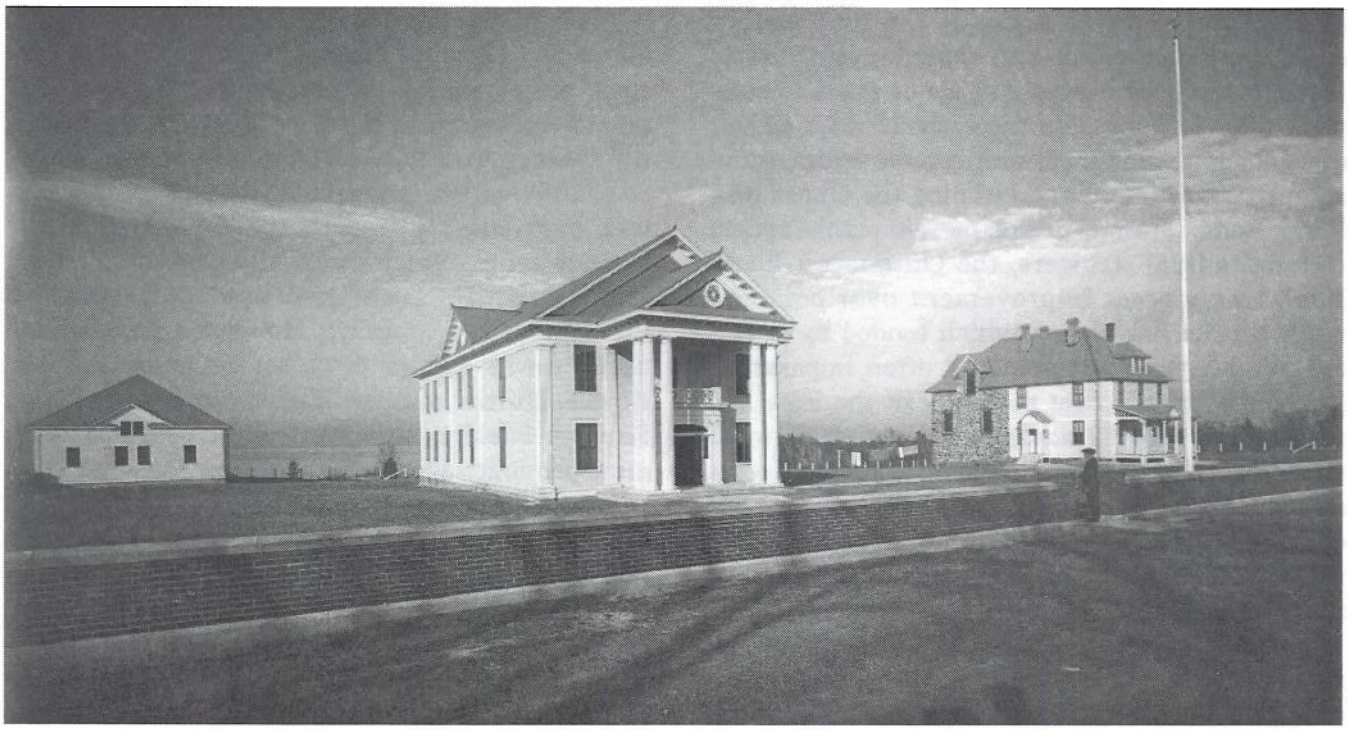
The community of Eagle River, although not endowed with a fine natural harbor, became another coastal center of commerce due to its proximity to mine locations. The land occupied by Eagle River was first obtained from the federal government in 1843 by the Lake Superior Copper Company, which tried—and failed—to start a paying mine a bit upstream of the river's mouth at Lake Superior. Eagle River also hosted one of the early manufactories in the copper district, a fuse factory. Eagle River became the seat of Keweenaw County in the 1860s, and its early and handsome courthouse still survives.

On the southern end of the mineral range, at the base of the peninsula, Ontonagon—located at the mouth of the Ontonagon River—became the

LIGHT HOUSE AND BARK HOUSES AT EAGLE HARBOR.

Eagle Harbor received its first lighthouse in 1851. That light, along with bark houses, is shown here in an 1853 illustration from Harper's New Monthly Magazine. (MTU Archives and Copper Country Historical Collections)

The Foley and Smith General Store, opened in the 1850s in Eagle Harbor, still functions there as a store—and some of its early business records still survive, too, within MTU's Copper Country Historical Collections. (MTU Archives and Copper Country Historical Collections)



Eagle River became the seat of Keweenaw County in the 1860s. Today, its courthouse and jail from that era still survive. (MTU Archives and Copper Country Historical Collections)

key commercial village. Prior to the mine rush, a small band of Indians had camped and fished at this site—they had also served as guides and helpers when the early explorers arrived to travel up the river to view the Ontonagon Boulder. After the rush started, some Native Americans stayed to catch and sell fish to new settlers, to help them navigate the river, and to load and unload cargo from the lake boats that, at first, had to anchor some distance offshore, due to a sandbar at the Ontonagon River's mouth.

James Paul helped found a permanent settlement at Ontonagon, starting in 1843. Ontonagon became the jumping-off point that serviced as many as thirty mines in the hinterland to the east, including the fabulously wealthy Minesota mine. As the only major port of call in its vicinity, and as the purveyor of goods and services to so many mines, Ontonagon thrived, particularly in the 1850s, and for a time was the largest settlement on the Keweenaw.

The Ontonagon River carried people and materials back and forth between the village and interior mine locations. In heading inland, early travellers went absolutely as far up the river as they could go, before rapids and shallow water forced them to use poor overland roads or trails to complete their journeys. In the early 1850s a cluster of mines improved their connections with Ontonagon by investing in and building the Ontonagon Plank Road. Formed of side-by-side planks spiked to longitudinal stringers, the Ontonagon Plank Road was a great improvement over common roads on the Keweenaw, which tended to be rutted, muddy, stump-strewn and often impassable. In the 1840s, the first pioneers in the area had made slow process hacking their way through dense forests, up hills, down ravines and across swamps and streams. A decade later, heading out of Ontonagon on the Plank Road, travellers could make good time riding a daily line of stage coaches running from Ontonagon out to a dozen mines.

Ontonagon improved its channel and docks, received a lighthouse, built hotels, welcomed druggists, erected schools and Protestant and Catholic churches, and became the seat of Ontonagon County. What limited its economic growth was the fact that the Minesota mine flourished for only a brief while, and although many other local mines flirted with profitability, they fell short. Mining declined on this end of the mineral range by 1870, and so did the fortunes of Ontonagon village. Meanwhile, the center of mining activity and growth shifted to the middle of the Keweenaw, which gave rise to two other waterfront centers of commerce: Hancock and Houghton on Portage Lake.

In the 1840s, many explorers made their way up into Portage Lake from Keweenaw Bay. They often arrived in canoes or other small vessels, guided and rowed by voyageurs. These early visitors remarked on the grand natural beauty of one particular stretch of Portage Lake—that stretch where high, steep, wooded hills came down to touch the shoreline. In the 1850s, this stretch of the Portage began taking on a very different appearance, as streets and roads lined with commercial, residential and industrial buildings now bordered the lake. The village of Hancock arose on the north side of the Portage; opposite Hancock, on the south shore, stood Houghton.

Each village served a cluster of mines on its own side of Portage Lake. On the hill above Hancock, after a decade of futility, in the late 1850s several mines entired full production, especially the Quincy, Pewabic and Franklin mines. Hancock's rise as an important, growing community was particularly tied to the fortunes of the Quincy mine, which originally owned much of the land that Hancock "grew into" as it expanded throughout the century. Houghton had several mines on its side of the lake, including the Isle Royale, Huron, and the Shelden and Columbian. Ransom Shelden, merchant, mine developer and entrepreneur, originally acquired the land that comprised Houghton. He set aside and platted part of it for a commercial village, while he reserved other portions as mining lands.

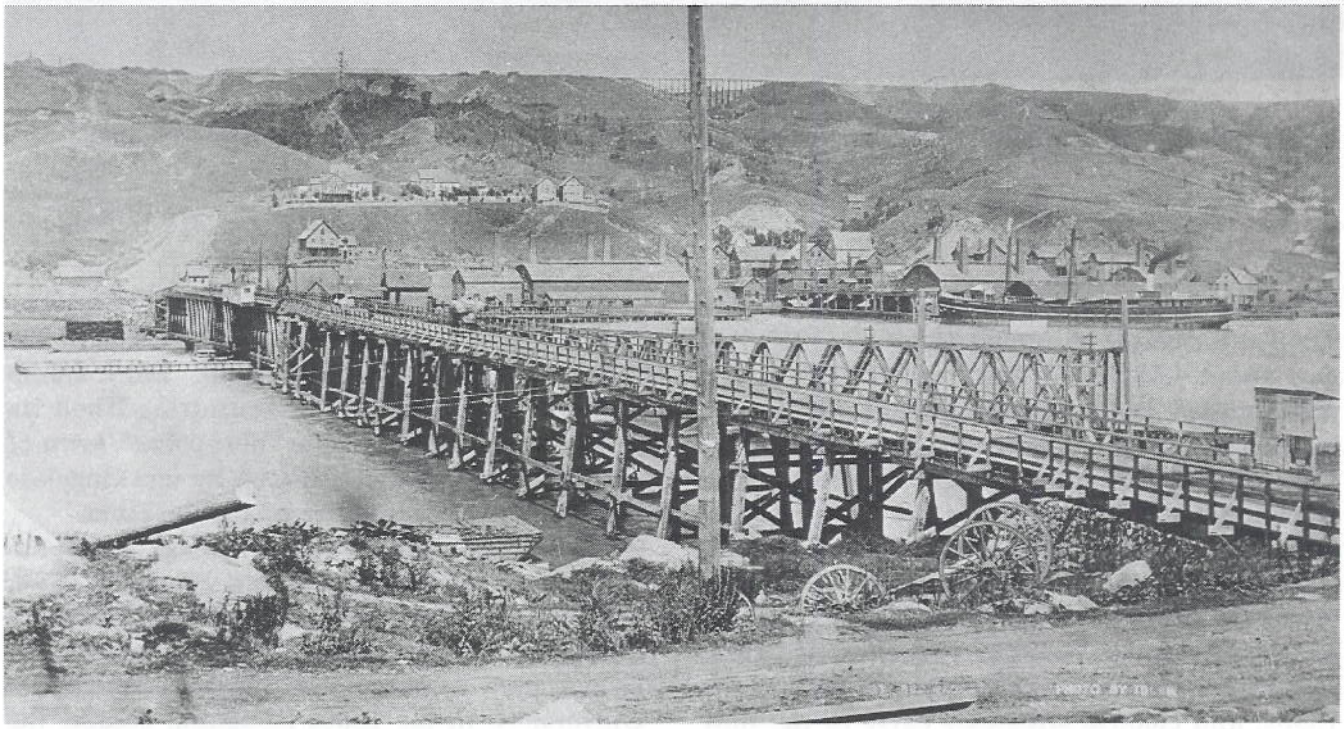
At first, the larger lake boats plying Superior could not pull up at Hancock and Houghton's docks, because they could not make it up the shallow, meandering channel leading to the villages from Keweenaw Bay. All the early cargo going into and out of Portage Lake had to do so on

lighters. In 1859, mining companies and merchants organized the Portage River Improvement Company to remove the sand bar at Keweenaw Bay and dredge and straighten the channel. When this company's work was done, any large boat that passed into Lake Superior through the locks at Sault Ste. Marie (which opened in 1855), could sail all the way to Houghton and Hancock.

Other internal improvements aided trade and commerce at Portage Lake. Initially, this water body opened up only to Keweenaw Bay on the east—its waters did not mingle with Superior's on the west, because a few miles of ground stood in the way. Between 1868 and 1873, steam-powered dredges ate this land away, creating a shipping channel cutting all the way across the Keweenaw.

The largest lake boats could now sail into or out of Houghton and Hancock in two directions. Another improvement arrived in 1876 that fostered trade and communication *between* the two villages: the first bridge across the Portage. In summer months, tugs and ferries had gone back and forth across the lake; in winter, cold weather formed an ice bridge crossed by pedestrians and horse-drawn stages on sleighs. Ice bridges were notoriously unreliable, especially early and late in the winter, when some unfortunate travellers were almost sure to take an icy bath. The initial wooden swing bridge was a great improvement over earlier means of passing between the Houghton and Hancock sides of the Portage.

Given their positions in the middle of the mineral range—where they would be flanked north and south by paying mines—and given their advantageous waterfront locations, both Hancock and Houghton experienced considerable growth throughout the nineteenth century and into the



A wooden bridge, with a swing section to accommodate ships, opened between Houghton and Hancock in 1876. On the Hancock-Ripley side of the Portage, a large lake boat is shown docked at the Detroit and Lake Superior smelter. The modern double-deck lift bridge over the Portage was completed in 1959. (MTU Archives and Copper Country Historical Collections)

This turn-of-the-century view overlooks the county courthouse in Houghton. Across Portage Lake, Hancock is on the left; the Detroit and Lake Superior smelter is on the right; and the Quincy mine occupies the hilltop.
(Library of Congress)

twentieth. (Hancock's population rose to nearly 9,000 at the height of mining activity in 1910; it is now about 4,550.) At first, both villages had a rather ragged, haphazard appearance: nondescript wooden buildings laid down on a raw hillside littered with tree stumps. More orderliness and architecture arrived by late in the 19th century, when the main streets dressed up a bit and masonry buildings began to appear. The two towns modernized as the decades rolled along. The Mineral Range Railroad started serving Hancock in the early 1870s. Electricity arrived in the 1890s, and electric streetcars early in the new century. Wonder to behold, between 1900 and 1910, concrete replaced the town's dirt and wooden sidewalks.

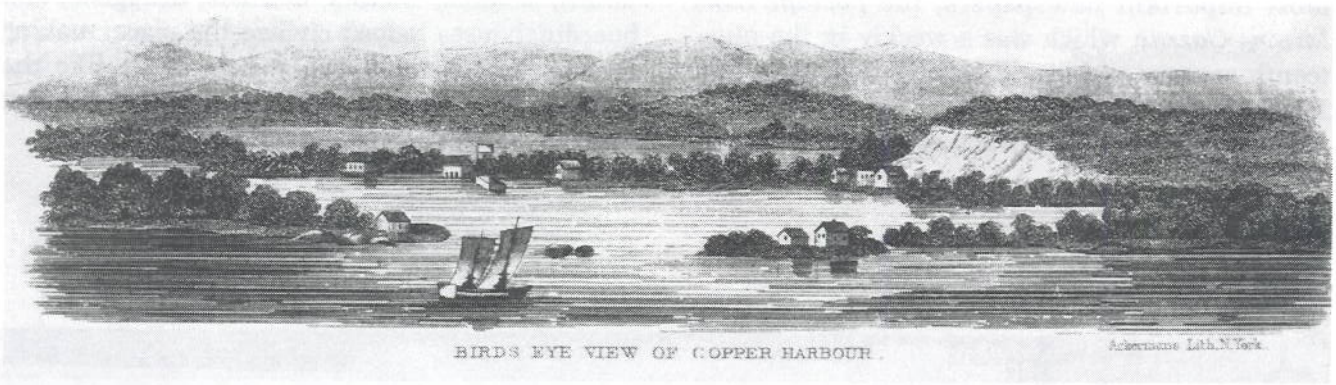
Houghton and Hancock were not mirror images of one another. The Hancock side of the Portage was more industrialized. More stamp mills, smelters, and iron foundries lined its shores. Hancock, the more "blue-collar" town of the two, was more dominated by workingclass society and immigrants, especially the Finns.

While Hancock had Suomi College and Seminary, established by Lutheran Finns in 1896, Houghton had snagged for itself the Michigan College of Mines, opened about a decade earlier (which grew to become Michigan Technological University). In the 1860s Houghton became the county seat, and its courthouse, erected in the late 1880s, was one of the finest public buildings in the Upper Peninsula. Houghton also boasted one

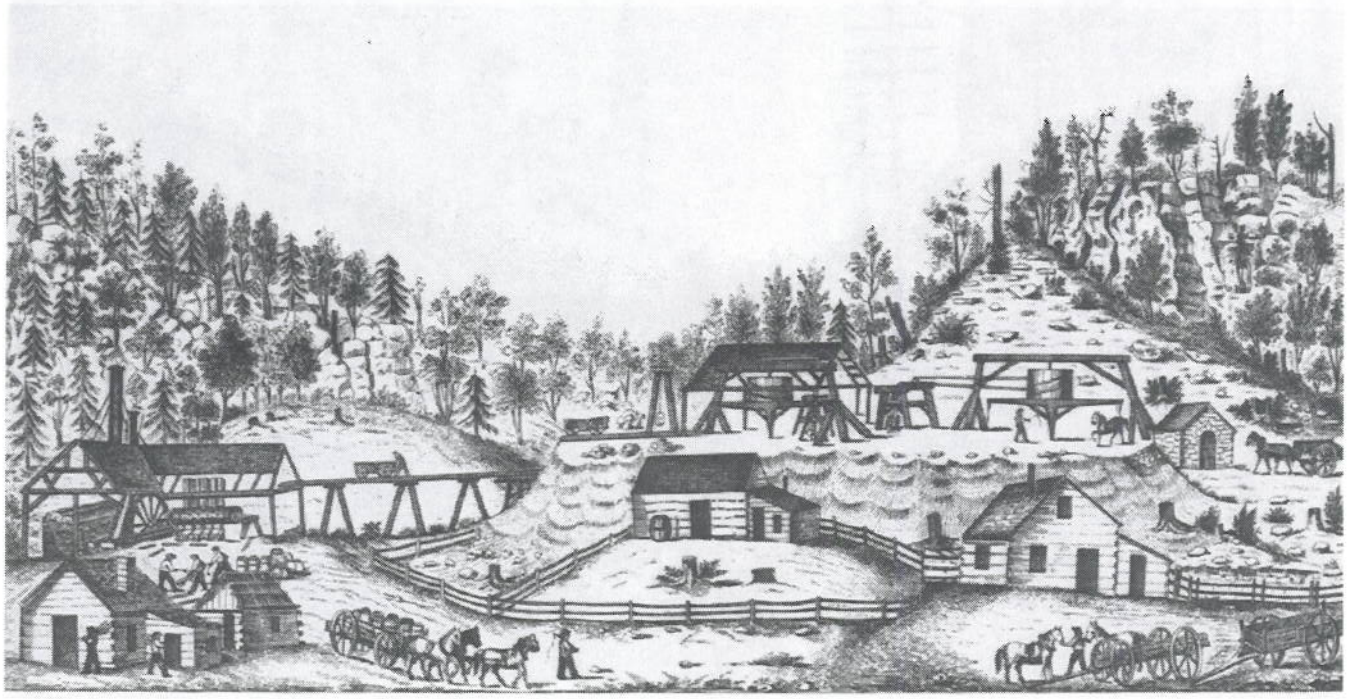
of the region's finest hotels, the Douglass House, and it laid claim to one of the region's oldest and most important newspapers, the *Portage Lake Mining Gazette,* which was a weekly in the nineteenth century and is still being published as the *Daily Mining Gazette.*

All the various waterfront commercial villages played key roles in settling the Copper Country. Their shops, stores, churches, courthouses, jails, hotels, schools, doctors, dentists, druggists, and boardinghouses helped civilize the place, making it more comfortable and secure, more like the "world below," and less like the wilderness that was here before the mine rush began.

View looking west down Quincy Street, Hancock's main thoroughfare. Taken at the end of the horse age, the photo shows that the street is still unpaved and shoppers strolled along board side walks.
(MTU Archives and Copper Country Historical Collections)



Copper Harbor, depicted here in a view published in 1849, hosted the earliest prospectors and miners, as well as the government's land office and Fort Wilkins.
(MTU Archives and Copper Country Historical Collections)



Leaving from hinterland mines sited along the mineral range, wagons carried copper over hurriedly built roads that ran to the shipping docks at waterfront commercial villages.
(MTU Archives and Copper Country Historical Collections)

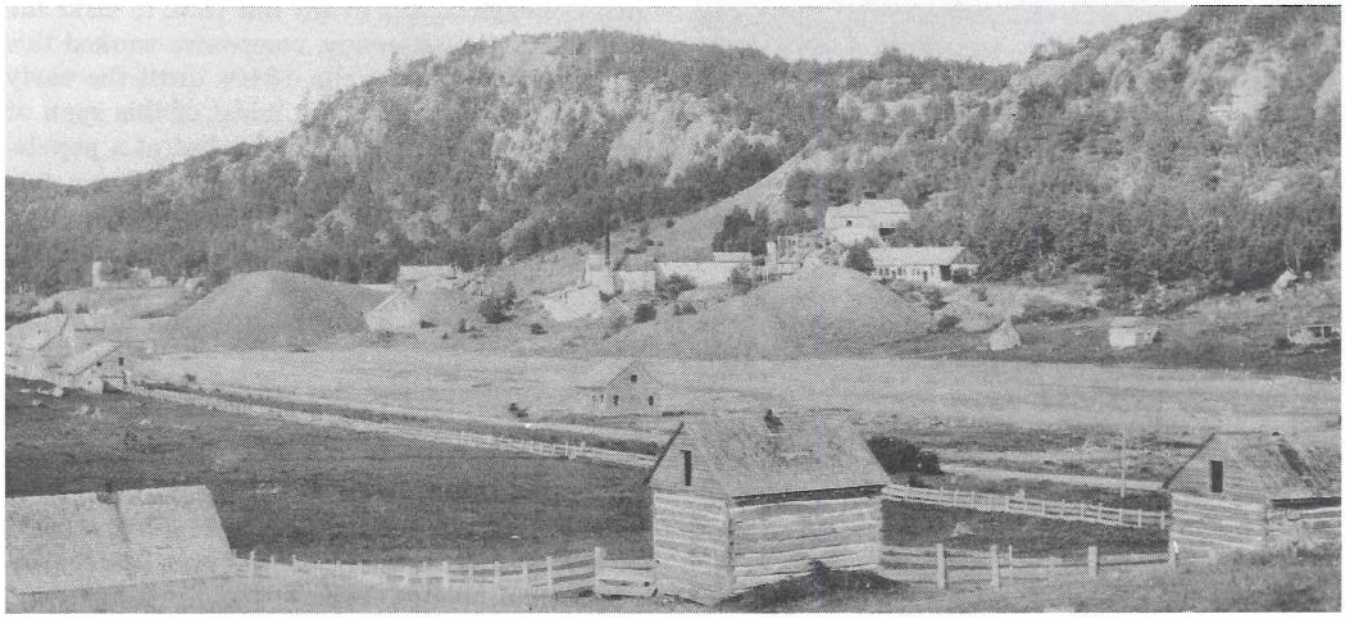
3 The Early Mass Copper Mines

In the 1840s and 1850s, mining companies, especially those operating in present-day Keweenaw and Ontonagon counties, largely ignored amygdaloid and conglomerate copper deposits and instead searched for fissure veins charged with mass copper. Miners used hand-held drill steels, sledge hammers, and black powder to drill and blast their way through rock, until they encountered a large mass of nearly pure copper underground. Their next task was to cut the copper into pieces small enough to transport out of the mine. Miners accomplished this with hammers and chisels. They parted a mass by chiseling a narrow groove all the way through it.

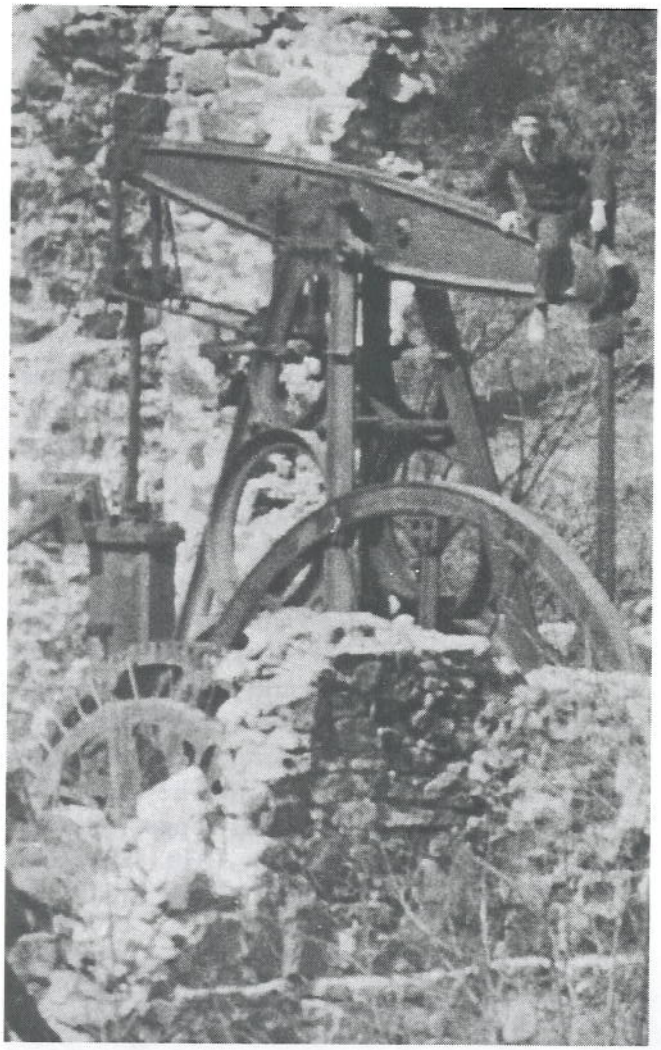
The remains of several early mass copper mines—and their attendant communities—are found alongside or near highway US 41 as it wends its way along the central portion of the peninsula in Keweenaw County. In succession, as you travel north, you encounter the Cliff, Phoenix, Central and Delaware mines.

Time has turned the Cliff mine and its village of Clifton into archaelogical sites—almost nothing has been left standing. At the top and base of the cliff, only parts of smokestacks and bits of walls mark the mine operations. Nearby, only cellar holes outline where the houses, churches, school, and stores once stood—not a single structure stands. The community has been dead for a long time, and it is fitting, perhaps, that two extant features of greatest interest are hard-to-find, in-the-woods cemeteries—one Protestant, one Catholic.

After failing to find a rich deposit of copper near Copper Harbor, the Pittsburgh & Boston Mining Company moved south a bit and in 1845 opened the Cliff mine and started settling the adjacent village of Clifton. Here, the Pittsburgh & Boston company struck it rich. The Cliff mine yielded large quantities of mass copper—its production hit a million pounds by 1849. That year, the Cliff paid out the region's first dividends,



Log houses stand in the foreground of this view of the abandoned Cliff mine; the mine works stand in the distance at the base of the cliff.
(Houghton County Historical Society)



Steam engines arrived on the Keweenaw in the late 1840s to help power the copper mining industry. A mid-century beam engine is shown amid ruins at a Keweenaw County mine, probably the Cliff. (John P. Reeder)

amounting to $60,000. The Cliff mine was the first to prove that money could be made by mining Lake Superior copper, and its success reinvigorated the mine rush, which had been flagging somewhat due to so many failures. Altogether, the Cliff mine paid out about $2.5 million in dividends—a nice return on an original investment of about $110,000.

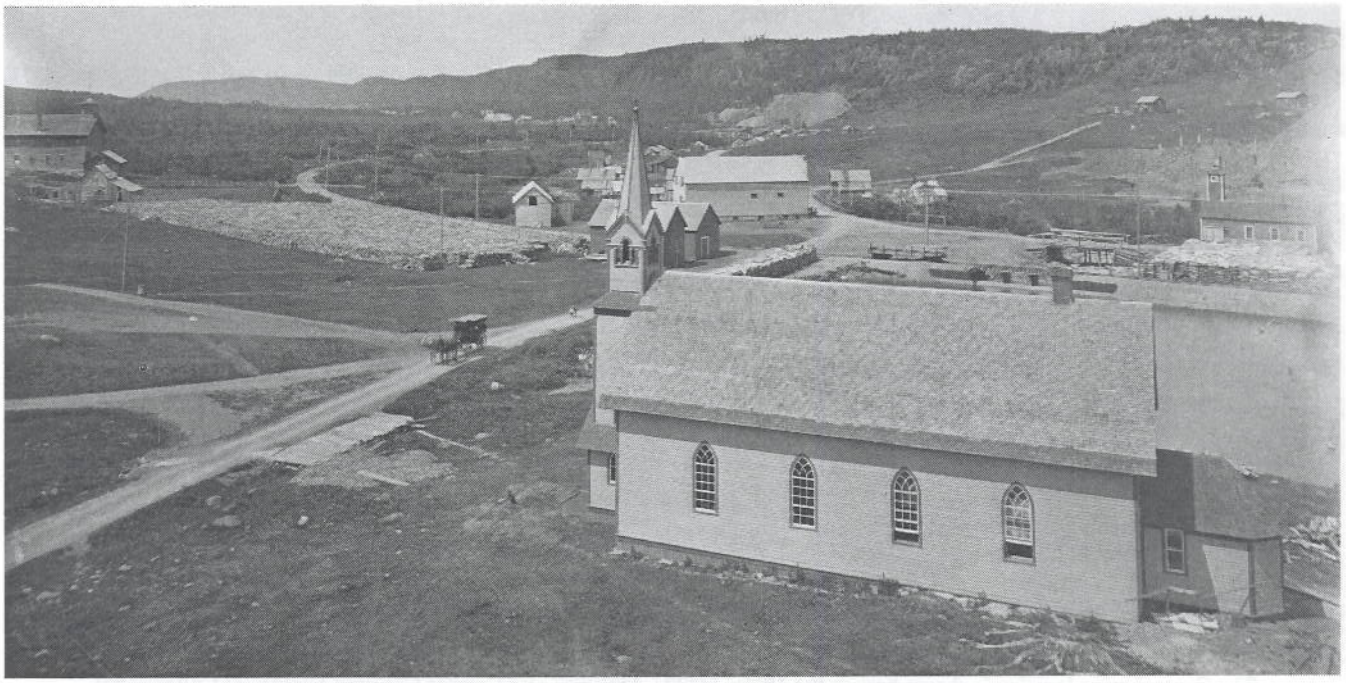
The Cliff mine reached a depth of approximately 1,700 feet and a maximum production of 1,182 tons of copper in a single year. It was the first mine in the region where workers could ride a "man-engine" into and out of the underground, instead of climbing ladders. As the mine grew and prospered, so did the village of Clifton. The company built rows of log houses for employees, which were joined in fairly short order by a few stores, a school, and three churches.

At its peak, Clifton boasted a population of about 1,500 men, women and children. But prosperity was short-lived at this mine and village. The Cliff, after rapidly succeeding, also rapidly failed as the finds of copper ended. It went into a steep decline in the 1860s—in one two-year span, its production fell by two-thirds. The once wealthy Pittsburgh & Boston Mining Company shut down the Cliff mine in 1870. Although some efforts were made later to renew mining at the site, the Cliff's glory days of the 1840s and '50s were over.

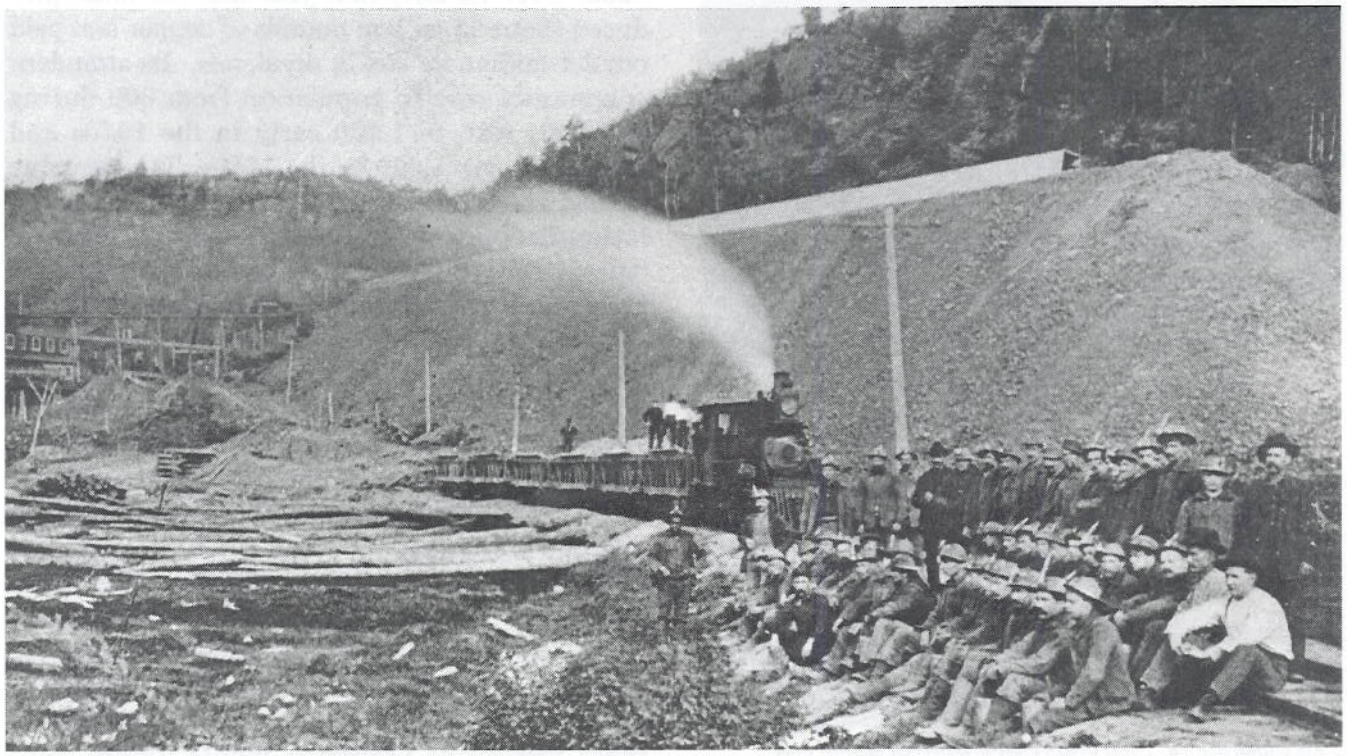
Another of the Keweenaw's earliest mass mines, the Phoenix, opened a bit north of the Cliff in the mid-1840s. The Phoenix Copper Company worked several fissure veins here; it also tried to exploit adjacent amygdaloid lodes. The Phoenix turned out to be one of the most frustrating types of properties: one that had copper, all right—enough copper to encourage development—but never enough copper in any one place to make the mine pay. Consequently, companies worked this site on-and-off from the 1840s until the early twentieth century. In the midst of this span of years, the village of Phoenix peaked at a population of about 1,000 in the late 1870s. Today, two standing structures along US 41—a general store and a church—harken back to Phoenix's days as a mining village. (The Catholic church, by the way, was moved here late in the nineteenth century from the abandoned Cliff mine.)

The Central mine started up about a decade after the Cliff and Phoenix mines; its parent company incorporated and acquired the property in 1854. The Central Mining Company soon discovered that it controlled one of the richest mass mines on the northern end of the Keweenaw. Almost immediately, copper taken from its fissure vein made the mine pay.

The Central remained in production until

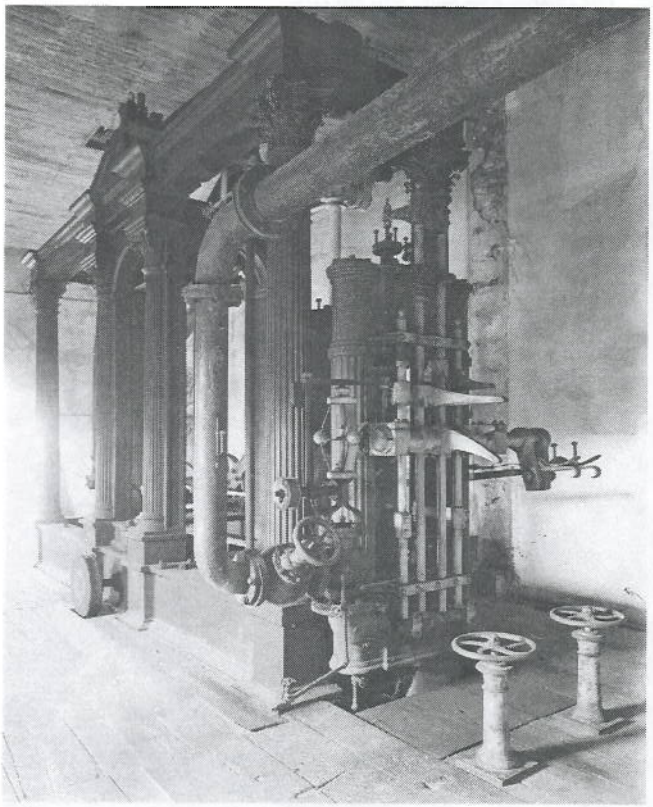


This turn-of-the-century view of Phoenix shows the Catholic church in the foreground (moved here from the Cliff mine); store in the center; and mine in the distance. The church and store still survive.
(MTU Archives and Copper Country Historical Collections)



View of rock train, poor rock pile and day-shift workers at the Phoenix mine.
(MTU Archives and Copper Country Historical Collections)

The Central mine location is shown here in the 1890s. (MTU Archives and Copper Country Historical Collections)



This elaborate, ca. 1860 beam engine powered stamp mill machinery at the Central mine. (MTU Archives and Copper Country Historical Collections)

1898. Over its forty-four-year life, the mine produced about 52 million pounds of copper and paid out 2.1 million dollars in dividends. Its attendant community rose in population from 600 during the Civil War, to 1,000 early in the 1870s and peaked at over 1,200 in the 1880s. As the mine slowed and then closed altogether, the local population dropped steeply, and Central took on a "ghost town" appearance as more and more houses and mine structures disappeared. Today, only about a dozen mine houses still stand at the site, along with some industrial ruins, and the Methodist Church, which dates back to the late 1860s. While some structures remain in private hands, the Keweenaw Historical Society has recently purchased much of the historic site and hopes to preserve it.

While the Central mine succeeded quite handsomely, the Delaware mine, just a few miles away, failed. In fact, this property failed not once, but several times between the 1840s and the end of the nineteenth century. Here was another of those frustrating properties whose fissure veins and lodes promised more than they ever deliv-

This turn-of-the-century view shows a mine site worked by several different companies, including the Delaware, in the second half of the nineteenth century.
(MTU Archives and Copper Country Historical Collections)

ered, that encouraged more than one group of investors to give a try at mining here, and that ultimately only consumed money, rather than making any.

Starting in the late 1840s, the Northwest Company, the Pennsylvania Mining Company, the Delaware Mining Company and then, in the 1880s, the Conglomerate Mining Company worked this location. These firms (and still others that came later), mined the same general area, sometimes seeking mass copper from fissure veins, sometimes seeking copper from a conglomerate lode. Regardless, after erecting substantial physical plants, investing heavily, and taking the mine to a depth of nearly 1,400 feet, they all failed.

Delaware once contained one of the largest, most modern mine plants in Keweenaw County. It boasted two hundred or more structures and, in the late 1870s, a population of about 1,150 people. Today, only a few houses remain. Located amid the mine ruins, since 1977 Delaware Mine Tours has offered visitors a chance to walk down to and across the first level of the mine, 100 feet below ground.

Not all companies flocked to the northern end of the peninsula—or "Keweenaw Point"—during the 1840s rush to open mass copper mines on fissure veins. Many went down to the base of the Keweenaw, in the vicinity of where the famed Ontonagon Boulder had resided before its removal to Washington. Of all early mines on the southern end of the mineral range, the Minesota [sic] was by far the wealthiest and the most historically significant one.

The Minesota Mining Company, like so many other companies, searched out "ancient Indian diggings" and used them for signposts leading to copper deposits. The Minesota mine, a year after starting in 1847, discovered and removed a six-ton mass of copper from an ancient, twenty-six-foot-deep shaft on its property. That not inconsiderable piece of mass copper soon paled, however, in the face of the Minesota mine's discoveries of single masses of copper weighing up to 500 tons. The mine's production reached up to four million pounds a year by the late 1850s. Launched with $366,000 of paid-in capital, the Minesota paid out $1.8 million in dividends by the end of the Civil

War. By then, however, miners could find precious little additional copper on the property, and the mine rapidly headed towards closure. Minesota had been one of the largest, richest mines and villages, but by 1870 its heyday was already over. Long abandoned, few remains of the entire operation can be easily discovered today.

Another Ontonagon County property from the early era bears noting: Victoria, a mine near Rockland and only about three miles from the Minesota. The Victoria mine's history is somewhat akin to that of the Delaware, in the sense that both started out as mass mines and ended up being worked by different companies in different eras. While the Delaware left behind a mine that can be toured today, Victoria left behind a fine cluster of old miners' log houses—now called "Old Victoria"—which can be visited in summer.

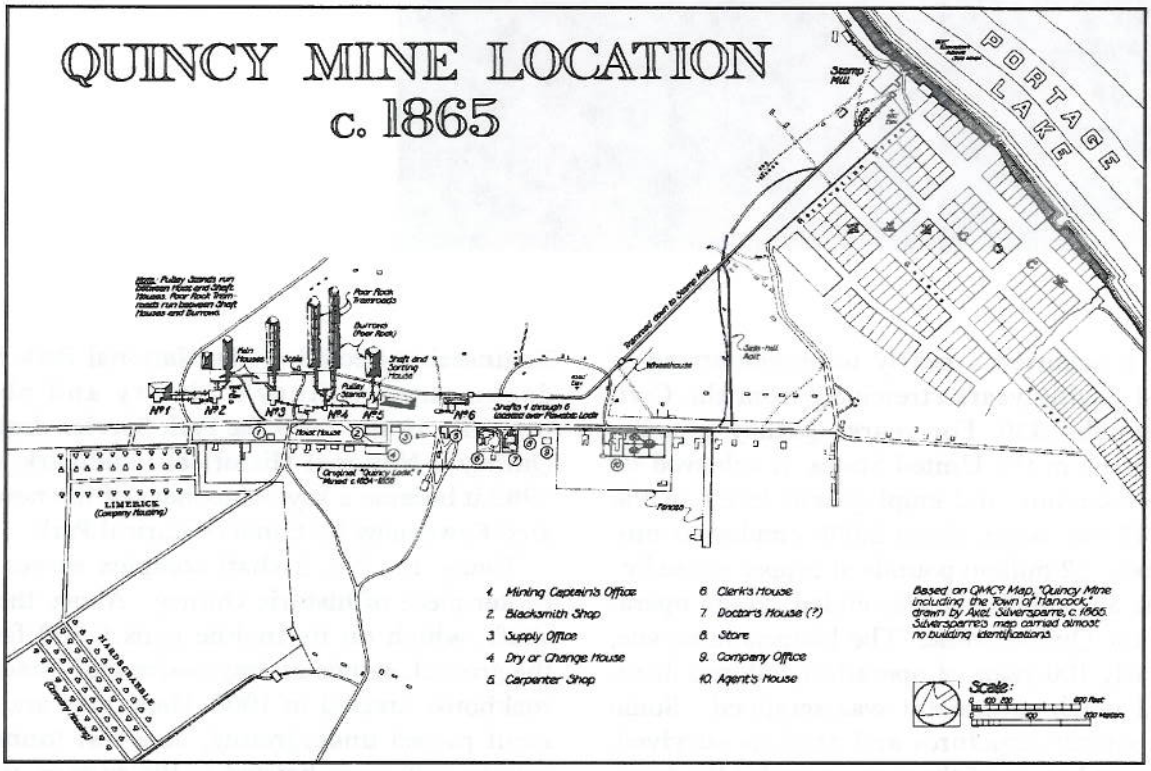
For a while, especially in the 1840s and 1850s, mass mines at the tip and the base of the Keweenaw defined Lake Superior copper mining. But basing an industry on fissure vein mass copper had its problems. Such copper wasn't to be found everywhere. Cutting it up was very labor-intensive and very expensive. And fissure veins had a bad habit of going very fast from being extremely rich in copper to being extremely poor. The Cliff and Minesota mines, for instance, both petered out quickly. So companies tempered their fascination with mass copper and started looking for well-charged lodes of amygdaloid or conglomerate copper. In short order, in the late 1850s and 1860s, the center of the Keweenaw (now Houghton County) became the heart of the Lake Superior copper mining industry.

4 Quincy and the Portage Lake Mines

In the second half of the 1840s and early 1850s, a number of mining companies located operations near the mid-point of the Keweenaw, on both sides of Portage Lake. On the south side, these mines included the Shelden Columbian, Isle Royale, Albion, Huron, Grand Portage, and others. North of Portage Lake, on the crest of the hill, stood the Quincy, Pewabic, and Franklin mines. All these companies struggled to find paying lodes of copper in their first decade of operation, and indeed, many mines at Portage Lake failed to ever make a profit. But the fortunes of the Portage Lake district began to change in the late 1850s, due especially to the Pewabic mine's discovery of a rich amygdaloid lode.

The Quincy Mining Company, with its works adjacent the Pewabic, had endured a decade of frustration and fits-and-starts mining at Portage Lake. Ten years of prospecting, clear-cutting, trenching, and shaft-sinking on its square mile of property had turned up nothing but financial losses. Then in 1856-57 Quincy discovered that the Pewabic Lode ran over onto its property—and that the lode was rich. Quincy proceeded to mine this one lode from 1856 until 1931, and then again from 1937 to 1945.

Due to its good fortune of sitting atop a long stretch of the Pewabic Lode, Quincy became the biggest and best of the Portage Lake mines. It earned for itself the moniker of "Old Reliable,"



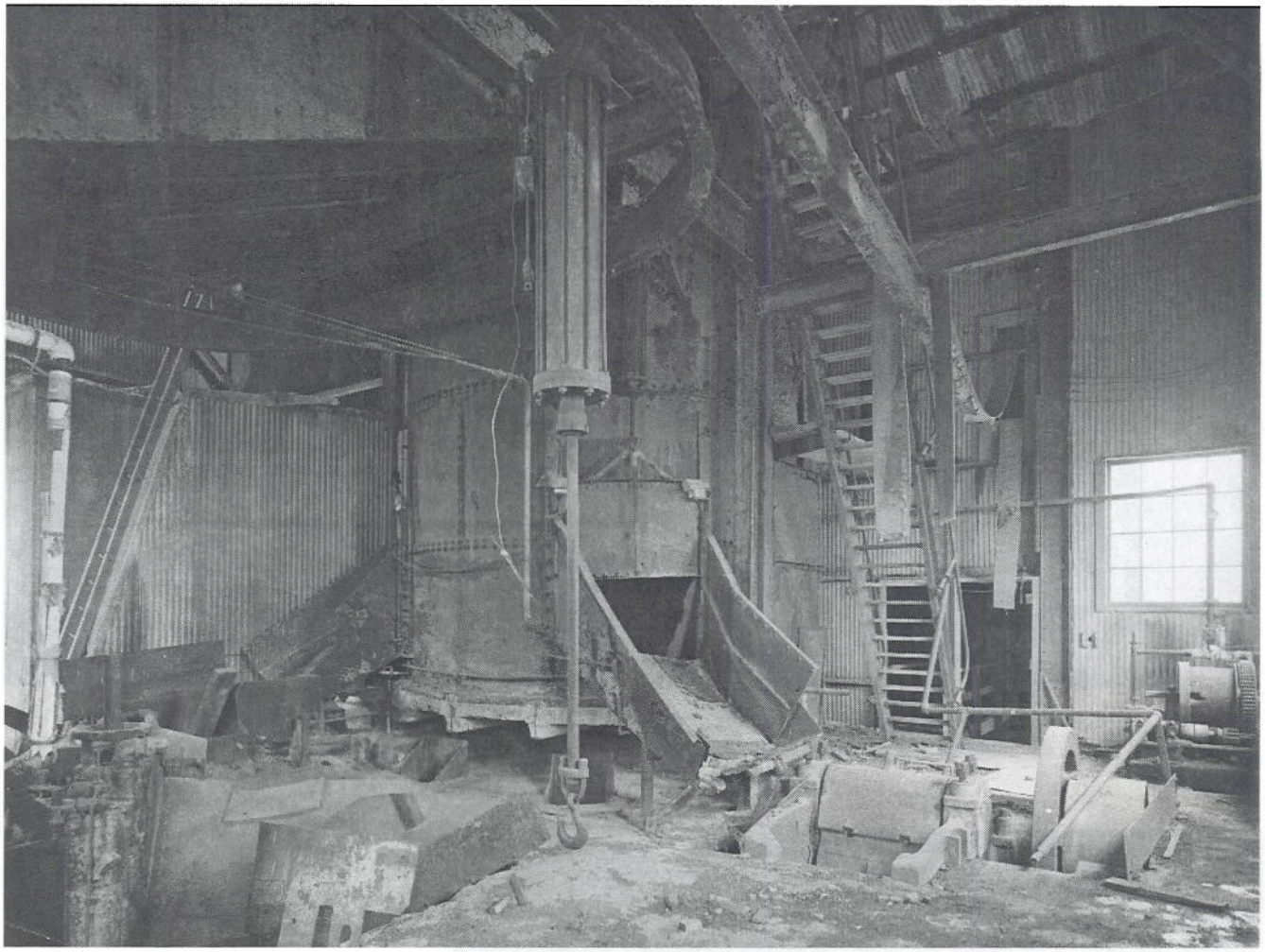
This 1865 site plan of Quincy shows the company's mine works and housing, and the mine's location relative to the company's mill and the village of Hancock.
(Historic American Engineering Record)

Quincy's steel-frame No. 2 shaft-rockhouse, shown under construction in 1908.
(Historic American Engineering Record)

because it achieved a nearly unbroken string of dividend paying years stretching from the Civil War through 1920. For years, Quincy was the deepest mine in the United States. It achieved its largest production and employment levels in the 1910-1917 era, when about 2,000 employees produced about 22 million pounds of copper annually.

As the Second World War ended, so did operations at the Quincy mine. The historic mine site, after nearly 100 years of operation, fell into disrepair and much equipment was scrapped. Some very important structures and artifacts survived, however, and some of these came under the stewardship of the Quincy Mine Hoist Association in the early 1960s. In 1978 the Historic American Engineering Record of the National Park Service documented Quincy's history and physical remains. In the 1989 the Park Service designated Quincy a National Historical Landmark, and in 1992 it became a key component of the newly created Keweenaw National Historical Park.

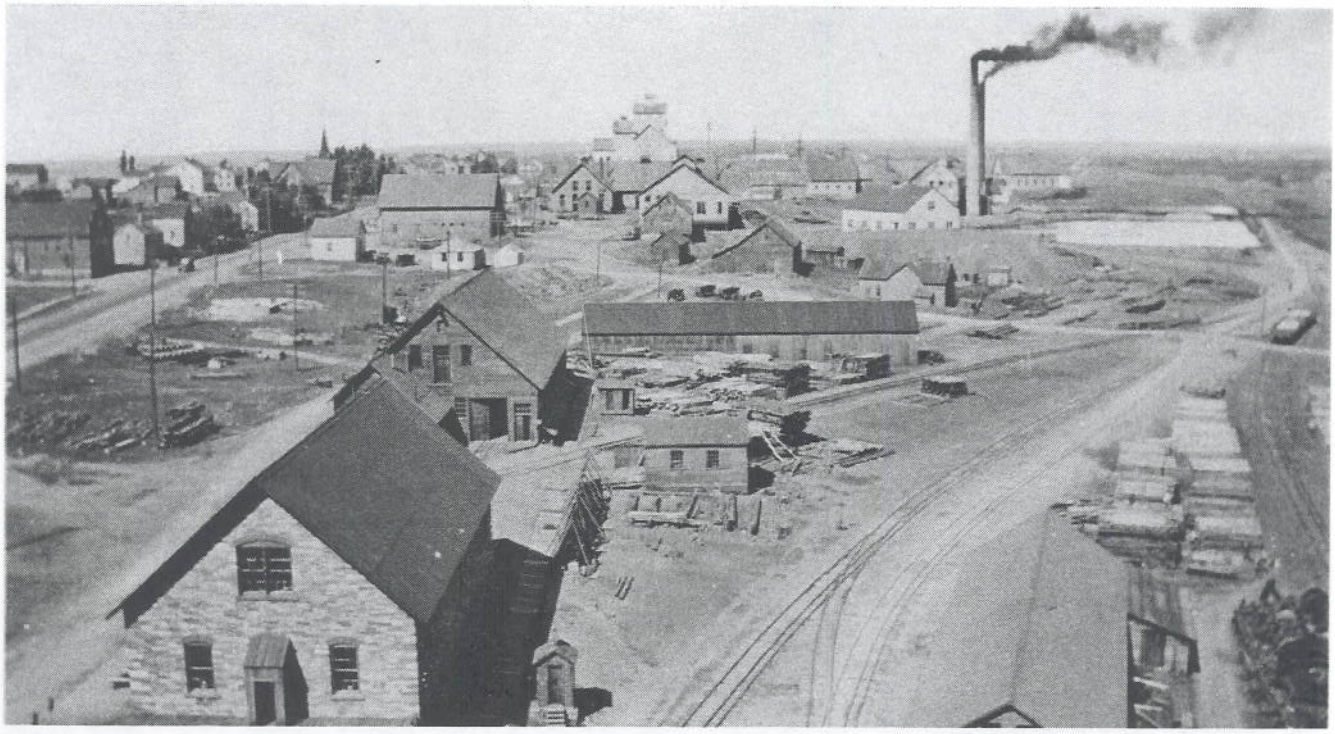
Today, the No. 2 shaft complex serves as the center-piece of historic Quincy. Above the No. 2 shaft, which on its incline runs 9,200 feet into the ground, stands an impressive and intact shaft-rockhouse erected in 1908. Here, men and equipment passed underground, and vast tonnages of copper rock were hoisted to the surface, where it was sorted, crushed, and chuted into rail cars for shipment to a concentrating mill. Nearby stand



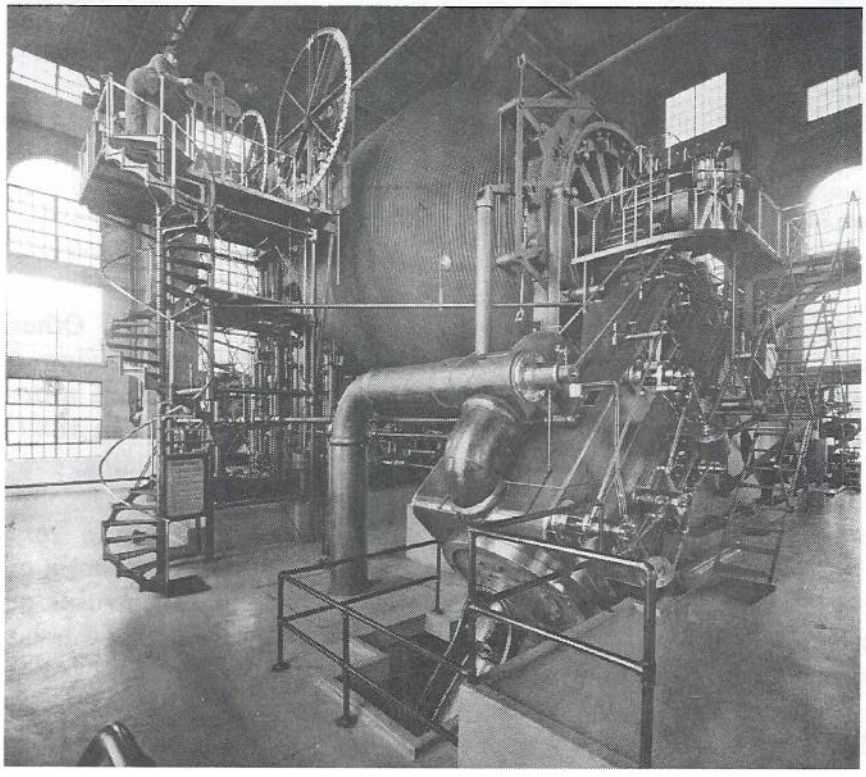
On the crusher floor, high up in Quincy's No. 2 shaft-rockhouse, copper rock was chuted from a bin directly into a jaw crusher, which broke the rock to a size of 3 to 4 inches in diameter.
(Jet Lowe, Historic American Engineering Record)

several hoist houses that once served this shaft. The latest one, which went into service in 1920, still contains its mammoth hoisting engine, built by Nordberg, the largest direct-acting, steam-powered hoist ever built. Its four large pistons, driving a winding drum thirty feet in diameter, could raise a 20,000 pound load of copper rock at 36 miles per hour.

The Quincy Mine Hoist Association opens the No. 2 hoist- and shaft-rock houses to visitors; operates a gift shop out of an 1893 supply building; and provides an underground tour of the Quincy mine through an adit which is reached by riding a new tram car down Quincy Hill. Other important standing structures that can be viewed from the outside by vistors include the mine superintendent's Italianate house, built in 1880-81, and the company's main office building, constructed in 1896-97 out of locally quarried Jacobsville red sandstone. Worker houses dating from the 1860s to the 1910s still exist at the margin of the mine site, which also includes the ruins of blacksmith and machine shops, boiler and hoist houses, dryhouses, and railroad facilities. Altogether, Quincy is the best-preserved mine site on the Keweenaw.



This ca. 1920 view, looking northward from Quincy No. 2 toward No. 6, shows the company's supply office, carpentry shop, machine shop, blacksmith shop, plus a boilerhouse and reservoir.
(Historic American Engineering Record)



This mammoth Nordberg steam hoist still survives at the Quincy mine. The cross-compound, condensing engine, with four cylinders and a hoisting drum thirty feet in diameter, raised 20,000 pounds of copper rock at a time from a depth of 9,200 feet.
(Historic American Engineering Record)

5 Striking It Rich: Calumet & Hecla

About a dozen miles northeast of Portage Lake, and about two decades after the initial mine rush had begun in the mid-1840s, Edwin Hulbert made the region's most important geological discovery: the Calumet Conglomerate Lode. Two companies formed to exploit this discovery, the Calumet Mining Company and the Hecla Mining Company. In 1871 these firms combined to form the Calumet & Hecla Mining Company, or C&H, which Alexander Aggasiz, a noted Harvard scientist, presided over for nearly four decades. Over that span, C&H became one of the richest mining companies in the world, and it erected a truly impressive and unrivaled physical plant. The C&H mine ran for nearly two miles atop the outcropping of the Conglomerate Lode. The mine included an impressive array of buildings and machinery, including many mammoth steam engines designed by Erasmus Darwin Leavitt, one of America's foremost mechanical engineers.

In the nineteenth century, especially, C&H was in a class by itself. It employed the most men, made the most copper, and paid the most dividends. This one company commonly produced 50 to 60 percent of all Lake Superior copper, and its total employment jumped from about 1,300 in 1871 to over 5,000 in 1900.

The amount of copper coming from the Calumet Conglomerate Lode started to decline about 1900, and the company finally had to close its works on that lode in 1937. Between those two dates, to prolong its life C&H undertook

This ca. 1910 view of the C&H mine looks southwestward along the line of shafts that then paralleled Mine Street. Red Jacket Road passes from left to right at the center of this scene.
(MTU Archives and Copper Country Historical Collections)

This ca. 1910 photograph, overlooking the C&H blacksmith and drill shops (on the lower right), shows the village of Calumet in the middle distance, and beyond the village, the Tamarack mine.
(MTU Archives and Copper Country Historical Collections)

important geological studies up and down the the Keweenaw; it opened works on the Osceola and Kearsarge amygdaloid lodes located 800 and 3,000 feet east of its old conglomerate; and it consolidated or merged with several other mining companies, mostly operating north of Calumet along the mineral range. Mergers once again made C&H king of Keweenaw copper producers; the Calumet & Hecla Consolidated Mining Company produced 50 to 70 percent of all Lake copper from the early 1920s through the end of the Second World War. The company continued mining operatations in the 1950s and 1960s, but was continually plagued by high production costs and labor problems. Finally, in the late 1960s, C&H mining operations ceased altogether.

Much of the heart of the old C&H mine disappeared after the works on the Calumet Conglomerate closed in 1937. Steam engines were scrapped. Hoist houses and rockhouses came down. Still, a number of historic structures avoided demolition. Near the intersection of Calumet Avenue and Red Jacket Road stand C&H's main office building and company library (both extremely handsome masonry buildings) and Alexander Agassiz's house, which he occupied when he came from Cambridge to spend a week or two at the mine each year. Mine Street is lined with a number of brick and stone buildings dating from the 1880 to 1910 era; these include a large machine shop, drill and pattern shops, a railroad roundhouse, man-engine house, a boiler-house and warehouse, and others. One old C&H building on Red Jacket Road now houses Coppertown USA's mining museum and gift shop.

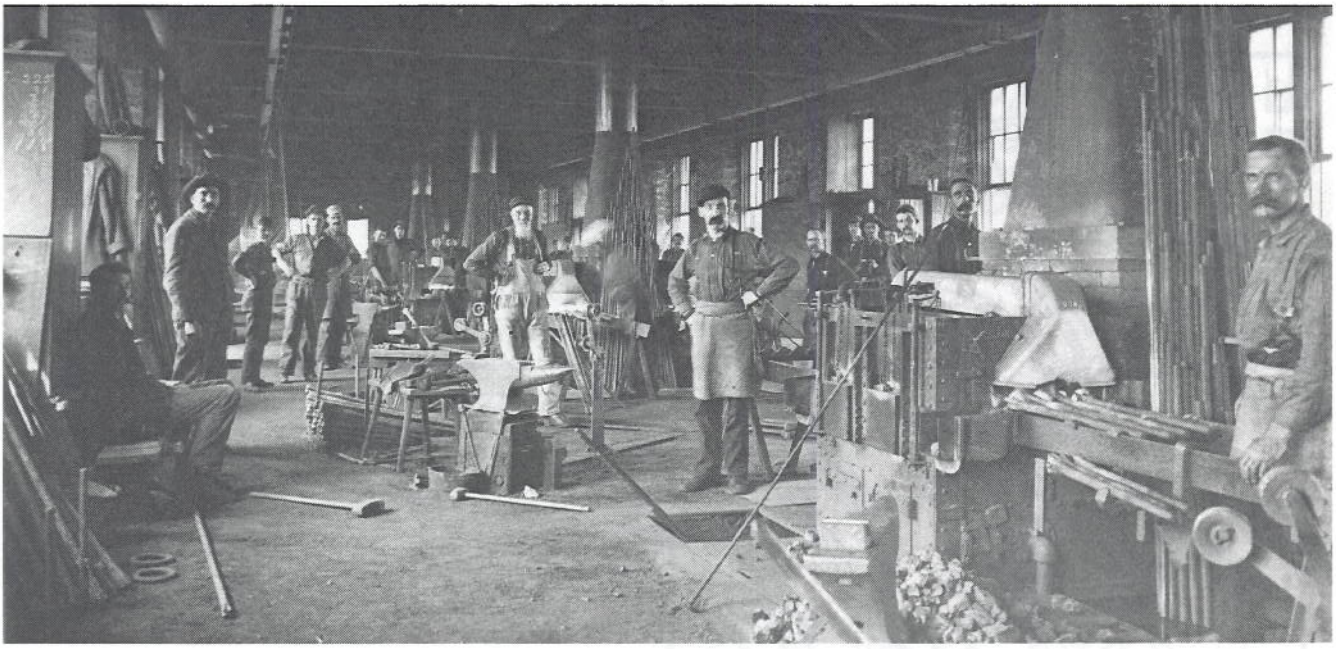
Calumet and Hecla's industrial district, plus

the village of Calumet, makes up the "North End" of the new Keweenaw National Historical Park. Starting in the summer of 1997, a Park Service walking tour, with signage, will guide visitors through the remains of the C&H mine.

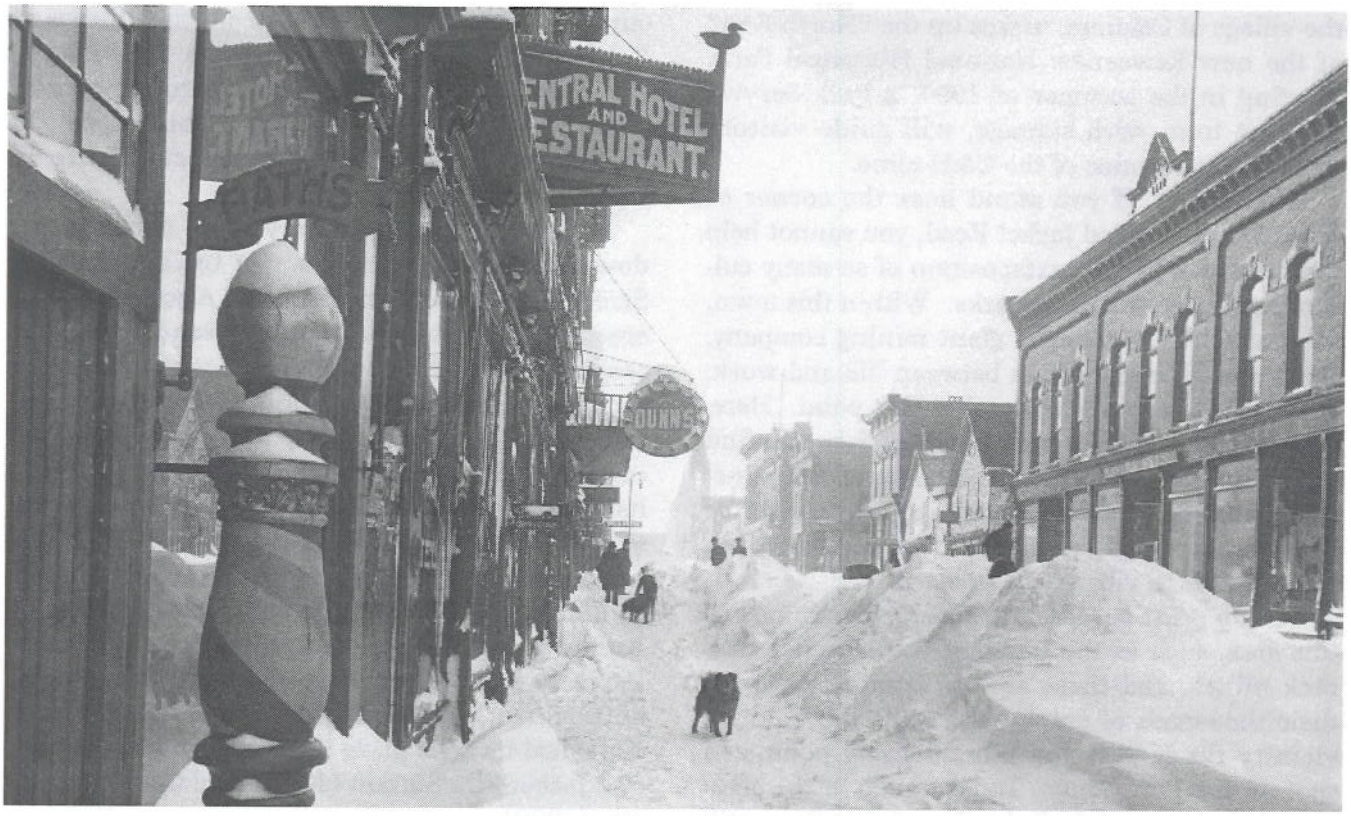
At Calumet, if you stand near the corner of Mine Street and Red Jacket Road, you cannot help but be struck by the juxtaposition of so many cultural and industrial landmarks. Within this town, so controlled by a single, giant mining company, there was little separation between life and work, and the landscape clearly makes that point. Here, within just a block or two of one another, you find the company's office and the heart of the mine; Calumet's main public schools; a tight cluster of five church steeples; and the head of 5th Street, the heart of the village's downtown.

C&H's great success attracted other mines to this area, such as the nearby Osceola and Tamarack mines, and these several companies, with their thousands of employees, made the Calumet vicinity the largest and most densely populated spot on the Keweenaw. Today, much of the company housing stock built by the mining firms still survives in the townships adjacent the villages of Calumet and Laurium, and within the villages, streetscapes exist that harken back to the turn of the century. Steeples and storefronts speak to both the sacred and secular aspects of life in Upper Michigan mine towns.

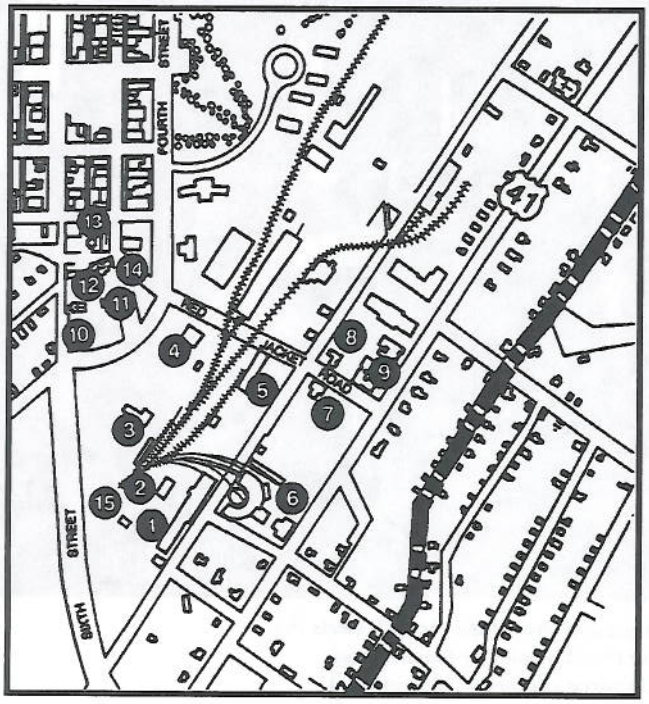
In Calumet, for instance, visitors should stroll down 5th and 6th Streets. At the head of 5th Street stands the handsome St. Anne's church, erected early this century of local sandstone. Proceeding along 5th and 6th you encounter a multitude of commercial storefronts. Don't just look at the ground level, but look up to see the decorative cornices. This was a prosperous town that made itself over between 1890 and 1910, erected structures of brick and stone, and embellished them with cast-iron fronts, terra cotta sunbursts, columns, pilasters, and turrets. Look for traces of Richardsonian Romanesque and Renaissance Revival architecture. As you walk to the far end of 6th Street, take particular note of how Calumet embodied its civic pride in its Village Hall (1885), Red Jacket Fire Station (1898), and Calumet Theatre (1900).



Inside the C&H drill shop, workers forged and sharpened the drill steels that miners used underground to drive the shot holes for blasting rock.
(MTU Archives and Copper Country Historical Collections)



Shoppers in Calumet did not always have an easy time of it when going from storefront to storefront in the winter. (MTU Archives and Copper Country Historical Collections)



1. Machine Shop
2. Pattern Storage
3. Blacksmith Shop
4. Pattern Shop
5. No. 1 Warehouse
6. Bathhouse
7. C & H Library
8. Agassiz House
9. C & H Administration Building
10. Swedish Lutheran Church
11. Christ Episcopal Church
12. First Presbyterian Church
13. St. Anne's Church
14. Union Building
15. Captain's Office

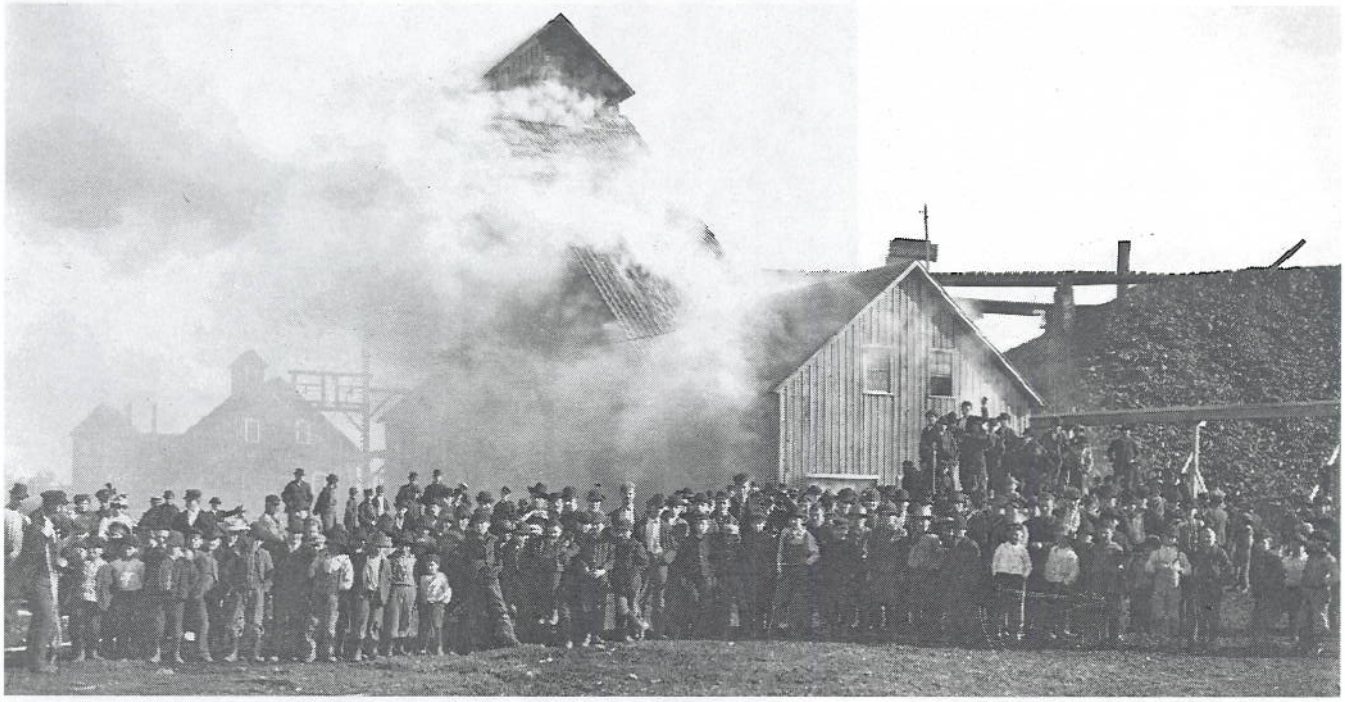
A number of historic structures survive at Calumet in the vicinity of the intersection of US 41 (Calumet Avenue) and Red Jacket Road. (National Park Service)

6 Companies and Communities Along the Osceola and Kearsarge Lodes

The mining companies that followed Calumet and Hecla out to its part of the Keweenaw and hoped to strike it rich by acquiring and exploiting other stretches of the Calumet Conglomerate Lode came away disappointed. As fate had it, C&H owned the only outcropping part of the lode that was profitable. Companies on the strike of the lode to the north and south of C&H never made the conglomerate pay. Eventually, however, companies did discover two new lodes east of the Conglomerate—the Osceola and Kearsarge amygdaloid lodes—that became important producers not only for C&H, but for a number of other mines in northern Houghton County and southern Keweenaw County.

Substantial production began on the Osceola lode in the late 1870s and on the Kearsarge lode in the late 1880s. Today, driving north along US 41, you drive past a string of communities which in whole, or in part, were at one time dedicated to exploiting these lodes. Osceola, Calumet, Laurium, Kearsarge, Centennial, Allouez, Ahmeek, Mohawk, and Wolverine all hosted firms that mined the Osceola lode, the Kearsarge lode—or both.

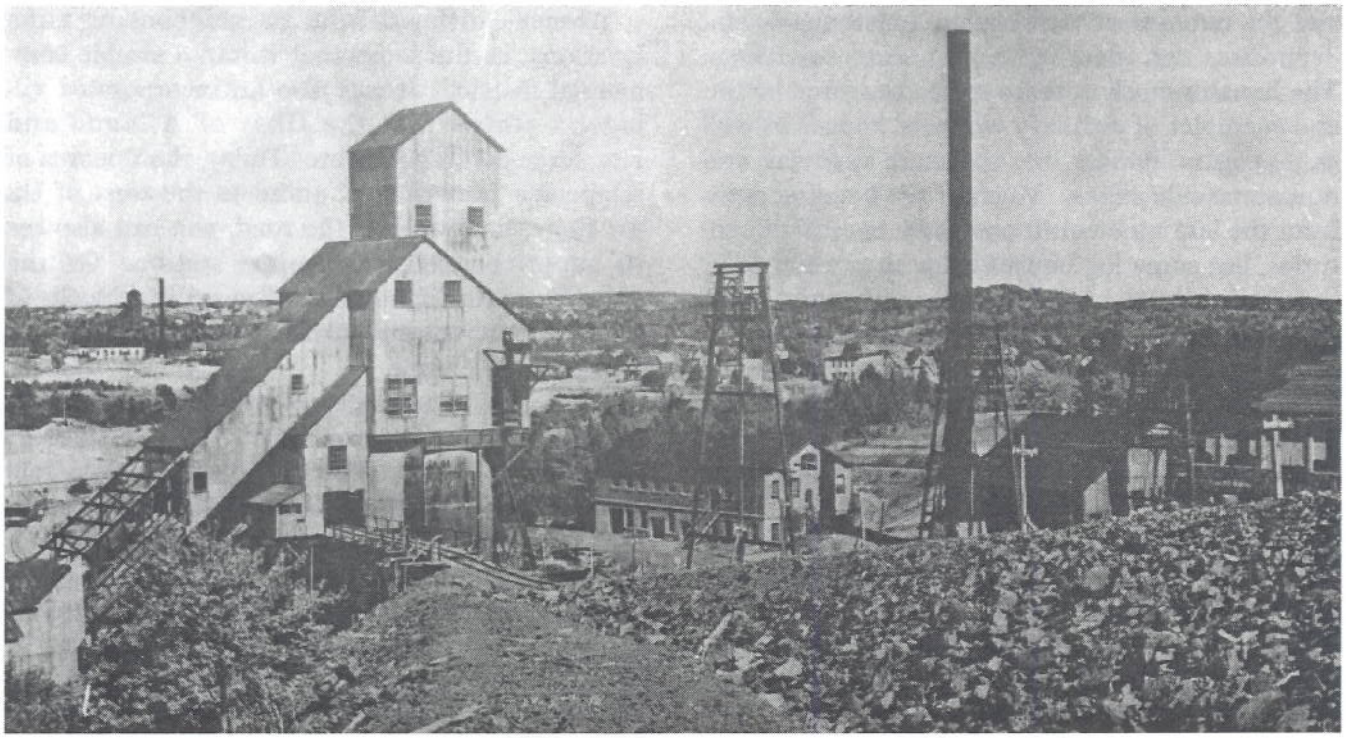
Mining companies at all these locations erected extensive physical plants, which largely have been obliterated. Still, mine structures can occasionally be spotted from the highway or by driving down side streets in the various locations. Shaft-rockhouses still stand at Osceola and Centennial,



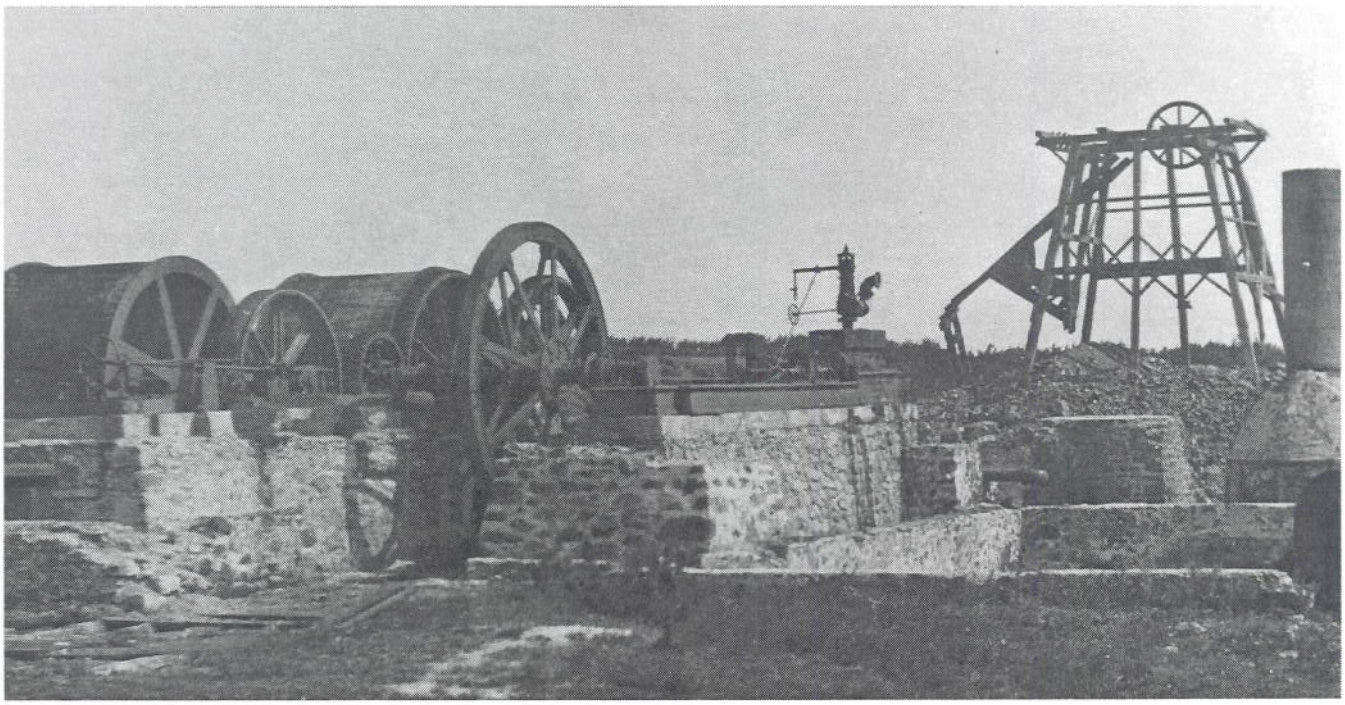
In 1895, the worst disaster in the history of Keweenaw copper mining occurred at the Osceola mine, just a bit south of Calumet. A smoky fire killed thirty men and boys, who failed to leave the mine promptly and were asphyxiated while trying to scramble to safety. In the photo, a few men and many boys pose on the surface as smoke continues to billow from the No. 3 shaft.
(MTU Archives and Copper Country Historical Collections)

Early in the twentieth century, some workers at the Ahmeek mine still lived in small log houses built several decades earlier. (MTU Archives and Copper Country Historical Collections)

This steel-framed shaft-rockhouse stood at the Ahmeek mine, one of the region's most productive during the twentieth century. (MTU Archives and Copper Country Historical Collections)



Part of the mine plant at Kearsarge, taken from atop one of the mine's poor rock piles.
(MTU Archives and Copper Country Historical Collections)



Ruins of a hoist and boilerhouse at the Alloeuz mine.
(MTU Archives and Copper Country Historical Collections)

and the remains of warehouses, hoisthouses, and dryhouses can also be seen at some locations. The housing stock at these mines has fared better, and examples of ordinary workers' houses as well as managers' houses line the main highway and numerous side steets. Much of the housing dates from the late nineteenth and early twentieth centuries, but some log houses from circa 1860-1870 stand along the highway, although most have been hidden behind siding of various materials.

Absent from most of these mine locations were extensive commercial districts. Instead of each small village establishing its own extensive set of shops and services, residents typically frequented merchants and professionals conducting their businesses out of nearby Calumet or Laurium. By 1910, 27 miles of streetcar track ran along the mineral range from Houghton to Mohawk, with a spur running over to Lake Linden and Hubbell. Streetcars enhanced residents' mobility and gave them more freedom of choice as to where they would live, shop, work or worship.

Ahmeek differed from its neighboring mine locations, in the sense that it had a sizable commercial district. It was also an incorporated village, a status that the likes of Alloeuz and Kearsarge could not claim. Today, the remains of Ahmeek's "downtown" stand to the west of US 41; there, hard against the road, you can also see its adaptively reused streetcar station. On the east side of the highway stand some fine blocks of worker housing, and further east yet stand the remains of the mine.

Most mines working the Osceola and Kearsarge lodes ultimately came under the control of Calumet and Hecla. When its great conglomerate lode started to falter, and C&H turned to consolidated operations as a way to boost production and cut costs at the same time, it acquired the Osceola, Centennial, Keasarge, Allouez and Ahmeek mines. Of these acquisitions, Ahmeek was of greatest import, as it was the best producer for C&H from its acquisition in the 1920s to its closing in the 1960s.

7 The South Range

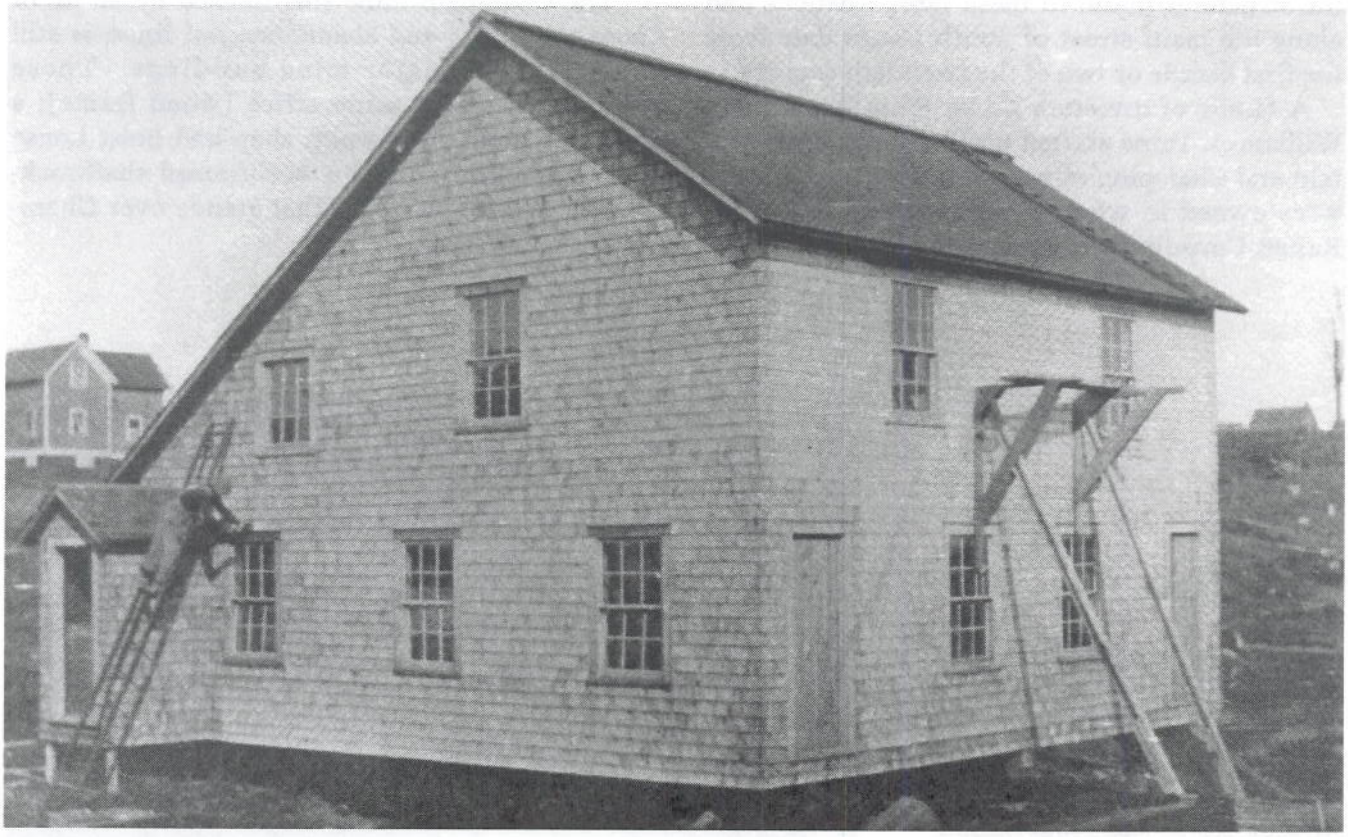
From the Calumet vicinity north, the Osceola and especially the Kearsarge amygdaloid lodes proved very important in sustaining the Lake Superior native copper mining industry deep into the twentieth century. Another lode key to twentieth century copper production was the Baltic amygdaloid lode, located roughly ten miles south of Portage Lake. Not discovered until the late 1890s, the Baltic deposits gave rise to three important new producers, the Baltic, Trimountain and Champion mines, and encouraged the development of a nearby commercial village, South Range, which served the workers and families in these new mine locations. Today, most of the structures found in these three locations and along the main street of South Range date from the first decade or two of the twentieth century.

A family of investors led by John Stanton and William A. Paine started up the Baltic, Trimountain and Champion mines, all of which ultimately were owned in whole or in part by the Copper Range Consolidated Mining Company. Of the three mines, the Champion, located in Painesdale, was the biggest producer and longest-lived. The Champion mine produced as much as 33.6 million pounds of copper in a single year, and it was the last of the Copper Range Company's native copper mines to close. The Champion struggled, to be sure, and operated on a much reduced scale after its peak years in the 1910s, yet it nevertheless managed to survive well past the Great Depression and all the way till 1967. Today, the Champion has the most standing industrial archeology structures of the South Range mines, and Painesdale is one of the best-preserved mining communities along the entire Keweenaw.

The Champion mine site, flanked by all ilk of poor rock piles and abandoned rail lines, is still home to five major mine buildings. These include the main mine office (wood frame); a machine shop, blacksmith shop and hoist house (all of sandstone); and a steel-framed shaft-rockhouse, erected in 1906, that stands over Champion's No. 4 shaft.

While many mines and mine locations grew and evolved over several decades or a half-century or more, the Champion mine and Painesdale mostly went up in a single decade: 1900 to 1910. This panoramic view shows Champion's No. 4 shaft-rockhouse, plus the mine's office building, machine shop, housing, and other structures. (MTU Archives and Copper Country Historical Collections)

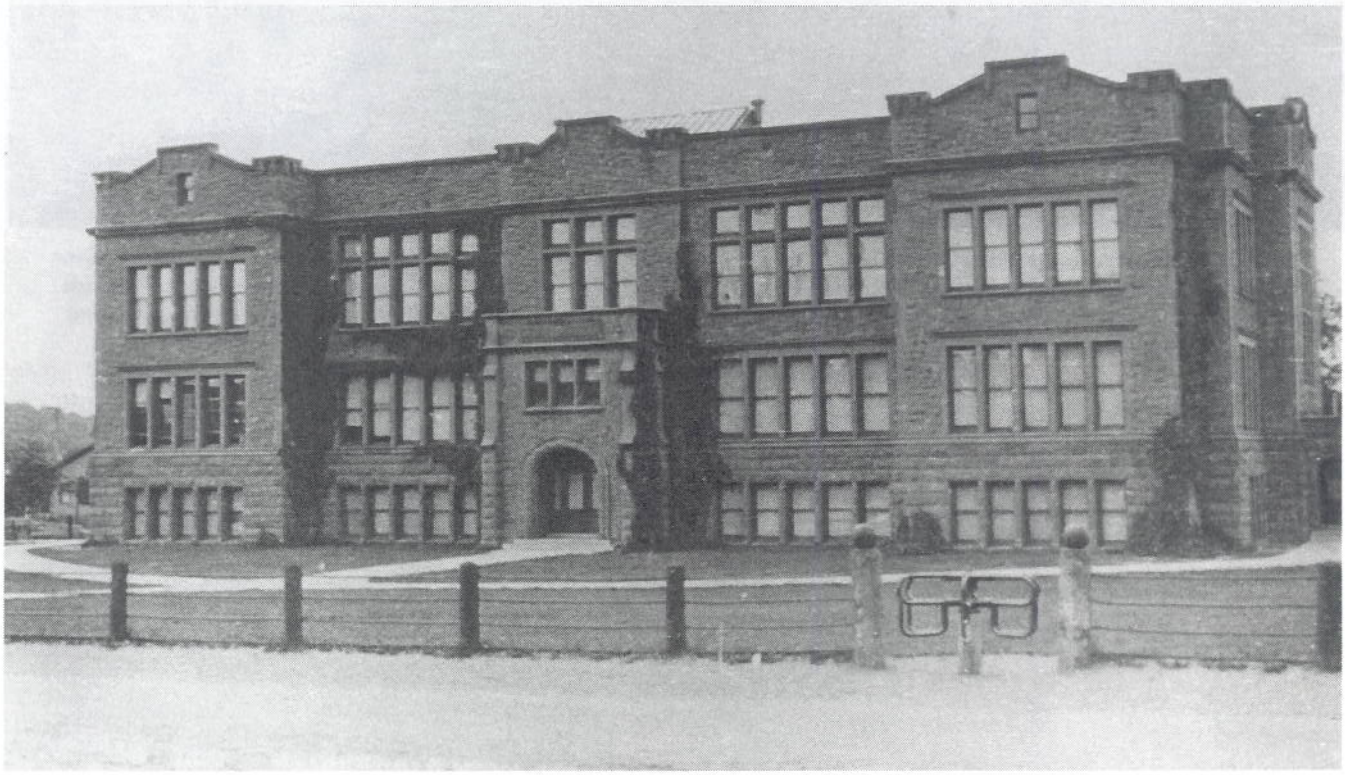
At the Champion mine, the dip of the shaft was so steep that men rode standing, rather than sitting, in the man-car that took them to and from the underground.
(MTU Archives and Copper Country Historical Collections)



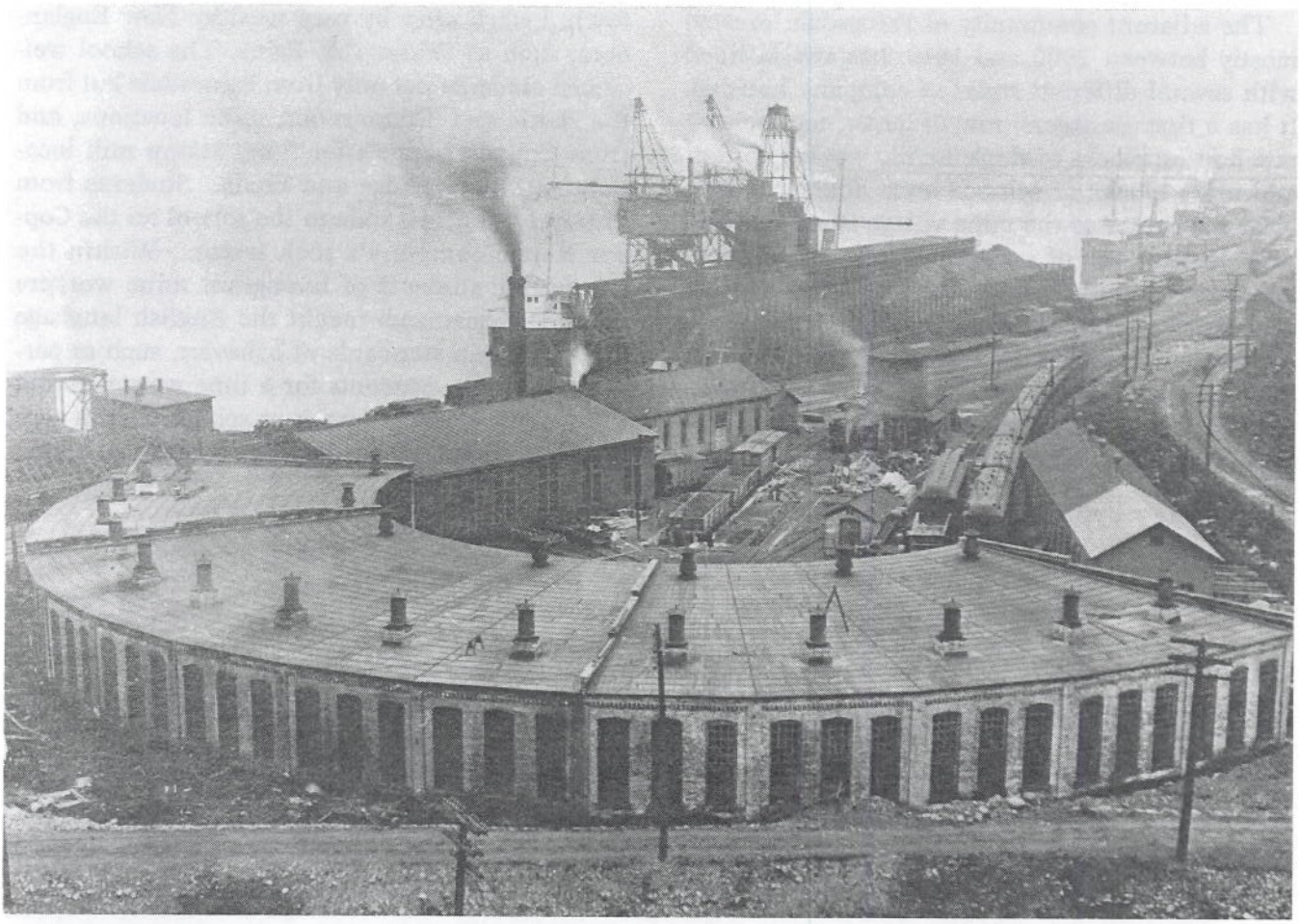
Many mine locations included neighborhoods made up of salthox houses. Painesdale has many extant examples of this double-house, done up in salthox style and built early in this century.
(MTU Archives and Copper Country Historical Collections)

The adjacent community of Painesdale, erected mostly between 1900 and 1910, has streets lined with several different styles of company housing. It has a fine managers' row of larger, more elaborate houses; blocks of single-family worker houses; and more blocks of salt-box style double houses. Near the center of the mine village stand two cultural institutions of note: the Methodist church, and across a green from it, the three-story Painesdale (now Jeffers) High School, put up in 1910.

This handsome school crafted of red Jacobsville sandstone symbolizes the fact that this small community was once more than it is today. It was once a bustling, productive and prosperous mine town, looked after by very wealthy New Englanders, such as William A. Paine. The school welcomed students not only from Painesdale but from the Baltic and Trimountain mine locations, and from Copper Range's far-flung stamp mill locations out by Redridge and Freda. Students from distant settlements rode to the school on the Copper Range company's rock trains. Within the school, the students of immigrant mine workers were Americanized: taught the English language and American standards of behavior, such as personal hygiene. Students for a time were required to take one shower a week at school, just in case they weren't taking any baths or showers at home.



Painesdale High School (now rechristened Jeffers High School), opened in 1910. It was one of the grandest of local schools erected during the mining era.
(MTU Archives and Copper Country Historical Collections)



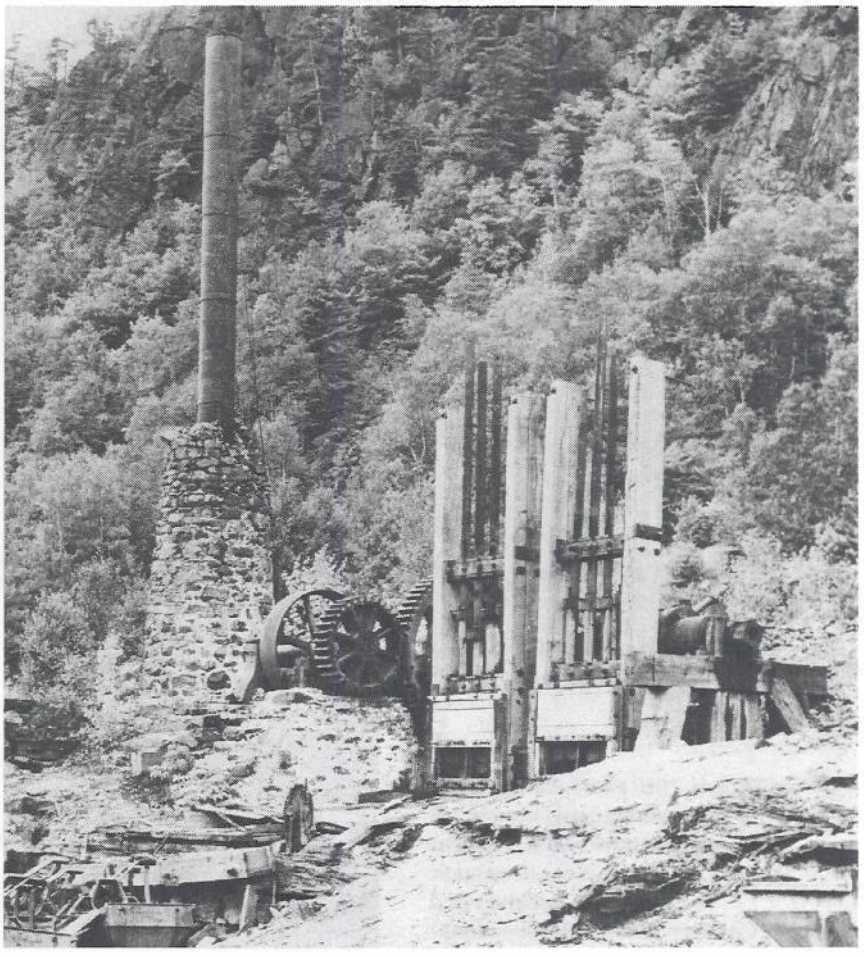
The Copper Range railroad connected the Copper Range Consolidated Mining Company's mines and mills with the Michigan Smelter on Portage Lake. The railroad's main station still survives, just west of the south end of the Portage Lake Lift Bridge. The Copper Range roundhouse, shown here, occupied the site now taken by the new Houghton City Beach. At Houghton and Hancock, lake frontage, once heavily industrialized, is being reclaimed for commercial and recreational use.
(MTU Archives and Copper Country Historical Collections)

8 On Water's Edge: Mills and Smelters

The copper industry on the Keweenaw had three major parts: mines, mills, and smelters. The mines along the mineral range produced some mass copper, but mostly stamp copper or copper rock—in other words, a minority of native copper bound up in a matrix that was mostly (95-99%) amygdaloid or conglomerate rock. This copper rock had to be mechanically worked to liberate the copper, and then various machines worked to separate the copper and rock, thus concentrating the mineral. This work was done at a stamp mill. Then the copper concentrate went to a smelter to be melted and refined.

At mills, first Cornish drop stamps and, later, much larger steam stamps broke and abraded the copper rock, reducing it to the size of a peppercorn or smaller. A steady stream of water pouring into the mortar box of a stamp flushed the reduced copper and rock out through coarse screens, and troughs or launders carried the materials to a series of esoteric mill equipment, such as hydraulic separators, jigs, wash tables, and slime buddles.

This concentrating machinery, much of it developed locally to work the region's peculiar copper deposits, used the difference in the spe-

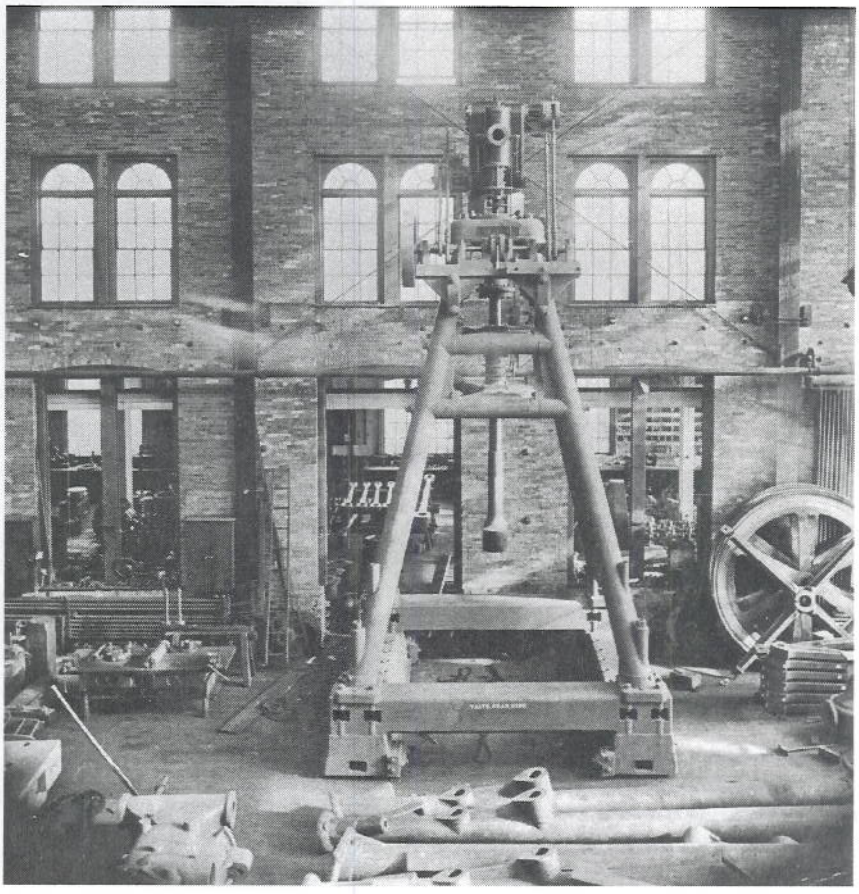


Cornish drop or gravity stamps, shown at a Keweenaw county site, probably the Cliff mine. After being stamped, copper and rock flowed out of the mortar box at the base of each machine. (John P. Reeder)

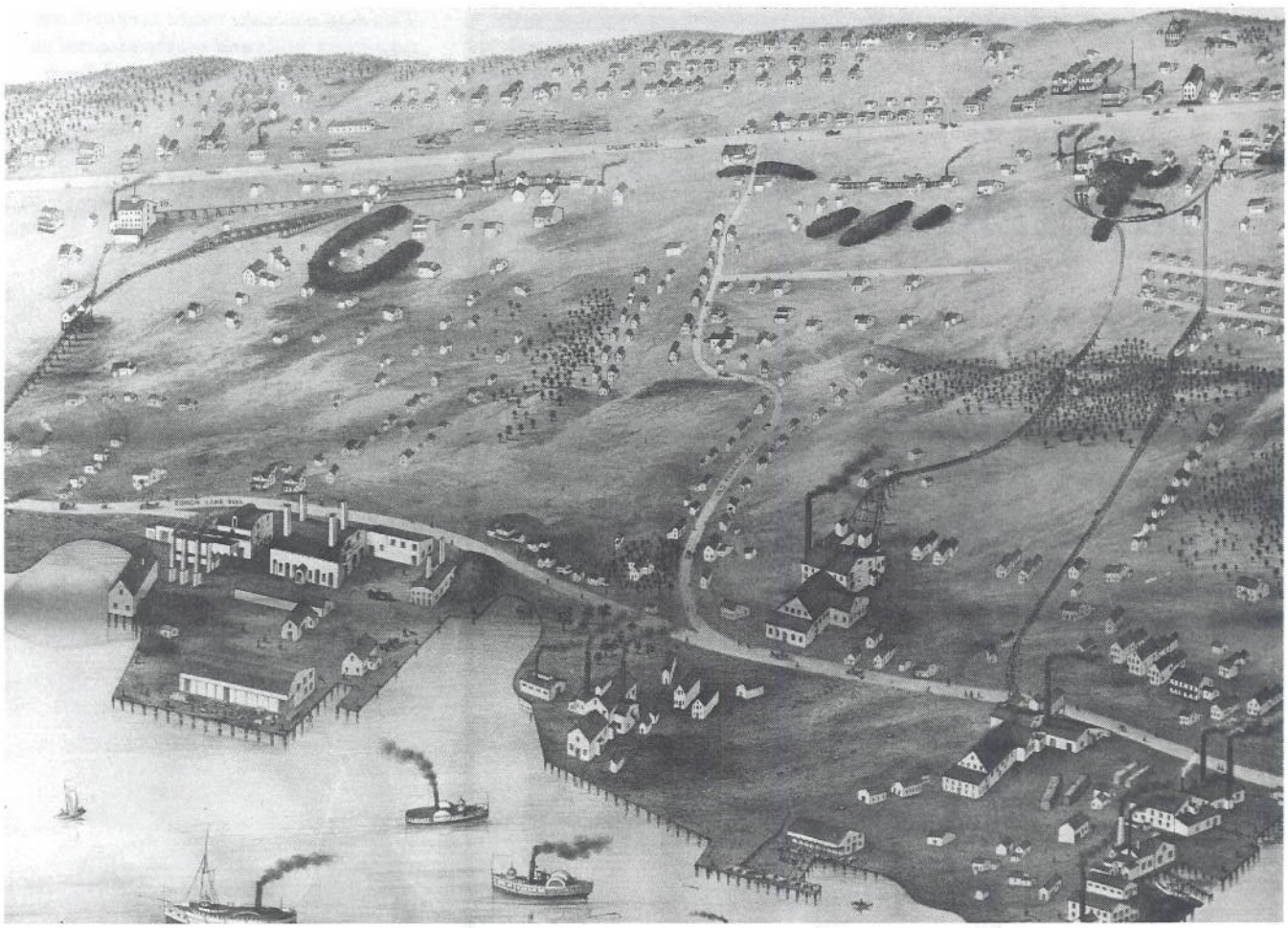
cific gravities of copper and rock to separate the two materials. In jigs, for instance, plungers agitated a watery suspension of copper and rock particles over a sieve. When the agitation stopped and the jigs were drained, the heavier copper tended to settle out first on the sieve plate, beneath the rock. Mill hands skimmed off the rock, then collected the copper. At the buddles, a slimy mixture of small particles of copper and rock flowed out slowly from the center of a large rotating disc. The heavier copper stayed on the disc; water carried the lighter rock along, finally tailing it off over the edge.

Many steps in the milling process used water to help separate materials and to move materials along—including the waste sands that would be washed right out of the building. In the first few decades of mining and milling, some companies were able to site their stamp mills on small ponds or lakes (often created by damming a small stream), which were located close to their shafts. But large scale production, and the vast quantities of water needed in milling, forced most companies to site their mills on large, deep lakes. These lakes served dual purposes. First, they provided an abundance of water. (By 1890, it took 30 tons of water to mill one ton of copper rock.) Second, the lake bottoms served as convenient dumps. The tailings or stamp sands leaving the mills washed right out into host lakes, creating desolate-looking beaches of coarse, dark gray or red sand, depending on the color of the mine rock being processed.

Many mining companies operated their own tramroads or narrow gauge railroads to transport copper rock from mine to mill. Starting in the late 1850s, Portage Lake—right in the vicinity of Houghton and Hancock—became one of the region's first major mill sites. Stamp mills lined both sides of the Portage. On the Houghton side



This ca. 1910 photo shows a large, powerful steam stamp being test-erected at the manufacturer before shipment to the Keweenaw.
(MTU Archives and Copper Country Historical Collections)

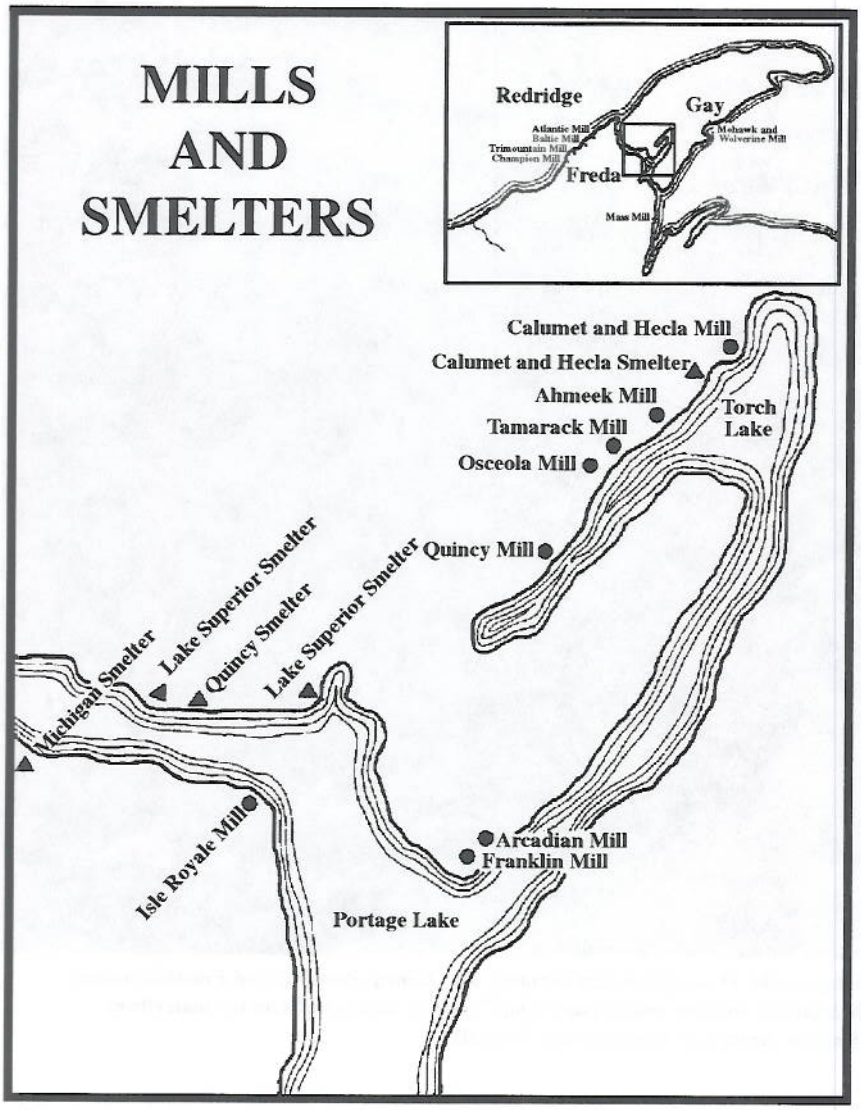


This 1873 bird-s-eye view, overlooking Portage Lake, shows (from left to right) the Quincy, Pewabic, and Franklin mines atop the hill, and the Detroit and Lake Superior smelter and Pewabic and Franklin stamp mills on the waterfront. (Historic American Engineering Record)

stood, among others, the Atlantic, Shelden and Columbian, and Isle Royale mills. On the Hancock-Ripley side of the Portage, the Osceola, Quincy, Franklin and Pewabic companies milled their copper rock. The Portage remained an important stamp mill center until the 1890s, when the mills in the narrow stretch of the Portage at Houghton-Hancock had to shut down and relocate, because they were threatening the navigability of this channel.

Torch Lake served as another very important base of operations for stamp mills. From Lake Linden down to Mason, settlement after settlement on this lake existed for the purpose of milling copper rock. Calumet and Hecla milled its rock here, as did Ahmeek, Tamarack, Osceola, and Quincy. (Some companies' mills moved here after being removed from Portage Lake).

Along several stretches of its shoreline, the greatest of the Great Lakes, Superior, also served as a mill site and tailings dump. At Redridge, the Atlantic mine, beginning in the 1890s, and the Baltic mine, starting early in this century, milled their stamp rock on the Keweenaw's western shore. These two stamp mills, instead of pumping their water up from Superior, as was the norm, created a storage reservoir to serve the mills by damming the Salmon Trout River. Southwest of Redridge, three other small shoreline communities served as stamp mill centers.

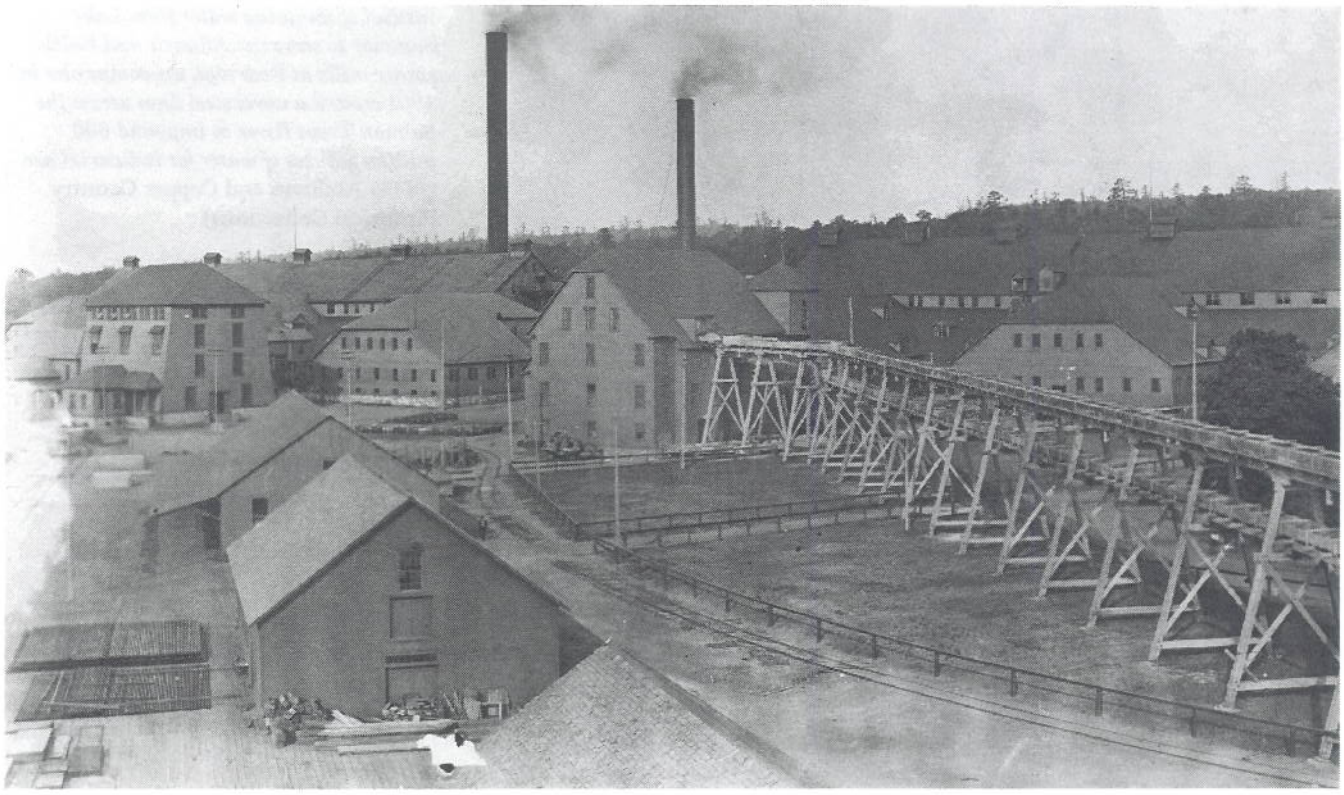


This map shows the major twentieth century stamp mills and smelters located on Lake Superior, Portage Lake, and Torch Lake. (Brian Arneson)

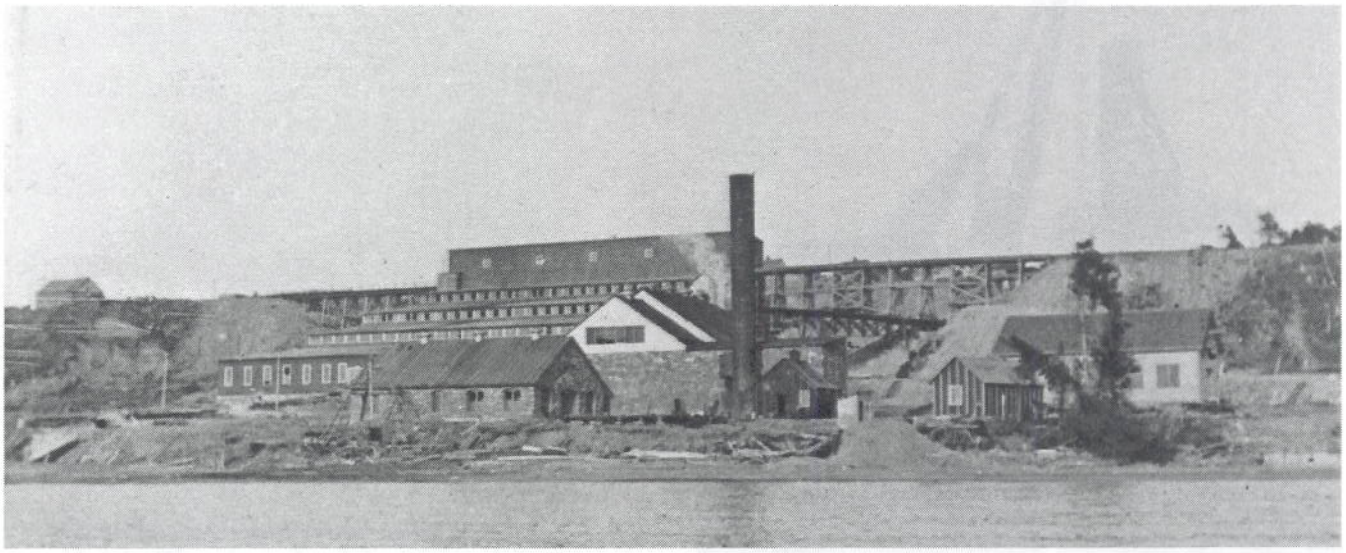
Beacon Hill boasted the Trimountain mill; Freda the Champion mill; and Edgemere the Adventure Consolidated's mill. All three started operations in the 1900-1910 period.

On the opposite or eastern side of the Keweenaw, near the turn of the century the Wolverine and Mohawk mines erected stamp mills at Gay, about halfway between Portage Entry and Lac La Belle. To the south, below Portage Entry and on Keweenaw Bay, the Mass Consolidated Mining Company operated a mill for most of the first two decades of this century. Nearby, a contemporaneous mill, built by the Michigan Copper Mining Company, was completed but never used, as the company's mine in Ontonagon County never produced much stamp rock.

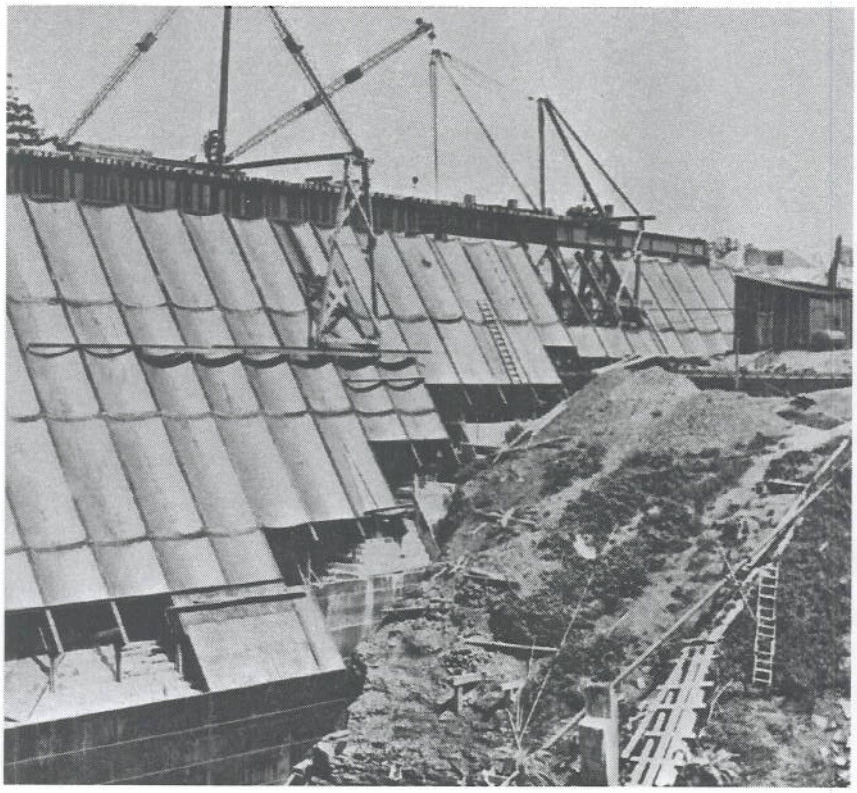
The stamp mills that operated prior to 1915 never captured all the copper contained in the host rock. Much copper washed out of the mills, still bound up in the coarse stamp sands or tailings. Calumet and Hecla, for instance, saw one-fourth of all the copper it raised from its mine end up in Torch Lake. As long as the mills used only gravity separation techniques, there was nothing the companies could do about this. If they went to the expense of grinding the sands more finely, this only liberated copper particles so small and light that they passed right through the concentrating



Calumet and Hecla originally tried to mill its rock near the mine, using a small man-made reservoir as a source of water. But as operations grew, the company came to site this large mill on bigger, deeper Torch Lake, and it connected mine to mill with the Hecla and Torch Lake Railroad.
(MTU Archives and Copper Country Historical Collections)



Copper rock mined in Painesdale traveled by rail all the way out to the Champion stamp mill, located on the shore of Lake Superior at Freda. Rail cars on an elevated trestle dumped their contents into bins at the top of the stepped structure; the rock went to steam stamps and then passed to a collection of washing and concentrating machinery.
(MTU Archives and Copper Country Historical Collections)



Instead of pumping water from Lake Superior to serve the Atlantic and Baltic stamp mills at Redridge, the companies in 1901 erected a novel steel dam across the Salmon Trout River to impound 600 million gallons of water for industrial use. (MTU Archives and Copper Country Historical Collections)

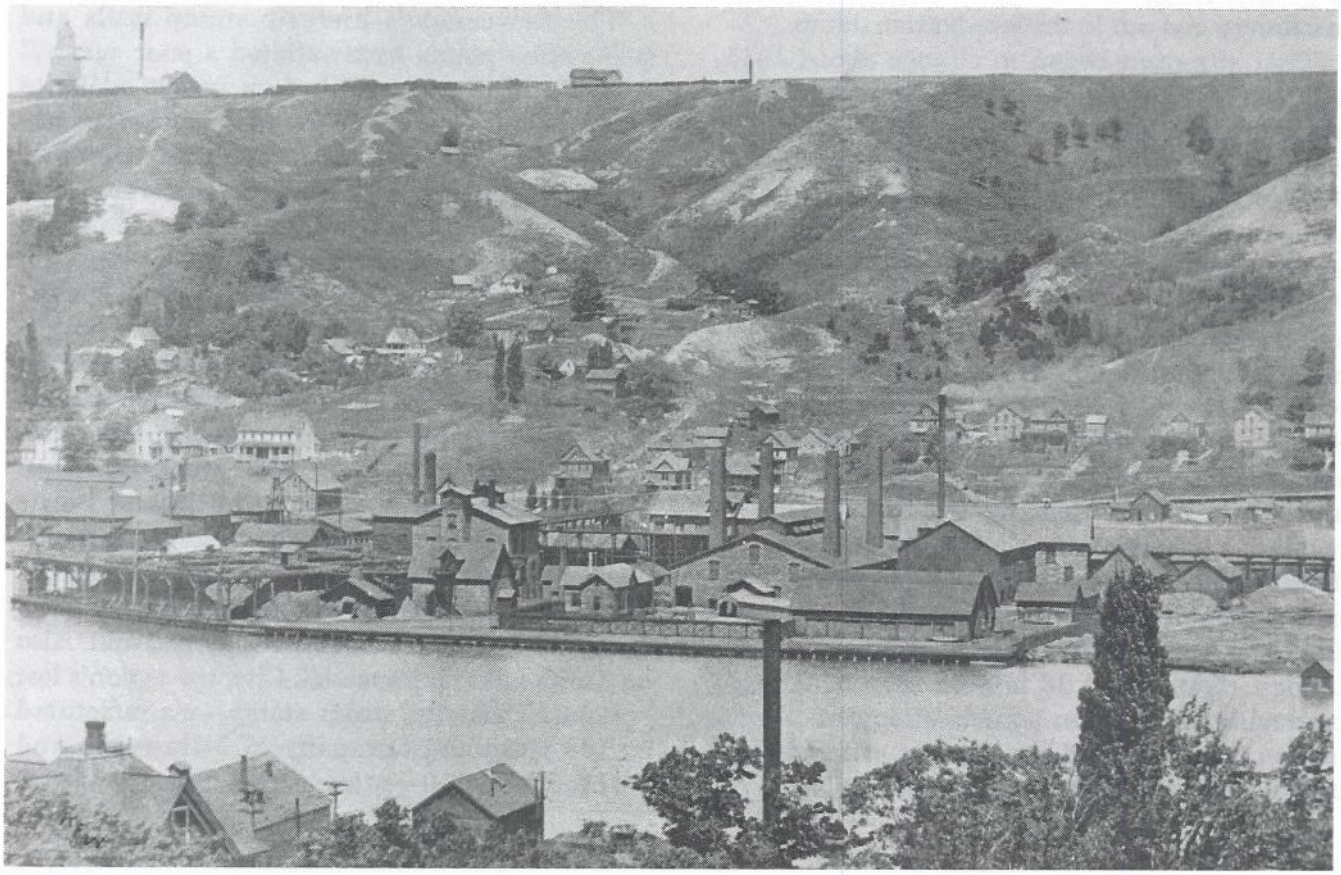
Calumet and Hecla built a suction dredge that could recover stamps sands from 110 feet below the surface of Torch Lake. Taken to a reclamation plant, the sands were more finely ground to release additional copper. (MTU Archives and Copper Country Historical Collections)

machinery and out in the lake-bottom dump.

That situation began to change about 1915-1920, as new copper-capturing techniques involving chemicals, such as flotation and leaching, as well as new concentrating machinery, such as Wilfley tables, started to come into play. Now, companies could capture finer copper, so they could grind their stamp sands to smaller sizes. Also, they could go back to their waste tailings and regrind and reprocess them to capture copper missed the first time. Several companies, starting with C&H and including Quincy and Copper Range, opened reclamation plants alongside their stamp mills. At Torch Lake, for instance, C&H and Quincy used floating suction dredges to retrieve copper sands from the lake bottom. These sands were then reground and treated with new technologies to reclaim copper. Between 1915 and 1952, C&H's reclamation plant at Lake Linden reprocessed 38 million tons of tailings, producing 423 million pounds of copper. Reclamation turned Torch Lake into one of the region's biggest "mines" in the twentieth century.

The Keweenaw's historic stamp mills and reclamation plants have suffered a poor survival rate. Nothing approaching an intact mill site exists. Along shorelines, the most obvious markers of these dead industrial sites are clusters of company houses that once sheltered workers, and expansive stamp sand beaches. Often, concrete pads or foundations mark where stamps and concentrating machinery once stood, and tall smokestacks mark the locations of long-gone boilerhouses. But a few choice remains can still be found. At Redridge, students of industrial archeology can examine both the original timber-crib dam and the later, very rare steel dam that impounded water for the Atlantic and Baltic mills. Near Mason (perhaps the best-preserved turn-of-the-century stamp mill community in the area), Quincy's suction dredge lies beached atop stamp sands not far from an abandoned mill. Also on Torch Lake, at Tamarack City, the region's last remaining massive steam stamp—manufactured by the Nordberg Company of Milwaukee and erected in 1910—stands tall on a concrete

Myriad stacks, most rising from reverberatory furnaces, extend skyward at the C and H smelter in Hubbell.
(MTU Archives and Copper Country Historical Collections)



Quincy's smelter on Portage Lake, shown ca. 1915. Note the deforested hill in the background.
(John F. Campbell)

pedestal above the ruins of the Ahmeek mill. At Lake Linden, the old C&H mill office now houses the Houghton County Historical Society Museum.

Mass copper from the mines and mineral concentrates from stamp mills had to be smelted before going to the copper market. The earliest attempts to smelt the copper on Isle Royale and the Keweenaw failed, and in the 1840s and 1850s companies shipped their copper south and east—as far away as Baltimore and no nearer than Detroit—to be smelted. Only in the 1860s did a large and successful smelting operation begin on the Keweenaw.

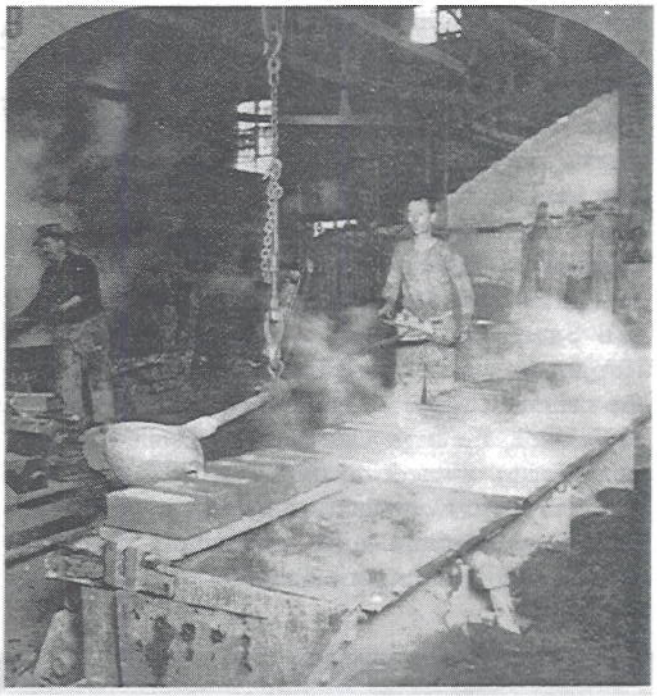
Smelting native copper was basically a melting and casting operation; it required little refining due to the purity of the native copper. Protecting that purity was important, so the smelters used reverberatory furnaces that separated the copper from the coal and prevented contamination. The main structure at any nineteenth century Lake Superior smelter was a furnace building rendered distinctive by the tall brick smokestack penetrating the roof near each of its corners. Inside sat four reverberatory funaces built of fireclay and brick. At one end of each furnace, coal burned in a fire box. A low bridge wall separated the fuel from the mineral and mass copper, which rested in a shallow hearth. Access doors and a flue and chimney stood at the opposite end of the furnace. Heat and flames swept over the bridge wall and reverberated along the hearth before going up the stack.

After the copper reached its melting point, furnacemen opened an access door and skimmed off the slag of molten rock. Using a paddlelike "rabble," they splashed the copper around; this mixed

air into the melt, which oxidized impurities. Then, to eliminate excess oxygen, the furnacemen plunged hardwood poles into the melt; the rapid combustion of the poles agitated the melt, and the wood's carbon combined with oxygen to produce gases that passed up the stack. Furnacemen again skimmed off the slag, then ladled the copper into molds to produce ingots and cakes of various sizes and shapes for different markets.

While nearly every productive mine on the Keweenaw built and operated its own stamp mill, very few mines had a large enough product to justify the cost of building a smelter. Consequently, few smelters were built on the Keweenaw, and these, not surprisingly, were clustered near the midpoint of Houghton County, where the largest mines and mills were.

In 1860-61, the Portage Lake Smelting Works built and began operating the region's first successful, large smelter. This custom smelter, located east of Hancock where the Houghton County Garage now stands, handled the product of many mines. In 1867 it merged with the cop-



Ladling molten copper into ingot molds at the C and H smelter. This early twentieth century photo was paired with another on a card and intended for viewing through a stereoscope.
(Robert Vogel, Smithsonian Institution)

In 1904, the large Michigan Smelter opened a few miles west of Houghton at Coles Creek; the facility handled the output of the Copper Range mines and mills. The smelter office still survives, but the industrial structures have been demolished.
(MTU Archives and Copper Country Historical Collections)

per smelting company operating downstate to form the Detroit and Lake Superior Copper Company. Later, other smelters opened on Portage Lake: one at Dollar Bay (the Dollar Bay Smelting Works merged with the Detroit and Lake Superior smelter in 1890 to form the Lake Superior Smelting Company); one by the Quincy Mining Company at Ripley, east of Hancock on the site of the old Pewabic stamp mill; and lastly, the Michigan Smelting Works, a few miles west of Houghton, which opened in 1904, largely to serve the various Copper Range mines. On Torch Lake, at Hubbell, the large Calumet and Hecla Smelting Corporation opened its works in 1887. All these smelters went to waterfront locations where they were close to stamp mills, and where lake boats could tie up at company docks to take on copper cargoes bound for distant markets.

While a few structures and considerable foundation remains can be found at the historic sites of the Michigan smelter (west of Houghton at Coles Creek), the Detroit and Lake Superior smelter (at Hancock-Ripley) and the C&H smelter (at Hubbell, now occupied by Peninsula Copper Industries), the most intact smelter, to be sure, is Quincy's, which was erected in 1898. Included within the boundaries of the new Keweenaw National Historical Park (although not open to visitors), the Quincy smelter site on M-26, east of the Portage Lake Lift Bridge, still contains its roadside slag pile, furnace buildings, casting machinery, an assay office, machine shop, copper warehouse, office, and other structures.

Copper ingots and cakes stacked up outside Quincy's smelter on Portage Lake, soon to be shipped to distant markets.
(Louis G. Koepel)

9 Other Readings: A Brief Bibliography

If this short volume has sparked your interest in the history of the Keweenaw Peninsula, you can move on from here to a number of other works on the topic. Not listed below, but readily found in bookstores and gift shops on the Keweenaw, are dozens and dozens of short pamphlets penned by local historians. These typically deal with the history of one mine or one community, and they often carry historic illustrations.

Of the book titles listed here, some are in print and others are not; you will have to locate the latter through a library or seller of old books. Some are scholarly and definitive; others are popular accounts that may strike you as more entertaining than authoritative. The list also contains an occasional government document or article in a periodical.

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