

XII.—*On the Discovery of Silver in the Mines  
of Cornwall.*

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[The beginning of this Paper was occupied by a history of Silver Mines in different parts of the world, the publication of which is deferred.]

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**S**ILVER extracted from lead has been long known in Cornwall. Carew, in his Survey, says, "Neither hath nature denied silver to Cornwall, and if we may believe our chroniclers reports, who ground themselves upon authentic records, King Edward Ist, and Edward III<sup>d</sup>, reaped some good benefit thereof."\* This account is echoed both by Norden and Borlase. That the silver here mentioned was extracted

\* Survey, page 7.

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from lead, may be presumed from the circumstance of miners having been brought from Derbyshire into Cornwall in the reign of Edward First, to work the silver mines.\* Now the Derbyshire miners were conversant with lead mines only, and would have been no better than the Cornish for other mines.

Small quantities of lead ore, rich in silver, have, from time immemorial, been found in the tin and copper mines, generally in the cross, or north and south lodes ; but the quantity being too small to pay the expense of extracting the silver, it has usually been sold as lead ore.

Some mines near Helston, amongst which were probably Huel Pool, and Huel Rose, were wrought for lead upwards of two hundred and fifty years ago, and the produce was sold merely as lead ore. About eighty years ago, they yielded tolerable profit to the adventurers.

About 1790, Huel Pool was again set at work, and produced lead ore which yielded from thirty to forty ounces of silver per ton, in sufficient quantity to induce the proprietors to erect smelting and testing works for the extraction of the silver ; but the expense was so great as to absorb the principal part of the profit which was actually gained by working the mine. A few years therefore terminated this adventure.

Huel Rose was wrought nearly at the same

\* Pryce, page 69.

time. Its lead ore yielded sixty ounces of silver per ton; but the quantity not being sufficient to pay the expense, this concern was soon abandoned. The silver was extracted from its ore at the works of Huel Pool.

Dr. Woodward\* mentions lead ore, very rich in silver, found at a mine called Guarneck, near Truro, probably that which is now called the Garres. This mine was wrought about 1720, when some of its lead produced one hundred ounces of silver per ton. In 1814 it was again set at work, and continued about two years. During this period it produced eight hundred tons of silver lead ore, containing thirteen parts in twenty of lead, and the lead yielding seventy ounces of silver per ton. The direction of the lode is N. N. E. and S. S. W. Its width is from two to six feet. It is heaved twice by two slides. The ore richest in silver was found between, and adjoining to, these slides, at the depth of about seventy fathoms from the surface. The silver was extracted on the mine.

These are the only modern instances in which silver has been extracted from lead in Cornwall. The silver lead ore found in other mines, after being properly dressed, has generally been sold to Bristol merchants.

The Bishop of Llandaff, in one of his essays, asserts, in substance, that there is no silver

\* Vol. 2, page 29.

produced in Great Britain, but what is extracted from lead.\* This assertion, at the time when he made it, was probably correct. Silver ore and native silver have, however, since been discovered in Cornwall in many instances, independent of lead.

The first discovery of this kind was made about 1788, in a mine in the parish of Perran Zabuloe, which was, in consequence, dignified with the name of Huel Mexico. This was in a north and south lode, which produced some lead rich in silver; and some fibrous native silver was found in the gossan. The adventurers, however, soon learned that a humbler name would have been more suitable to their mine, as the silver, which was first discovered in the adit, continued a very little way under it.

The next instance occurred in the Herland mine, in the parish of Gwinear. A particular account of this discovery, by the Rev. M. Hitchins, was inserted in the transactions of the Royal Society for 1801. The silver was found in a cross course, or north and south lode, and was richest near the point where this lode intersected the copper lode, particularly where the latter was rich in copper ore. It was discovered in the 90, and continued to the 120 fathoms level. Its extent in length was no where above forty-five feet, but it gradually became poorer as its distance from the copper

\* Chem. Essays, vol. 3, page 301.

lode increased. The ore consisted chiefly of vitreous silver ore, arsenicated silver ore, and black oxyd of silver. Some of the latter, called by the miners *goose-dung* ore, contained upwards of 50 per cent. of silver. The specimens of fibrous and capillary native silver have rarely been excelled. The amount of the silver produced in this mine was about £8000. A part of the ore was smelted and tested on the mine, but the cost being considerable, and, perhaps, the proper process not being accurately known, the principal part was sold in Bristol. The miners had a very simple method of assaying this ore. They first calcined it over a kitchen fire, they then placed the calcined ore, with an equal weight of red lead, in a stout iron ladle, and melted it in a smith's forge. The alloy from this melting they afterwards tested.

In Dolcoath, in 1810, some grey silver ore intimately united to cobalt ore, together with a little native silver, were found in the sixty fathoms level in the copper lode, very near a small cross course.

The next discovery of silver ore was made in 1812, in Huel Duchy, near Callington, in a lode inclining to the north-east and south-west, and from one to three feet wide, in which the adventurers were searching for copper. In the adit, silver ore was found in detached lumps, with small bunches of native silver. In the ten fathoms level, there was a regular course

of silver ore, accompanied by native silver, for nearly three fathoms in length, yielding above £200 worth per fathom. This was its richest part. In the twenty fathoms level, some native silver, and bunches of silver ore were found, but the lode had here declined in value. In the next deeper level the silver was exhausted. The ore consisted chiefly of red and grey silver and black oxyd of silver.—The value of the silver produced was about £3000.

Silver has been found in very small quantity in some other mines.

In Huel Alfred, in 1813, some native silver was found, appearing as if plated on the copper ore; but in so small a quantity as not to be worthy of notice on any other occasion.

In 1813 also, silver was discovered in Huel Basset in Illogan, in a cross course. The copper lode here has an east and west direction, and at the twenty-eight fathoms level, (or thirty-eight fathoms from the surface), is two feet and a half wide, and very productive of yellow copper ore. The cross course is about four inches wide, bears south-east and north-west, and intersects the copper lode without heaving it. The silver ore was found in the cross course, at and near the point of intersection; and although very rich whilst crossing the lode, it gradually declined in value as it left the lode, and at the distance of six feet on each side, it almost wholly disappeared.

A specimen of the ore from this mine will shew that, although accompanied by galena, it is a distinct grey silver ore; and, what is a little extraordinary, the galena, although so closely connected with rich silver ore, contains very little silver. No native silver has been found in Huel Basset; but some of the ore yielded six hundred ounces of silver per ton.

Huel Ann, in Phillack, furnishes the next instance. In 1814, a small bunch of blackish grey silver ore, containing a great deal of arsenic and spathose iron, and accompanied by native silver, was found in the sixty-five fathoms level, in an east and west copper lode. In the seventy-five fathoms level, the silver ore appeared in the midst of the copper lode, as a separate lode, from two to five inches wide, between distinct walls of quartz. Some fine specimens of fibrous native silver were found in this level; but these, as well as the ore, proved of very short duration.

The last instance in which silver has been discovered in Cornwall, occurred in Wills-worthy mine, (which, indeed, may be said to be rather on the border of Devon) in 1815. The lode here is about twelve inches wide, bearing N.N.E. and S.S.W. and underlies two feet and a half per fathom to the south. In the ten fathoms level, a vein of white and amethystine quartz divided the lode: between this vein of quartz and the lower, or northern wall of the lode, was found a vein of rich

arsenical cobalt ore, combined with native capillary silver, in a ferruginous matrix, from three to six inches wide. The space between the vein of quartz and the higher, or southern wall of the lode, was occupied by a vein of rich yellow copper ore, from six to nine inches wide. The silver continued about two fathoms in length. The copper was not so soon exhausted. The specimens of native silver from this mine have eclipsed all that have ever before been found in Cornwall, both in size and beauty.

The mines of Cornwall in which silver has been found, have been, without exception, in killas or argillaceous schistus.

The circumstances in which silver has been generally discovered in Cornwall, should induce the miners to pay more attention to the component parts of cross courses, or north and south lodes, than they have been hitherto accustomed to bestow on them. The Herland mine, already mentioned, furnishes a case in proof of the utility of a stricter examination of these lodes. When the principal cross course was discovered to be rich in silver, search was made in several others for this precious metal, and the result proved its existence in a neighbouring course, called, from its reddish colour, the Rusty Cross Course. It would certainly be wise to subject the contents of every cross course which may be discovered



in pursuing an east and west, or copper lode, particularly of that part of it which immediately intersects the copper lode, to an assay for silver, or even to a general analysis. The expense would be trifling. The result might be important.