

## Clive Mine

**Location** - Western outskirts of Clive village (SJ51392386)

**Minerals** - Cobalt and copper

**Working Life** - Known working life : 17th century-1869

### **History 1 ("Clive Copper Mine", Neal Rushton, draft SCMC Account)**

It is impossible to say when copper deposits were first worked on the hill but, if copper ore was exposed at surface in a rock outcrop, its obvious green colour might have attracted early miners. Elsewhere in the country, it has been proved that copper was mined in the Bronze Age as one of the constituents of bronze. A Mr Samuel Wood, surgeon from Shrewsbury, also suggested in 1862 that the Romans had mined at Clive but he had no evidence for this. If such early mining did take place, any workings have been destroyed by later operations and there is no proof that mining took place at Clive during these early periods of history.

Initial working of the copper probably took the form of "Open Cut" works along the length of the vein, where the mineral could be found at the surface. It is impossible to prove when this first started but it is known for certain that adjacent mines were extracting copper in the 17th Century. It would have been necessary to dig the holes deeper as the copper was removed and eventually the open workings would have become unsafe. The only way then was to sink shafts and mine the copper at depth. It should be mentioned that this early mining was often carried out as a part-time activity by small groups of farmworkers. At that time, it was common for farmworkers to be laid off over winter and, since there was no other source of income, mining copper kept their families fed until Spring. The surface would thus have been divided up into numerous areas, all worked by different groups.

The earliest underground workings were called "bellpits" because the shape was like an inverted bell. The shaft would be about 3ft in diameter at the top and it would be enlarged into a chamber at the bottom when the copper deposits were reached. Small passages would be driven from the chamber but they wouldn't go more than a few feet due to lack of ventilation. Since the only means of lighting was tallow candles or grease lamps, the air in the workings would rapidly become too foul to work in. In some cases, the extent of bellpit workings was limited to that where daylight could penetrate from the shaft, thus removing the need for artificial lighting and its attendant ventilation problems. When a bellpit became impossible to ventilate, it was abandoned and a new one sunk a few yards away, the waste rock being thrown down the old shaft.

It is often thought that bellpit shafts were linked underground but evidence suggests that this was not the case. It was common for adjacent bellpits to be

worked by different groups and they would jealously guard their workings. Any connection would allow the neighbouring miners to creep in and steal their copper! The visitor to Clive Mine will see a number of these old shafts in the roof of the currently accessible workings but they were undercut by the later workings rather than being connected earlier.

It was fortunate for the miners that sandstone was relatively easy to break down with picks, hammers and chisels. They had no explosives in those days and they had to dig the shafts and levels by hand. If they were lucky, there would be cracks or weaknesses in the rock in which they could place a wedge and break off large pieces. If not, they had to wear it away with chisels and picks. The remains of the old shafts still show pick marks and the beautifully squared shape testifies to the pride and skill of the old miners. Old tools dating from the 17th Century were found in the mine during the last period of working but these have now all gone.

By the start of the 18th century, a change in working methods seems to have taken place. The old piecemeal working had been abandoned and attempts made to develop the workings in more efficient manner. The earliest known record is that a mine at Clive belonged to Thomas Spendiloves who bequeathed it to his son John on his death in 1703. The latter then leased it to Roger Atcherley in 1711. There is also, however, a reference to a Drepewood or Threapwood Mine in the area which was worked in 1710 by Thomas Oswin. This suggests that there may actually have been two separate mines working the same deposit, reflecting land in different ownerships.

A letter dated 19th January 1739 from John Spendiloves to a Mr Bresner at Droitwich supports this suggestion. In it, Spendiloves says "... There is on Vernon's land at Clive part of a copper mine which I will help to sell.... I would also like to see a mine lease that Mr John Payne has ...". There is also a separate reference to an eminent copper prospector from Ireland who had mentioned this one yard wide vein of copper "green and gritty", containing gold, which was proposed for development by Roger Atcherley in 1711. This lease of the Spendiloves copper mine specified an area one mile around Grinshill Church.

This seems to indicate that there were mine workings on both Vernon's land and Spendiloves'. Since Spendiloves was offering to help sell the Vernon part, it indicates that they were originally worked separately and that Spendiloves was trying to sell both as a job lot. Atcherley thus seems to have leased Spendiloves' part of the mine from 1711 and Oswin leased Vernon's part from 1710. If Spendiloves was trying to sell the mine, it indicates that Atcherley had either ceased working or his lease had expired. Since leases were commonly granted for 25 years, it could have expired in 1736 and left the mine standing idle for 3 years. Spendiloves interest in a lease held by Payne could indicate that the latter had taken over the lease of Vernon's mine from Oswin. Since he was trying to contact Payne, it suggests that Payne was not actively working his part of the

mine and perhaps Spendiloves hoped to negotiate transfer of the lease so both mines could be sold as one.

The significance of a lease "one mile round" the church is as follows. In 1568, Queen Elizabeth I chartered two organisations to encourage home production of copper. These were the Company of Mines Royal (who had a monopoly on copper mining in Cornwall, Devon, Gloucestershire, Worcestershire, Westmorland, Cumberland, Lancaster and York) and the Company of Mineral & Battery Works (who had the monopoly in all other counties). They either engaged in mining operations themselves or granted licences in return for a royalty. During the 16th century, their mining activities decreased and they failed to encourage the copper industry as they were set up to do. As a result, there was great discontent amongst landowners and miners and a number of illegal copper mining operations were set up in opposition. Even when official licences were granted to mine copper there were encroachments, with some trying to extend workings up to five miles around the given spot. The Company of Mineral & Battery Works (which controlled Shropshire) therefore set their own rules such that nobody should have a right to mine on "first asking" and also imposed a limit of working of one mile from the focal point, say a church or a stake. Eventually the monopoly of the two Companies was taken away by two Acts of Parliament in 1689 and 1694.

The mine was probably worked on a small scale for many years until 1862, when a new venture was attempted. In September of that year, Articles were executed between William Henderson (manager of British Metal Extracting Ltd and company chemist for Alderley Edge Mining Co Ltd) and James Thomas Harris. In these, Henderson agreed to sell to Harris all his rights and interests in or near Clive, viz 3 undivided 1/5th shares presently leased from Robert Gardner of Sansaw Hall for 21 years from 25th March 1862. It is not known who held the other two 1/5th shares of the mine but this might even have been Harris himself. Henderson also agreed to sell to Harris a free licence under the former's patent for improvements in treating certain ores and alloys.

On 7th October 1862, Robert Gardner granted a 21 year lease of the mine to James Thomas Harris, Kendal Coghill and John Coghill. The lessees undertook to pay £4 per acre every half year for the first 10 years of the lease, together with 1/15th of all copper ore raised. For the remainder of the lease, they would pay 1/12th of all copper ore raised. The lease specifically excluded field number 245, which is interesting since on an estate map dated 1882 this field is described as "The New Mine Spoil Bank and Plantation".

A clue comes from a comment in the later lease which states that "Harris, Coghill and Coghill still stand to be possessed of the mines for the residue of the 21 years". It is possible that Henderson leased only the area of field number 245, perhaps using it for experimenting with his copper reclamation process. When the new partnership wished to take over the whole mine, they would have had to

buy out Henderson's lease of field number 245 and then negotiate a separate lease for the rest of the property. To put things on a clear footing, Gardner could have backdated the later lease to March 1862 (the same as Henderson's), hence the comment about the partners possession.

The later lease allowed the lessees to search for and extract copper mines, veins, beds, nests and bunches of copper ore, mineral ores and metallic minerals on parcels of land indicated. Clauses were inserted to facilitate buildings, de-watering, etc and as little damage as possible was to be done. The mines were to be measured and dialled (surveyed) and sections kept. Gardner had the right to inspect the mine and have access to the land, as well as being informed of the weights of copper ore extracted.

There was also a clause specifying that, within 3 months of finishing mining operations, the lessee must "sollar" all pits and shafts as ought to be kept open to the depth of, or at least 12ft below, the level of the deepest adits communicating thereto. The meaning of this term is not clear but it seems to refer to ensuring that the important shafts were kept open to below adit level so that access to the workings could be maintained for future lessees. The lessee also had to fill up and safely cover all excavations, pits, shafts, etc not required by Mr Gardner. This is a fairly standard part of a mining lease which tried to ensure that an abandoned mine did not become a danger to the landowner's stock but was still able to be re-opened at a future date. Present day evidence suggests that the abandoned shafts were not filled in as required but such clauses were always difficult to enforce after mining operations had ceased. The adit mentioned in the lease may be the same one indicated on the 1901 Ordnance Survey map, incorrectly labelled as for ironstone.

The format of the lease seems to suggest that it was used to construct additional leases of the mine, although there is no evidence that they were ever operational. It would appear that there had been sufficient previous mining to necessitate such an elaborate lease and that the lessees had great expectations.

As soon as Harris and the two Coghills had obtained the lease, they set about forming the Clive Copper Mining Co Ltd under the Companies Act 1862. The Memorandum of Articles & Association state that "The company shall have the right to purchase, to take on lease or tenancy, working mines of copper or other mines situate near Clive and for ... reducing, refining, melting by acids or otherwise the ores from mines and to sell the same". The initial capital was £10,000 in £1 shares, made up as :-

Samuel Morris 4,499  
Kendal Coghill 2,249  
Sir John Coghill 2,050  
F Phillips 1,000  
H Somerville 200

James Thomas Harris 1  
Basliff 1

The fact that Harris was one of the original partners but only held 1 share indicates that he perhaps contributed practical mining knowledge to the enterprise rather than capital. The original partners would do well out of the deal since they would have received payment from the new company for selling their lease and also became shareholders into the bargain.

Three years later in 1865, the company was offering the lease for sale at £4,000 and it was bought by the New Clive Mining Co Ltd. Most of the shareholders of the new company were from Birmingham and they spent a great deal of money in developing the mine but "did no good".

During 1868, the main drawing shaft was deepened to below the lower tramming level, a depth of 183ft, and a borehole continued from its base. This then became a well that supplied water to the estate and it is still in use today. Mining operations had certainly ceased for good by 1869 when the acid leaching tanks were sold to a mine in Wales.

Up to the end of the 18th century, the "old men" had only removed the solid deposits of copper ore since they didn't have the ability to separate the copper where it was intermingled with sandstone. The 19th Century miners possessed better technology and thus not only re-worked the areas mined previously but also took a greater proportion of the ore out. This has left large voids called "stopes" in the upper level which have destroyed most of the earlier workings. They have also truncated the old bellpit shafts, which can be seen entering at roof level.

This secondary working included the use of modern techniques such as drilling and blasting, as well as wagons and tramways to transport the ore. Remains of sleepers and powder barrels were found when the mine was re-discovered. Underhand stoping methods were also used, where ore was mined from below the haulage level. This was labour intensive and meant that the miners had to overcome gravity, as opposed to overhand stoping where ore was mined above and gravity used to bring it down to the haulage level.

The lower levels contain no mineralisation but there is evidence of the use of rails, tubs and blasting. It is thus likely that they were developed at the same time as the underhand stopes mentioned above and that ore was thrown down to the lower levels to be transported to the shaft. The upper and lower levels were connected by internal shafts called winzes but there are no remains of the ore chutes which must have been installed in these to control the loading of tubs some 25m below.

Once at surface, the copper ore had to be treated to make it suitable for sale to the smelter. Since the smelter only wanted copper ore, the miners had to remove this from the sandstone where it was intermingled. Large pieces of pure copper ore could be picked out by hand but the rest had to be crushed and separated. In early years, the technology did not exist to do this but William Henderson's patent for acid-leaching almost certainly extended the life of the mine and enabled extraction of a large percentage of the 3.5% copper present in the intermingled ore.

The intermingled ore was crushed to produce pieces less than 25mm in size and placed in the tanks. Dilute hydrochloric acid was poured onto the ore and this dissolved out the hydrated copper minerals. The tanks had false bottoms covered with brushwood and straw, which allowed the hydrochloric acid to pass through and be collected. Every two hours the acid was poured back in and the process repeated until the acid was saturated and no more copper could be dissolved. The acid was then fed into precipitating tanks where pieces of scrap iron and cuttings of tinsplate were added, causing copper to be released from the solution and replaced by the iron. The copper collected on the base of the tank as a dark brown solid, this was removed, dried and sold as a precipitate averaging 75% copper. At other mines, the remaining solution was evaporated to produce a cobalt concentrate but it is not known if this was done at Clive. There were 24 acid-leaching tanks in use at Clive but it is not known where they were sited. They were sold to Van Consols Lead & Barytes Mining Co Ltd in 1869 when Clive Mine closed and were used to process barytes at their Bryntail Mine. The latter site is now the Clywedog Dam and visitors are able to walk around a mine trail and view the tanks in situ.

## **History 2 ("Mining in Shropshire", Geoff Warrington)**

Further east is the village of Clive and here lies the largest known copper workings in this area, known as Clive Mine. There are several small handpicked shafts leading into shallow workings and this suggests that this part of the mine is very old, perhaps dating from the 17th century. The number of shafts and their spacing also suggests that these were separate small scale workings, perhaps worked on a part-time basis by farm workers who were laid off in winter. There is a reference to a Drepewood or Threapwood Mine in the area which was worked in 1710 by Thomas Oswin. There is also a reference to a Spendiloes Mine near Grinshill Church which Roger Acherley proposed to develop in 1711.

The mine was probably worked on a small scale for many years until 1862 when the Clive Copper Mining Co Ltd was formed to acquire the mine. Three years later the company was offering the lease for sale at £4,000 and it was bought by the New Clive Mining Co Ltd in 1865. Most of the shareholders of the new company were from Birmingham and they spent a great deal of money but "did no good". The workings are still accessible to experienced mine explorers and the company's activities can be seen. The upper level in the mine was enlarged

to produce chambers up to 20ft wide and 30ft high. This broke into the bottom of the older workings and the old shafts can now be seen from below. As it went north, the copper deposit in the upper level eventually ran out and was not found again, despite desperate searching. A lower level was cut but there is very little trace of mineralisation at this depth. The lower level connected to surface by a shaft which was deepened when the mine closed to form a well.

By 1869 the ore had run out and the company was selling off the mine's equipment, including a set of stone troughs for precipitating copper. Some of the latter went to the Bryntail Mine in Wales where they may still be seen as part of an interpretation by the Water Authority. Since the copper ore was intermixed with the sandstone, it was crushed and covered with hydrochloric acid in the stone troughs. This dissolved out the copper and the liquid could be passed to other troughs containing scrap iron. The copper steadily precipitated on the iron which was eventually removed so the copper sulphate could be scraped off. From the excavations in Clive Mine, it has been estimated that 20,000 tons of rock was removed producing 200 tons of copper metal.

### **Surface Remains**

There are a number of shafts into the workings and many of these are old shallow ones which date from the early working of the mine. The Rubbish Shaft is in the wood opposite Mine House and has been capped with a locked lid. Well Shaft is in the building in front of Mine House and was converted to a well by deepening the shaft after working ceased. All other shafts have either been filled or capped.