

Mining and Metallurgical Section.

(*Stated meeting, held Thursday, March 19, 1908.*)

Notes On Copper Mining in the American Colonies.*

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The possibility of the occurrence of mineral wealth in the New World naturally attracted the attention of the colonists from the very earliest times. Aside from the fool's gold, which in those days entrapped the unwary, as it does even now, the iron ore with which the country abounded was the first object of mining operations. The beginnings of the iron industry have been well told by many writers, but the search for copper, which also commenced in the early days, has received little consideration. The following data, obtained in the course of a study of the copper deposits of Pennsylvania, seem, therefore, worthy of publication.†

The colony of New Amsterdam was started by the Dutch in 1624, but only fragmentary records of events were preserved at first. From the selections of these copied in Brodhead's History of New York, and Hazard's Annals of Pennsylvania, it appears that the earliest mention of copper occurs in 1659, in the following words:

"We lately saw a small piece of mineral, said to have been brought from New Netherland, which was such good and pure copper, that we deemed it worth inquiring of one Kloes de Rutyer about it * * *. He asserted that there was a copper mine at Meenesink and that between the Manhattans and South River was discovered a mountain of crystal."

In Hazard's Register of Pennsylvania, Volume I, page 439, is

*Part I of paper on Triassic Copper Mines in Southeastern Pennsylvania, as presented at the meeting.

†I am greatly indebted to Mr. George W. Geist for calling my attention to several of the publications herein referred to, and embrace this opportunity to express my thanks for his valuable assistance.

an article headed, "Meenesink, Mine Holes, &c.," in which Samuel Preston describes a surveying trip to Northeastern Pennsylvania, taken in 1787, with the express purpose of "learning more particulars respecting the Mine Road to Esopus," and the Meenesink settlement which had been observed by Nicholas Scull and John Lukens on a visit to the region in 1730.

"At Paaquarry Flat, on the Delaware, above the Blue Mountains," he found a settlement, "the inhabitants being all Hollanders," and one of them, Nicholas Depuis, gave him the following account of the mining operations:

"That in some former age there came a company of miners from Holland; supposed from the great labor that had been expended in making that road about 100 miles long that they were very rich or great people; in working the two mines, one on the Delaware where the mountain nearly approaches the Lower Point of Paaquarry Flat, the other at the north foot of the same mountain, near half way between Delaware and Esopus; that he ever understood that abundance of ore had been hauled on that road, but never could learn whether it was lead or silver."

Preston further learned from New York surveyors whom he met that the Mine Holes and Mine Road were recognized by them as "a work transacted while the State of New York belonged to the government of Holland; and must have begun many years before the English occupation, in 1664."

The Meenesink or Paaquarry Flat locality is situated on the Delaware River, nine miles northeast of the Water Gap. The quartzite of the Kittatinny Mountain carries here considerable amounts of copper and silver, which are being exploited, though with little success, at the present day; and below the recent workings the old tunnels driven by the Dutch are still to be seen.

The "north foot of the same mountain" evidently refers to Ellenville, New York, where copper, lead and zinc were actively mined fifty years ago. Here, also, openings of considerable antiquity are known to exist, and, although usually attributed to the Indians, were probably the work of the Dutch, as above described. In fact, since this is the nearer to the Hudson River, the principal path of traffic in those days, it is very likely that it was the first to be discovered. The "mountain of crystal" noted by De Ruyter was no doubt one of the veins of crystallized quartz, so common in the Kittatinny Ridge.

A somewhat similar problem is presented by the Solebury copper mine on Bowman's Hill, two miles south of New Hope, Bucks County, Pennsylvania. From Battle's History of Bucks County the following description is taken:

"The main shaft, running northwest from the entrance, is four feet wide by seven feet high; sixty feet from the entrance it crosses a chamber about fifteen feet in diameter, seven in height, with a stone pillar near the center. The drift extends twelve feet eastward from the chamber. To the right of the latter is the main shaft to the surface, six feet in diameter and about thirty in height, which descends through the chamber to a depth of twenty-two feet; and at the bottom a second drift is encountered extending northward fifteen feet. A tradition concerning the existence of the mine has always been current in the neighborhood. * * It was discovered and explored by John T. Neely in 1854.

"The land was originally seated by William Coleman, sold to a company, by them to Robert Thompson in 1753, reserving the right to dig for copper, lead, or iron ore. * * * There is no evidence that they or any subsequent purchasers made the original excavations. Indian tradition asserts most clearly, however, that 'white men' worked the mine. Who they were, whence they came, and what disposition was made of the minerals they extracted are among the secrets of history."

Now it is true that no mention of this mine is made in the records of New Netherland. But it seems quite reasonable to suppose that the Dutch, guided, of course, by the Indians, traveled sixty miles down the river from Meenesink to seek for ore here also.

That copper mining engaged the attention of the settlers in New England at an early date is generally recognized. Thus in the Records of Massachusetts for October, 1651, we find the following note:

"Upon the request of our present Governor, John Endecott, Esquire, this Court doth graunt him three hundred acors of woodland, tendinge to the furtherance of a copper worke he intends to set up in a place called Blind Hole neere to a farm formerly graunted him, the said land not being formerly graunted, provided he set up his said works within seven years."

It appears, however, that the said works were not set up, for no later mention of this locality can be found.

A more successful enterprise was that near Simsbury, in Connecticut. The deposit was discovered about 1705, and operations were begun in 1709 by the first mining company chartered in America. The results were at first somewhat disappointing, for in 1718 the Records of the Colony say:

"* * * The copper mines within this colony, by the orderly and effectual management of them may in time to come be of great use and advantage * * * although at the present time they be of small advantage to anybody, and a fruitless expense of money to the proprietors * * *."

The later history of the mine,—the coining of the Granby coppers from the metal obtained, and its use as a prison during the war,—is so well described in the various stories of the colony that no further account need here be introduced.

Although the Solebury mine can claim precedence in Pennsylvania, as far as actual date is concerned, the first mines opened by the English (and German) colonists were destined to become of far greater importance. The deposits must have been discovered almost immediately after the first settlement, for William Penn, in writing to Lord Keeper North and other friends in England, in 1683, mentions the existence of "mineral of copper and iron in divers places."

As to the year in which mining was begun local historians are not entirely agreed, and although it is often given as 1720, there are some suggestions of activity at an earlier date. In 1703, the deputies of Penn had granted to Nathaniel Puckle a tract of "four hundred and fifty acres of land fronting on the present northeast line of Limerick, * * * in the southwestern portion of the present Township of Frederick," described as rough and unimproved;* and it seems not improbable that some work was carried on at that time, although it is not until 1722 that we find Roger Edmunds, son-in-law of Puckle, organizing a company to operate the copper mines. This company was unsuccessful, and the next year they were sold out by the sheriff to Andrew Hamilton, Esquire, of Philadelphia. He in turn formed an association among his friends, under the title of the Perkiomen Mining Company, but no extensive development of the property was undertaken until about 1740.

*Bean's History of Montgomery County, p. 843.

Christopher Geist, a German mining engineer, was then brought over to carry on the work, and drove a tunnel westward from the Perkiomen Creek to a distance of over 2000 feet; it there connected with three shafts and with a drainage tunnel opening on Mine Run, which is still accessible and can be followed in for some distance. Sufficient ore was obtained and sent to England to justify its inclusion among the principal exports of the Province of Pennsylvania by Sir Charles Whitworth,* but about 1770 the mine was closed, the property sold and the locality forgotten. Scull's map of Pennsylvania of 1759 shows two mines in this region, the one just described and a "Caledonia mine," about two miles to the northwest, of the history of which nothing is known.

It is, however, not only in the Records of the Province of Pennsylvania that information concerning these early mines is to be found. A German journal, the *Breslau Kunst und Natur Geschichten* (Supplement III, page 46) published about 1720, contains an interesting, though rather rambling and indefinite account of them. In this, particular reference is made to a copper deposit discovered in 1717 on a tract of land called New Hanover, by John Henry Sprogel, the ore from which had been assayed by Herr Marggraff, of Berlin, and found to contain, in four ounces, one ounce of metallic copper and four grains of gold, which the writer, "a learned physician of Frankfurt-on-the-Oder," wisely considers "so strong that it would be safe to neglect the copper and count upon the gold." Sprogel's property is at present the Brendlinger farm, about three miles east of Boyertown; several openings are still visible there, but whether they were made by Sprogel, by Geist, or by later workers is unknown.

The account also states that other mines had been opened about the same time (1717), evidently referring to the Perkiomen mine, above described, and perhaps to the Gap mine, in Lancaster County, which, according to another authority, dates from 1718.† And finally, it mentions the finding of copper "by a moor" on the Schuyler farm, in "West Jersey, ten miles from New Yorck," in 1714. The Schuyler mine therefore antedates these various Pennsylvania mines, with the possible exception of the Perki-

*An account of the trade of Great Britain, London, 1776.

†Doble, C. Annual Report of the Secretary of Internal Affairs of Pennsylvania, 1875.

men; but nothing can be added to the excellent account of it which recently appeared in these pages.*

As a summary of this paper the following table is introduced, including all of the copper mines believed to have been opened in the American Colonies before 1725, with the approximate dates when operations were begun. But as the incompleteness of the records renders the exact order uncertain, the list must in no way be regarded as final:

Ellenville	New York,	before 1650.
Meenesink,	New Jersey,	before 1650.
Solebury,	Pennsylvania,	before 1650.
Simsbury,	Connecticut,	1709.
Schuyler,	New Jersey,	1715.
Perkiomen,	Pennsylvania,	1717.
Brendlinger,	Pennsylvania,	1717.
Gap,	Pennsylvania,	1718.

PRODUCTION OF CORUNDUM AND EMERY IN 1906.

Corundum and its modification, emery, furnish the best natural abrasive known, except diamond, the use of which is limited by its high price, and the purer forms of corundum make an abrasive material which is probably the equal of any of the artificial abrasives. The abrasive quality of emery is determined by the quantity of the iron ore (magnetite or hematite) mechanically mixed with the corundum, being better as the percentage of iron is smaller. The production of these minerals in the United States is limited by the scarcity of the supply and by competition with Canadian corundum, Asia Minor emery, and artificial abrasives.

Corundum has been mined in the United States for abrasive purposes in North Carolina, Georgia, and Montana, but with the exception of a small quantity from Kansas, the whole production in 1906 came from Massachusetts and New York. The output for 1906 amounted to 1160 short tons, valued at \$44,310, as against 2126 short tons, valued at \$61,464, in 1905.

The demand for corundum and emery and other abrasives, natural and artificial, is reported by Douglas B. Sterrett, geologist, United States Geological Survey, in an advance chapter from "Mineral Resources of the United States, Calendar Year 1906," which is now ready for distribution by the Survey.

*Granberry, J. H. The Schuyler Mine. *Journal Franklin Institute*, 164, 1907, 13-28, 217-223.